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FOOD PLANNING AND MONITORING UNIT
MINISTRY OF FOOD
GOVERNMENT OF THE PEOPLE'S REPUBLIC OF BANGLADESH

**STUDY ON SUBSIDIES
IN
PUBLIC FOOD GRAIN DISTRIBUTION SYSTEM IN BANGLADESH**

FINAL REPORT

EUREKA (Bangladesh) Ltd.

Consulting Firm
48/1/1 Shidheswari Lane,
D H A K A.
Phone: 40 81 11

OCTOBER, 1986

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(SPONSORED BY FPMU UNDER USAID TECHNICAL ASSISTANCE GRANT)

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P R E F A C E

The Government of Bangladesh has long been pursuing a policy, mainly, of consumers welfare in respect of foodgrain distribution. Accordingly a large amount of food subsidy has to be given with a particular intention to safeguard the interest of consumers falling under low income groups.

The continuance of subsidy on PFDS and its justification has been questioned seriously in view of growing need for resources in the development of the country. Nevertheless the issue of subsidy has become controversial one from donors' as well as recipients' point of view. Although present PFDS involves a heavy cost, it can be structured to benefit the majority poor by doing away with the urban biased distribution policy. Side by side the element of food security should also be judged outside the narrow economic considerations. Thus it is desirable to bring about a harmonious link between the two contrasting consideration of welfare and monetary gain.

In the backdrop of the situation, Ministry of Food, (GOB) under its Food Planning & Monitoring Unit has launched this study which has been undertaken by us. The study has been accomplished primarily through collection of data by field survey as also the review of available studies of similar nature, holding periodical sessions with the learned members of the Functional Committee headed by Secretary Finance and analysing extensively the relevant data/information collected from various sources.

It would be quite clear from our deliberations and analyses that the present method of subsidy calculation, by all considerations, is inadequate to reflect the resource position vis-a-vis explaining utilization by the beneficiaries. Exhaustive studies were made on the subsidy issue, classes of people enjoying the subsidy and the ways how these resources affect the government as

also the people. An attempt has been made therefore, to review the existing inadequacies and inefficiencies of the current food management. Our findings, we believe, will open up a new direction for adopting policies regarding subsidy. It is also worth-mentioning here that there is no change of viewing food sector without going into social welfare considerations which have been overshadowed in the mere accounting exercises. In the report standard methods have been suggested, very carefully, to calculate the subsidy in PFDS with alternatives along with a set of recommendations so that different social and economic considerations are reflected.

I am extremely grateful to Mr. M. MUSTAFIZUR RAHMAN, Secretary, Ministry of Finance & Chairman, Functional Committee of the study, the learned MEMBERS OF THE FUNCTIONAL COMMITTEE and the USAID MISSION in Bangladesh. For their wise and kind decision we were honoured to conduct such a valuable study. We were also immensely benefited in accomplishing this study by their valued contributions during the periodical review meetings and their written comments on the Draft Report.

Successful completion of this study was the result of co-operation of many individuals. It is difficult therefore, to write an individual acknowledgement to each of them. But I must appreciate with gratitude the cooperation and services of Messrs A.K.M.KAMALUDDIN, SECRETARY, MOF; ALAMGIR FAROOQ CHOWDHURY, D/G, Food; M.A.L.MATIN, Jt. Secretary, Finance; GOLAM MOHIUDDIN, Addl. D/G, Food; and their subordinate officials who were instrumental in supplying us huge quantity of relevant data as also listening and replying patiently to our lot of queries on different aspects of the study.

I owe a special word of gratitude to MR. GIASHUDDIN, Section Chief, FPMS and his OFFICIALS whom I used lavishly in establishing access to the investigating points both in the field and in

different Ministries & Directorates. Their timely and prompt response, in the matter and also making us available relevant data, helped a lot in conducting the study smoothly.

I will not be faithful to my duties if I fail to express my heartfelt thank to DR. A. H. SHAHADATULLAH, Team Leader of the study, who organised and guided the other team members very efficiently. He also took much pain in editing the whole report critically and with utmost care.

Finally I would submit, most humbly, that the outcome of the study is a mere diagnosis, not any treatment. If I have been able to sensitise the authorities to the need of appropriate treatment I will consider that my efforts have not gone in vain.

Dhaka, the 30th October,
1986


(HAFIJUR RAHMAN, Ph.D.)
Project Manager
&
Managing Director
EUREKA (Bangladesh) Ltd.

ABBREVIATION

ADP	:	Annual Development Plan
AG	:	Accountant General
BIWTC	:	Bangladesh Inland Water Transport Corporation
BIDS	:	Bangladesh Institute Development Studies
BBS	:	Bangladesh Bureau of Statistics
C & F	:	Cost & Freight
CV	:	Coefficient of variation
CSD	:	Central Storage Depot
DG	:	Director General, Food
DW	:	Durbin-Watson Statistics
EP	:	Essential Priority
FAQ	:	Fair Average Quality
FM	:	Flour Mill
FPMS	:	Food Planning and Monitoring Secretariat
FFWP	:	Food For Works Programme
FAO	:	Food and Agricultural Organisation
GOB	:	Government of Bangladesh
GR	:	Gratuitious Relief
HS	:	Household Survey
IC&T	:	Inspection, Control & Training
IFPRI	:	International Food Policy Research Institute
LC	:	Letter of Credit
LSD	:	Local Supply Depot
LEI	:	Large Employees' Industries
MR	:	Modified Rationing
MT	:	Metric Ton
MOF	:	Ministry of Food
OMS	:	Open Market Sale
OP	:	Other Priority
PFDS	:	Public Foodgrain Distribution System
SR	:	Statutory Rationing
VGFP	:	Vulnerable Group Feeding Programme
WFP	:	World Food Programme
WQSC	:	Weigh Quality & Stock Certificate

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EXECUTIVE SUMMARY

A. GENERAL:

1. The present study - "Study on Subsidies in Public Food Distribution System in Bangladesh", has been undertaken by EUREKA (Bangladesh) Ltd. under an assignment from the Ministry of Food. Public food distribution started as a rationing system in 1943. After 1971 the existing 12 channels are regrouped into two primary classes on the basis of pricing system, namely, into monetized and non-monetized channels. Food distributed through the Public Food Distribution System has changed both in quantity and composition. Quantity distributed during the Second Plan (1980-85) varied between 15.2 lakh tons and 25.6 lakh tons; the share of non-monetized channels (e.g. food for works) has increased from 20.7% in 1979/80 to 35.6% in 1984/85 and the proportion of wheat from 83.5% to 99.3% over the same period.

2. Within the monetized channels (e.g. Statutory Rationing) there has also been increased emphasis to reduce the gap between procurement cost and sales price. This has been attempted by reducing the share of costlier food element i.e. rice by increasing sales prices and by containing access of population to such channels. Ration cards which covered 67% of SR area population in 1980 covered only 49% such population in 1985. Their number even declined from 36.9 lakhs to 33.7 lakhs over the same period.

3. Entitlement of food has been reduced from 4 Sr. per head in 1976/77 to 2 Sr. now. Share of rice in ration entitlement was reduced from 62.5% in March, 1976 to 33.3% in May, 1980 and to 25% in December, 1981 and the quantity of rice from 2.5 Sr. to 1.0 Sr. and to 0.5 Sr. respectively.

4. Ration price of rice (SR/MR) has been increased from Tk.90 /md. in 1976/77 to Tk.140 in 1979/80 and to Tk.268 in 1984/85 and the gap with the domestic procurement price was reduced from Tk.32 /md. to Tk.30 in 1979/80 and to Tk.20 in 1984/85. In case

of wheat ration price was raised from Tk.107.6 /md. (average) in 1980/81 to Tk.167 in 1984/85 and the domestic procurement price from Tk.113.3 /md. to Tk. 165. In relation to procurement cost, both internal and external, including incidental cost, proportion of ration price (SR/MR) increased from 38.4% in 1980/81 to 74.4% in 1984/85 in case of rice and from 78.5% to 93.3% in case wheat.

5. In spite of narrowing gap between procurement cost and sales price budget subsidy increased from Tk.109 crore in 1980/81 to Tk.244 crore in 1984/85 as per the revised budget estimates. The increase was due to both increase in the volume of food distributed - from 1472 thousand tons in 1980/81 to 2650 thousand tons in 1984/85, and increase in subsidy from Tk.740 per ton in 1980/81 to Tk.920 /ton in 1984/85. Since the revised budget is primarily based on estimates, actual outlay on and receipts from the distribution of food appear to be different. In 1984/85 actual subsidy was Tk.247 crore against the revised budget estimate at Tk.244 crore and per ton (rice & wheat taken together) subsidy was Tk.963 against revised budget estimate of Tk.921.

B. FINDINGS:

1. Of the total food subsidy of Tk.247.2 crore, some Tk.210.56 crore was on account of food distribution through the monetized channels and Tk.36.62 crore only was on account of nonmonetized channels. Because of the shift in share between the two sets of channels in favour of non-monetized channels, in recent years share of the latter in the subsidy amount has increased from 9.15% in 1982/83 to 14.82% in 1984/85 - from Tk.21.98 crore to Tk.36.62 crore. Within the monetized channels subsidy on account of EP channel has increased from Tk.47.53 crore (19.74%) in 1982/83 to Tk.64.39 crore (26.05%), followed by MR accounting for subsidy of Tk.58.14 crore (24.21%) in 1982/83 and Tk.49.52 crore (20.03%) in 1984/85 and OP where subsidy amount was Tk.45.14 crore (18.80%) in 1982/83 and Tk. 41.65 crore (16.85%) in 1984/85. Statutory Rationing incurred a subsidy of Tk.28.38 crores (11.44%) in 1984/85 against Tk.40.74 crore (16.96%) in 1982/83, showing a substantial decline.

2. Besides the estimation of subsidy between channels its allocation between urban and rural population was also attempted. The effort followed two courses - one, according to the characteristic of channels and another based on household survey. According to the former method, which allocated the channels between the urban (e.g. SR, EP, LE and FM) and rural (e.g. MR and FFW) sectors, either wholly or partly, the amount of subsidy going to the urban sector was Tk.153.65 crore in 1984/85 against Tk.93.35 crore going to the rural sector. Shares of the two sectors ^{remained} almost stable between 1982/83 and 1984/85. In 1982/83 urban sector enjoyed 63.52% (Tk.152.44 crore) of total subsidy (Tk.240 crore); its share slightly declined to 62.20% (Tk.153.65 crore) in 1984/85.

3. In urban areas, according to the household survey conducted for the study, out of an average household consumption 1.57 md. a month, 0.39 md. or 24.8% was received from the Public Food Distribution System. Against this in the rural areas household food receipt from PFDS was .03 md. /month (1.6%) only out of a total monthly consumption of 1.89 md. /month. For the country as a whole average monthly consumption was 1.75 md. per household of which 0.20 md. (11.6%) was accounted by PFDS. The survey shows poor accessibility of the rural population to PFDS. In urban areas 13.6% of rice and 59.0% of wheat consumption were accounted by PFDS.

4. The survey also reveals that the lowest income group (upto Tk.499 monthly income) is most dependent on PFDS for rice - 9.6% of its consumption coming from PFDS. Corresponding shares for income groups, Tk.500-1499 and above Tk.4000 were 23% and 9.0% respectively. Taken wheat and rice together, dependence (percentage of household consumption) of the income groups, Tk.500-1499 /month was 3.9% against 14.4% in case of higher income groups like those of Tk.4000-5999 and Tk.10,000 - 19,999.

5. Nutritional impact of PFDS was based on observation of health condition of the children and adult members of families surveyed classifying the households first into two groups, having access to PFDS or other-wise and then according to income level. Within the same income level both the adults and children were better off in terms of health condition in households having access to PFDS. In case of children the situation was worse than with the adults.

6. Since the budget estimates of subsidy is primarily based on cash flows with some imputed values for food received under food aid and food distributed under non-monetized channels prices as well as costs of transportation and handling was required to be closely examined to eliminate arbitrary pricing and excessive costs and wastages from estimation of subsidy. This has led to an adjustment of budget subsidy. Three sets of adjustments were found necessary: first for food received from aid donors for which donors' domestic market price rather than world market price was used; secondly, for food purchased on cash-cum-deferred payment basis which also tends to show some variation from world prices and thirdly, for external and internal handling and transportation cost and losses, the latter including storage loss.

7. Food received under food aid and purchased under cash-cum-deferred payment arrangements was valued at international prices for each of the three years, 1982/83, 1983/84 and 1984/85. Domestic procurement prices of rice and wheat were also adjusted to the world price level for those year. In these years adjusted value was lower than the budget numbers by Tk.70.56, Tk.26.40 and Tk.68.79 crores respectively.

8. Freight, handling and transportation costs were also adjusted. International freight rate was used for imports. With respect to domestic incidental cost, the items entering into such cost were examined separately in 3 groups, namely, cost of handling, loss in handling and in transit and godown losses. Since there are no competitive information on these components, like international freight, an analytical approach was followed to identify the

contribution of various factors to different components of incidental costs. For this purpose a godown survey was undertaken to collect information on (i) transit and godown losses, (ii) mode of transportation, (iii) frequency of consignment and despatches, (iv) season of movement, (v) godown types and sizes, (vi) vintage of godown and existing facilities, (vii) inspection frequencies, etc. Sample weight of bags was also taken. Besides calculation of statistical averages for all the components of incidental costs, econometric method was used to identify factors' contribution.

9. Overhead cost was analysed by using the volumes of local procurement, import and distribution as explanatory variables. Average cost tends to decline with increase in the volume of local procurement and distribution but increase with the increase in international procurement. As PFDS has an extensive internal net-work in existence, it is rational to expect such behaviour of overhead cost.

10. Similarly average cost of storage is found to vary inversely with local procurement and distribution volumes and directly with import. Since overhead and storage costs are incurred for the system as a whole a multivariate analyses was necessary to identify impact of procurement, import and distribution on such cost.

11. Transport cost analysis shows that average transport cost falls if more quantity is moved by railway, followed by water transport and road transport in order of comparative economics. If one ton of food is moved by railway by switching from road transport about Tk.20 /ton can be saved in transport cost; corresponding saving from water to railway switching is Tk. 7 only and from road to water, Tk.13.5 /ton only.

12. Transit loss was estimated both statistically and econometrically from data collected through godown survey. Average transit loss was found to be statistically highest in railway, followed by road and water transport respectively. Percentage of loss was 1.30, 0.52 and 0.41 over the three modes respec-

tively. Average loss was 0.87% by all means including boats and carts. There is tendency towards reducing transit loss with increased frequency in consignment, but seasonal variation in transit loss does not appear to be distinct. The econometric analysis of transit loss according to mode of transport, distance, quantity and frequency shows that with increase in quantity and frequency, transport loss increase and with distance and railway mode in declines.

13. Storage loss was explained by godown type, size, number of consignment, inspection frequency, moisture content and frequency of despatch/sales. Generally bigger size godowns tend to raise loss; so also frequency of sales; on the other hand inspection frequency reduces loss. Improved godown construction reduces storage loss, while moisture content increases it. Increase in the volume of sales also reduces godown loss.

14. Incidental costs were adjusted on the basis of efficiency estimates so that only true cost is charged to the consumers. Adjusted subsidy came to be Tk.199, Tk.262 and Tk.146 crores in 1982/83, 1983/84 and 1984/85 respectively against the corresponding actual subsidy of Tk.240, Tk.317 and Tk.247 crores. Subsidy on rice was Tk.98, Tk.79 and Tk.41 crores in those successive years against the actual subsidy of Tk.118, Tk.96 and Tk.70 crores respectively. Corresponding numbers for adjusted subsidy on wheat were Tk.101, Tk.183 and Tk.105 crore against the corresponding actual of Tk.122, Tk.224 and Tk.177 crore. The adjusted subsidy was then allocated to various channels and between urban and rural areas on the basis discussed earlier.

15. Since international prices, in the calculation of economic subsidy, is not relevant so long as food cannot be sold in the international markets, economic subsidy was estimated on the basis of domestic prices. This was particularly carried out with a view to assessing the likely impact of elimination of subsidy for the public sector employees. For this purpose shares of the public employees in various channels were estimated. In case of SR this

was done on the basis of card holding. It was found that in 1984/85, out of the total subsidy of Tk.210.6 crore in actual, Tk.119 crore was on account of public employees and public sector establishments. Thus the share of the public sector was 37% only. On the basis prices prevailing in the markets as alternative opportunity for acquisition of food the economic subsidy in the public sector came to be Tk.68.6 crore, most of it (Tk.63.6 crore) being on account of EP channel.

16. The study also looked into the question of compensation to public sector employees in case subsidy is withdrawn. Since subsidized food is viewed as a transfer of income/compensation in kind, only income effect of any increase in price of food under PFDS become relevant. To estimate income effect and substitution effect a household survey was carried out; later on households were grouped into 3 classes namely, low income, middle income and high income. The two effects were estimated through econometric estimation of price elasticity and income elasticity for each of the 3 groups, rice and wheat separately, substitution elasticity was derived from price and income elasticity and income effect from these two elasticities. Compensation to public employees for income effect comes to Tk.1.8 crore only.

C. RECOMMENDATIONS:

1. Subsidy for imported and local grain should be calculated through appropriate adjustments in cost for inefficiencies. Adjusted subsidy should be clearly arrived at by valuation of grain at international price - preferably average of say 3 such exporting countries' price and actual cost of procurement in case of domestic procurement with adjustments for incidentals and handling costs.
2. In calculating subsidy distribution of food through non-monetized channels, namely, FWP, VGF and Relief should be charged at full cost so that cash subsidy for account of monetized channels is correctly accounted for.

3. Since EP as well as OP cover both households and establishments, it is recommended that food subsidy be adjusted through departmental budgets.

4. The unit and total subsidy on Public Foodgrain Distribution may be reduced in phases.

5. The existing PFDS may be restructured and changed/mixed with welfare consideration particularly the maintenance of nutrition level and in that case the present rationing approach should be replaced by "TARGET GROUP" approach.

6. VGr, FFW, GR and even some MR recipients should be treated as target groups in order to ensure nutrition level. Given the economic status and purchasing power of these consumers, the level of subsidy for MR may be determined.

7. It may also not be undesirable to abolish the SR channel altogether from the PFDS.

8. A budget is both a plan and an instrument of control. It loses its effectiveness unless performance is evaluated in relation to the plan objectives and criteria with utmost promptitude. It is essential to have a dependable system of finding the historic costs for the purpose. Thus, the urgency of developing and installing one/^{such} could not be too strongly emphasized.

9. In a trading budget, as in the context of food trading by the state, indication of opening and closing stocks of foodgrains with their valuation would enhance the element of budgetary control.

10. In the interest of budget stability, it is worth considering whether the operation of the food budget should be separated from the revenue budget making it totally dependent on bank borrowing except for one final adjustment for budget subsidy as is the practice in some South East Asian countries.

11. From budgetary/accounting point of view a uniform rate of issue price for EP/SR/MR/OP channels appear to be more equitable. It would also reduce the inequity of the existing system.
- 12.. The possibilities of cost reduction for bank charges and stock losses under operational expenses should be given a serious thought.
13. If the present level of subsidies is withdrawn from almost all the channels, there may be a generation of additional resource which can be transferred to development budget. Money thus saved may be allocated in development programmes exclusively on agricultural production, nutrition & child welfare, rural infrastructure, etc. This new step, suggested, is likely to give better and more visible welfare service to the target group.
14. Uniform weighing and bagging system should be introduced throughout the country so that physical verification becomes easier.
15. In the subsidy calculation handling, storage, & other losses should be charged against operation cost and there are enough scope to reduce it.
16. In order to increase the efficiency of the management of stock and thus to reducing stock loss various measures have been recommended.
17. To reduce transit loss dependance on Railway has to be reduced and truck as a substitute with accountability should be preferred as usual mode of transport, unless Railway would improve their trafic/commercial management.
18. Control of loss at port point deserves special attention, since loss of foodgrain is, reportedly, about 5 times of storage loss and 2.4 times of total storage and transit losses combined together.

19. Since the godown life of all grains handled through PFDS are not the same, maximum shelf life of the grain (may be, 3 months for wheat, 4 months for rice and 6 months for paddy) should be ensured.

CHAPTER - I
HISTORY AND STRUCTURE OF PFDS

1.01: INTRODUCTION:

1.01.1: Scale of Operation of PFDS:

Public Food Distribution System, shortly known as PFDS has grown into a powerful tool in meeting two needs of the country - accelerating production of food cereals towards food self-sufficiency and satisfying the food entitlement of people. First is being addressed by PFDS through procurement of food grains at incentive prices and the second through distribution of food at prices which people can afford. At the extreme end of the latter are free feeding of vulnerable groups and free distribution of food at time of distress. In 1984/85 for example 348.8 thousand tons of food grains were procured out of domestic output at a cost of Tk. 181 crores, in addition, as in 1984/85 government procured 2589 thousand tons of food from outside, partly under aid and partly under commercial purchases. Thus, the total quantity of food procured internally and externally amounted to 3013 thousand tons valued at Tk.151.8 crores. On the other hand, PFDS distributed 2562 thousand tons in 1984/85. Because 1984/85 was a year of natural disasters / both procurement and distribution were above their normal levels in the range of 1600-2000 thousand tons and 1500-2000 thousand tons respectively. That the government has to quickly respond to food emergencies due to natural calamities make such shifts in procurement and distribution of food enhance the importance of PFDS rather than reduce it. This is reflected in the huge stock of food that PFDS is required to maintain to meet emergency situation.

1.01.2: But it has a cost to the government exchequer as cost of procurement and distribution of food far exceeds, the sale price of food grain under PFDS. In 1984/85, the financial cost to the budget called budgetary (or cash) subsidy amounted to Tk. 250 crores. The amount of such subsidy was however the highest in 1984/85, the year being a bad year from the point of natural disaster, recurrent floods first followed by a cyclonic storm which devastated a large tract of coastal land; but it had been above Tk.150 crores in the preceding 3 years.

1.01.3. The Nature of the Subsidy Problem:

The government has been pursuing a policy of reducing food subsidy with a view to mobilizing domestic resources and has been also largely successful in narrowing down the difference between procurement and distribution prices, though the overall level of subsidy is still high. The question of subsidy reduction raises welfare issues and hence, distribution of subsidy between different socio-economic classes having access to different channels of distribution of PFDS. The problem is sharpened by the fact that different prices are charged for food distributed through different channels raising issues of equity and nutrition in the distribution of subsidized food. Further as subsidized food implies income transfer in kind, it constitutes a fringe benefit and therefore a compensation for services rendered by public sector employees. Because the questions of equity, nutrition and income transfer on the distribution side of PFDS and production incentive of procurement subsidy appears as a complex issue. The issue is further complicated by the differences in prices between the domestic market and world market and between world prices and prices at which food under aid is received. It is look into these issues of food subsidy that the government of Bangladesh has initiated the present study and appointed EUREKA (Bangladesh) Ltd. to undertake the study on its behalf under its letter No. 1056 ME/FD/FPMS-27/83 dated 22.11.1984.

1.01.4. Terms of References:

The terms of references for the "Study on Subsidies in Public Food Distribution System in Bangladesh" is as follow:

- (i) To determine the economic price of foodgrain distributed under PFDS showing separately each for imported and locally procured foodgrains.
- (ii) To estimate present level of subsidy given in foodgrain both in rice & wheat separately taking into account the mode of procurement.
- (iii) To determine the share of subsidy given to each channels of PFDS.

- (iv) To identify socio-economic groups showing the extent of benefit enjoyed by each group in rural and urban areas.
- (v) To calculate the present cost of the foodgrain with break down of its components including the capital cost and suggest measures for reducing them.
- (vi) Estimate total sale proceeds and the amount available for reinvestment.
- (vii) To estimate the extent of loss of foodgrain in handling, transport, stock and deterioration in any other way and suggest maximum allowable limit for each category.
- (viii) To assess the impact of subsidy on -
 - (a) Production of foodgrains;
 - (b) Loss of income of the farm families;
 - (c) Level of consumption of foodgrains of different socio-economic groups in rural and urban areas.
- (ix) To determine actual and imputed value of subsidized foodgrain distribution through food for works and other non-monetized channels.
- (x) Estimate the amount of finance required to components the loss of the benefit derived by the salaried officials of the Govt., Semi-Govt. and Autonomous Bodies from subsidized rationed foodgrain supply in case of elimination of existing subsidy.

1.01.5. Plan of the Study:

Chapter one of this study introduces the scope of study starting from the genesis of the problems and its development, both quantitative and qualitative. Second chapter is devoted to the critical evaluation of existing method of estimation of budgetary or financial subsidy. Third chapter suggest alternative methods of estimation of budgetary subsidy. Fourth chapter addresses the sources

of losses and evaluates such losses against the standard prescribed by the government and those obtained in the neighbouring countries and suggest ways and means to reduce the loss. It argued that loss due to inefficiency should not be treated as subsidy. Fifth chapter analysed the cost from the point of its minimisation. It argued in the similar fashion of chapter Four that the loss that could be avoided through efficiency improvement should not be treated as a part of subsidy to the extent. Sixth chapter has treated subsidy in a different way than that dealt in Chapter Two and Chapter Three. It dealt subsidy from economic point of view. Here opportunity cost of PFDS food grain was assumed as the ruling market price of the country - not the international price for obvious economic reasons. Estimation of price elasticity, income elasticity and substitution elasticity were estimated in this chapter suggested for different income groups to measure the effect of increase in the prices of foodgrain of PFDS on different income group and also estimate amount of compensating income that would keep the welfare level unchanged particularly for the public sector employees and the level of domestic output. Seventh Chapter contains recommendations of the study which emerge from the discussion of various problems related to procurement, transportation, storage and distribution of food under PFDS.

1.02: PFDS ; CURRENT STATE - BENEFICIARY GROUPS, VOLUME, BUDGET:

1.02.1. The distribution of foodgrains by the Government, commonly known as ration system, started during the Bengal Famine of 1943 has expanded rapidly since 1971. Prior to 1971 only five channels of distribution existed which has now increased to twelve such that the "ration system" has come to form a part of a more comprehensive system called the "Public Foodgrain Distribution System" (PFDS) and the volume has increased from 7.2 lakh tons in 1964/65 to 25.62 lakh tons in 1984/85. The distribution of food under different channels is shown in the following table to be followed by a detailed discussion on each channel.

Table : I - 1

CHANNEL-WISE DISTRIBUTION OF FOODGRAIN

Year	SR	MR	All Priorities (EP, OP, LE, FM)	MO, OMS	VGF & Relief	FFW & CD	('000' tons)
							Total
1	2	3	4	5	6	7	8
1974-75	471	578	554	-	161	-	1764
1975-76	359	496	584	11	110	116	1676
1976-77	377	288	551	58	33	166	1473
1977-78	451	353	753	6	30	255	1848
1978-79	417	312	754	52	45	216	1796
1979-80	492	385	907	121	57	440	2402
1980-81	313	179	601	-	50	349	1522
1981-82	307	483	656	155	70	365	2036
1982-83	303	362	636	116	83	404	1904
1983-84	293	399	641	158	120	440	2051
1984-85	266	464	711	209	340	572	2562

Source: Ministry of Food.

(i) Statutory Rationing (SR):

It was initially started in the non-producing but densely populated cities. By now the cities of Dhaka, Narayanganj, Chittagong, Rangamati, Khulna and Rajshahi are covered under this programme. But from 1974 only the newly appointed Government, Semi-Government and Autonomous Bodies' servants are entitled to get the ration card as new holder though some of the above cities experienced a rapid increase of population. As a result the proportion of ration card holders to total population declined as shown below:

Table : I - 2

YEAR-WISE POPULATION & RATIONCARD HOLDER

Year	Population	Ration Card	%
1	2	3	4
1980	55,18,231	36,91,347	67%
1981	57,58,693	36,63,805	64%
1982	60,12,034	35,51,924	59%
1983	62,74,014	34,95,320	56%
1984	66,34,126	35,2,450	53%
1985	69,26,870	33,72,920	49%

Source: BBS & Ministry of Food.

But with the increase in food price and increasing gap between ration price and procurement price the government also decided to reduce entitlement so as to reduce the burden of subsidy. As a result off-take in SR has decreased.

At present SR channel covers about 36 lakh of people. Card holders are served on weekly basis. Present weekly quota for adult card holder is 500 grams rice, 1500 grams wheat and 200 grams sugar. For infant card holder the share is half of adult, except for sugar.

In 1973-74 about 5.02 lakh tons were distributed which gradually decreased. In 1984-85 the quantity was only 2.66 lakh tons. In 1973-74 the share of SR was 29% which declined to only 10% of the total off-take in 1984-85. The quota of rice and wheat has also undergone changes several times. Table below shows the composition entitlement for the last few years:

Table : I - 3

CEREAL QUOTA PER CARD HOLDER UNDER STATUTORY RATIONING

(In seers per card holder)

Period	Total Cereals quota	Share of		Rice, Wheat Ratio
		Rice	Wheat	
1	2	3	4	5
Oct. 16, 1976 - March 4, 1977	4.00	2.5	1.5	5 : 3
March 5, 1977 - Dec. 2, 1977	3.00	2.00	1.00	2 : 1
Dec. 3, 1977 - May 2, 1980	3.00	1.5	1.5	1 : 1
May 2, 1980 - Jan. 2, 1981	3.0	1.0	2.0	1 : 2
Jan. 3, 1981 - Dec. 11, 1981	2.5	0.75	1.75	1 : 2.5
Dec. 12, 1981 - Present	2.0	0.5	1.5	1 : 3

Source : Ministry of Food.

(ii) Modified Rationing (MR):

It is mainly operated in those areas of the country which are not covered by SR. The eligibility for MR is in principle inversely related to income of the rural people. The rural people are classified on the basis of tax payment into A,B,C,D classes and accordingly foodgrains, edible oil, sugar, etc. are distributed dependent on their availability giving first priority to 'A' class who in the bottom in the income group. In the post independence period the share of MR was highest. In 1973-74 the share of MR was 45% of the total distribution. Later on distribution gradually decreased. But recently as a policy matter the distribution in MR has increased for the greater benefit of the rural poor. In 1980-81 distribution under MR accounted only 12% of the total distribution; 1984-85 it stood at 18%. With increase in volume, the share of rice and wheat has reversely changed in recent time. In 1980-81 wheat and rice distribution was 86 and 93 thousand tons; in 1984-85 wheat distribution was 3.40 lakh tons and rice was only 1.25 lakh tons. Through MR foodgrain is distributed once in a month. About 65 lakh people are benefited through MR at different point of time in a year.

(iii) Essential Priorities (EP):

This group includes members of defence and law and order enforcing organisations, hospital patients and residents of student hostels and orphanages. The requirement is determined by the receipt as per their demand. The prices of foodgrain under EP are less than from other categories. Off-take under EP has been more or less constant. During the last five years it varied between 0.90 to 1.10 lakh tons accounting for 4% to 5% of the total off-take. Compared with other channels of off-take rice constitutes a greater proportion. Table below shows the year to year distribution of rice and wheat.

Table : I - 4
OFF-TAKE IN ESSENTIAL PRIORITY

Year	Total Dist- ribution	Rice	Wheat	Rice/Wheat Ratio
1	2	3	4	5
1980-81.	88	53	35	1 : 0.6
1981-82	100	61	39	
1982-83	99	60	39	
1983-84	108	66	42	
1984-85	113	69	44	

Source: Ministry of Food.

(iv) Other Priorities (OP):

All employees of Government, Semi-Govt./Autonomous and Nationalised Bodies including teachers of all categories who are resident outside the Statutory Rationing areas are served under this system. The recipients are usually served twice a month. Off-take under OP also increased over the years. In 1972-73 off-take was only 1.63 lakh tons which increased to 3.87 lakh tons (137%) in 1984-85. The share of wheat is more than 3 times of rice. Presently, about 51 lakh people are served under this channel.

(v) Flour Mills (FM):

The automatic and compact flour mills are given some allocation of wheat under this channel. Earlier price was same as statutory ration price and now the open market sales price is followed for this purpose. Flour is sold to bakeries for making loaf, biscuit, semai, etc. At present 15000 tons of wheat are allocated for flour mills per month.

(vi) Open Market Sales (OMS):

Open market sales commenced in 1979-80. Under present operating procedures OMS is initiated through grain dealers when retail market prices are 15% above the procurement price of rice and 20% of wheat. The grain is usually sold at a price approximately half the way between the ruling market price and the OMS trigger price.

1.11.2: Fertilizer distribution in last few years have undergone a rapid increase. In 1974-75 only 2.79 lakh tons of chemical fertilizer was distributed which stood at 12.62 tons in 1984-85. The

(vii) Marketing Operation (MO):

Under this channel foodgrain is sold through rationshops at SR prices. The beneficiaries do not need card for entitlement. The marketing operations comes in operation only when market price goes up suddenly. In 1984-85 only 8 thousand tons of foodgrain were distributed under MO.

(viii) Large Employers(LE):

The establishments with more than 50 workers outside the SR areas are served under this channel. The workers get 33 kg. of wheat per month. Some time rice is also given to them. At present 2.42 lakh industrial labourers get this facility. In recent years about 60-70 thousand tons of foodgrain were distributed under this channel annually. In 1984-85 the off-take under LE was 63 thousand tons compared with 31 thousand tons in 1980-81.

(ix) Food For Works (FFW):

In 1975 this new concept of providing food against some specific work was introduced in the rural areas to provide temporary employment. The projects are drawn by the Union Parishad by forming project committees. The Upazila finally scrutinise and sends them to Relief Ministry for approval. Water Development Board also under take projects under FFW Programme. Earlier it was limited to only earth works, now construction (mainly bridge, culvert, etc.) involving cash outlay has also been included. It covers about 20-25% of the total off-take. In 1984-85 off-take under FFW was 5.71 lakh tons compared with only 1.16 lakh distributed in 1975-76 (7% of the total off-take). Mostly wheat is offered for the work. Only a negligible quantity of rice was distributed in FFW. 10-12 crore man-days yearly are utilised under this programme. The male worker gets 3 seers of wheat for 70 cft. of earth work and the female workers gets the same amount for 50 cft. earthwork.

(x) Canal Digging (CD):

At present this channel is not in operation. Canal digging like FFW is an employment generating work with emphasis on agricultural

production. At the beginning of eighties 5-10 thousand tons of food were distributed under CD.

(xi) Gratuity Relief (GR):

In case of any natural calamities people are provided with a specific gratuity of foodgrains for a short period under this channel in order to overcome distress and save life. Just after liberation off-take in GR was substantial but presently its volume depends on the extent of natural hazards. In 1971-72 about 4.21 lakh tons of food-grain was distributed as GR followed by 2 lakh in 1972-73. During eighties it was only 20-30 thousand tons except 1984-85 fiscal year when it stood at 1 lakh tons.

(xii) Vulnerable Group Feeding (VGF):

The helpless poor mother and children are provided food under this category of distribution through local government institution like union parishad. It is one of the Govt. policy to help the rural poor to overcome the nutritional problem. The listed mothers get the foodgrain once in a month. Presently they get 33 kg. wheat per month. Now about 10-12 lakh mother/children are benefited under VGF programme. In the year 1984-85 about 2.31 lakh tons foodgrain were distributed in this channel.

1.03. COMMERCIAL AND NON-COMMERCIAL ASPECT OF PFDS:

1.03.1. The foodgrain distribution broadly classified into two groups (a) commercial (monetized), (b) non-commercial (non-monetized). Under monetized channels (SR, MR, CP, EP, LE, FM, OMS, MO) the Ministry of Food distributed foodgrains. On the other hand Ministry of Relief and Rehabilitation distributes through non-monetized channels (FFW, CD, VGF, GR) as relief. The year-wise distribution in these two groups of distribution were as follows:

Table : I - 5 -
YEAR-WISE DISTRIBUTION IN MONETIZED & NON-MONETIZED CHANNELS

Year	('000' tons)		
	Monetized	Non-monetized	Total
1	2	3	4
1976-77	1274	199	1473
1977-78	1563	285	1848
1978-79	1535	261	1796
1979-80	1905	497	2402
1980-81	1123	399	1522
1981-82	1596	435	2031
1982-83	1417	487	1904
1983-84	1491	560	2051
1984-85	1650	912	2562

Source : Ministry of Food.

The share of non-monetized off-take increasing as much stress have been given in FFW programme which alone constituted about 20-25% of the total off-take.

1.04. RURAL AND URBAN SHARE OF PFDS :

1.04.1. As per policy of the government the system of rationing have been benefiting the rural poor gradually. The distributional pattern changing in favour of rural poor. The Table below shows the share of rural and urban distribution:

Table : I - 6
SHARE OF OFF-TAKE IN RURAL AND URBAN AREAS

Year	Urban basis (%)	Rural basis (%)	Total (%)
1	2	3	4
1976-77	67	33	100
1977-78	65	35	100
1978-79	68	32	100
1979-80	64	36	100
1980-81	62	38	100
1981-82	55	45	100
1982-83	55	45	100
1983-84	53	47	100

Source: Ministry of Food.

1.05. ORIGIN OF PEDS - FROM GREAT FAMINE TO LIBERATION:

1.05.1. Famine of 1943:

The industrial revolution around Calcutta immediately after First World War and the establishment of military bases during the Second World War led Calcutta to occupy a position of priority consumption area. But the war condition and the famine as a result of the cyclone in October, 1942 that swept over Bengal resulting in crop failure led the Govt. of Bengal to make arrangements for distribution of food-grains, food-stuffs, kerosine and other essentials through a system of controlled distribution on the basis of economic groups establishing priority lists of families. Initially, this food operation was carried out by the local govt. through Food Committee consisting of 12 members comprising the bureaucrats, advocates, politicians, teachers, public representatives, etc. (for every block of 100 houses or so). In support of this distribution programme the Deptt. of Civil Supplies was set-up in 1943 and the "Foodgrain Enquiry and Control Order 1943 with powers to make enquiries and to take census" was passed.

1.05.2. With the deterioration of the food situation and rocketing of prices of foodstuff, government also adopted a policy of price control. Organisation of relief throughout the province was also undertaken to avert famine and the food committees were brought both into relief as well as price control works. In all the important urban areas of the then province of Bengal rationing of all controlled commodities was introduced out of which subsequently some areas were retained as Statutory Rationing Area. In the rural areas a modified scheme of rationing was introduced in 1944 where distribution was made after classifying the families into three economic groups - A, B & C based on the payment of tax. A being the lowest income group. In both the rural and urban areas the ration quota for rice was fixed at 2 seers per person per week and the total quantity of foodstuff (rice, wheat, flour, millets, etc.) that may be given to any person shall not exceed 4 seers per person per week. The quota, in areas which though deficient but produce substantial quantity of food, was limited to 2 seers only. If supplies ran short, every family was to get proportionately less.

1.05.3. The food crisis of 1943 that brought into being a network of food & relief committees throughout Bengal also prompted the idea to set up consumers' co-operative stores at the union level to solve many of the then age-long issues of people.

1.06. PFDS AFTER PARTITION:

1.06.1. The Government of Pakistan inherited the Civil Supplies Department from the Government of Bengal after the partition of India in 1947. The channel of distribution was limited to Statutory Rationing Area and Modified Rationing Area. The Statutory Rationing Area comprised the municipal area of Dhaka, Narayanganj, Khulna and Chittagong. But a new channel was introduced as Essential Priorities under the civil supply department to meet the supplies for Defence Forces, Jail, Police and other para-military forces. In course of time orphanage and other groups were covered under this channel. Rationing system had always been considered as income support to the industrial workers and government servants; hence the other priority group channel had been opened to cover the government servants and workers in the non-SR areas.

1.06.2. However, at one stage in 1956 considering the production and its growth rate in both the wings of Pakistan the Food Department was abolished and the rationing system was withdrawn. But this created repercussions in the form of price hike of foodgrain and resentment among the workers and government servants equally. So the government had to re-establish the department and all the district headquarters were taken up as SR areas for a short period. The rationing system had always been in favour of the consumer if the ration price and market price of foodgrain are compared. This is shown below in a table:

Table : I - /
AVERAGE PRICE OF FOODGRAIN IN MARKET AND RATION

Year	Rice		Wheat	
	Ration Price	Market price	Ration Price	Market Price
1	2	3	4	5
1949-55 (average price)	19.00	35.00	18.00	NA
1957-69 (average price)	20.00 27.00	39.00 74.00	19.38 20.00	NA NA
1969-74	31.00	92.00	26.00	60.00
1974-75	70.00	244.40	50.00	150.00
1975-80	105.00	210.00	95.00	130.00
1980-84	190.00	260.00	130.00	145.00
1984-85	269.00	300.00	173.00	200.00

Source: Ministry of Food,
 Directorate of Agricultural Marketing.

1.07. PERIOD OF REHABILITATION:

1.07.1. During the War of Liberation all sectors of the economy were affected and million of families were displaced. So a major rehabilitation programme was undertaken after the independence which include the reconstruction of roads, bridges and rehabilitation of displaced families. The problem of food deficit was accentuated by transportation and handling problem.

1.07.2. The major problem was the operation of relief programme. The monthly average off-take during 1972-73 was 2.18 lakh tons which is the highest record of off-take and at one stage the stock of grain came down to 1.36 lakh tons in the month of December, but was soon replenished. However, the average stock during the year under discussion was 3.22 lakh tons. The relief operation was supplemented by a number of NGOs and the Freedom Fighters also worked with the government food department in order to maintain the situation within control.

1.08. BEGINNING OF TRANSFORMATION - LOOSENING THE HOLD OF MARKET LEVY:

1.08.1. To support distribution of foodgrains and stock build-up the internal procurement scheme was introduced from 1944. Different methods were adopted in different years for the internal procurement of rice and paddy. They fall in the following broad categories:

- (i) Compulsory procurement under a statutory order.
- (ii) Voluntary procurement with cordoning and border drive.
- (iii) Voluntary procurement without cordoning the border drive.
- (iv) Border drive.
- (v) Monopoly purchase.

(i) Compulsory Procurement:

Under this system a large producer was required to sell a portion of his produce to government at the given price. Quantity of paddy to be delivered was levied at certain rates depending on the size of each family's holding.

(ii) Voluntary Procurement with Cordoning:

In order to intensify internal procurement, the surplus districts used to be cordoned prohibiting movement of foodgrains from surplus areas to deficit areas. The price were artificially pushed down to the government price set at uneconomic level for the farmer.

(iii) Voluntary Procurement without Cordoning:

Under this method any body can sell rice/paddy to government at a price fixed by the government for procurement of foodgrain. This system has become the normal procedure now.

(iv) Border Drive:

This is an anti-smuggling measure intended to prevent smuggling of rice and paddy across the border, Under this scheme the surplus stock of the producing family residing within 5-mile border-belt are procured under the Foodgrains (Disposal and Acquisition) Order, 1948.

(v) Monopoly Purchase:

Under this scheme, directives are issued on the Major Rice Mills prohibiting them from purchase of paddy for any purpose other than for sale of the resultant rice to government at predetermined price.

Method of procurement undertaken in the various years in the past had been different which is reflected in the table given below:

Table : I - 8

BASIS OF FOODGRAIN PROCUREMENT IN BANGLADESH (1958-59 to 1984-85)

Year	Procurement Basis					Total
	Voluntary	Border	Levey	Advance purchase	Other	
1	2	3	4	5	6	7
1958-59	180.1	12.5	-	-	24.8	217.4
1959-60	11.6	9.0	-	3.5	0.1	24.2
1960-61	12.2	9.1	-	5.0	-	26.3
1961-62	2.1	6.0	-	2.0	-	10.1
1962-63	0.1	3.9	-	0.1	-	4.1
1963-64	95.3	11.4	-	4.0	14.0	124.8
1964-65	3.4	6.4	-	0.1	2.5	12.4
1965-66	7.0	-	82.0	-	3.0	92.0
1966-67	0.9	6.4	0.1	-	-	7.4
1967-68	12.0	9.4	-	-	0.4	21.8
1968-69	2.6	6.7	-	-	0.1	9.4
1969-70	2.1	4.0	-	-	-	6.1
1970-71	3.0	2.0	-	-	1.0	6.0
1971-72	-	-	-	-	-	-
1972-73	0.05	-	-	-	-	0.05
1973-74	48.5	16.3	-	5.3	0.7	70.8
1974-75	-	-	-	-	128.0	128.0
1975-76	415.0	-	-	-	-	415.0
1976-77	314.0	-	-	-	-	314.0
1977-78	550.0	-	-	-	-	550.0
1978-79	355.0	-	-	-	-	355.0
1979-80	348.0	-	-	-	-	348.0
1980-81	1016.7	-	-	-	-	1016.7
1981-82	298.0	-	-	-	-	298.0
1982-83	190.8	-	-	-	-	190.8
1983-84	266.4	-	-	-	-	266.4
1984-85	348.8	-	-	-	-	248.8

Source : Ministry of Food.

1.08.2. It would appear from the official figures on procurements of foodgrain that the maximum procurement was 10.16 lakh tons in 1980-81, and the minimum was 50 tons in 1973, in terms of rice and other. Under the system of levy the maximum procurement was 1,22,432 tons in 1949. During the year of 1966 when country was at war wide universal levy system was introduced, the procurement was 92,000 tons only. The wide variation in the procurement was mainly due to crop condition and prevailing prices. During the year 1974-75, the method of procurement was compulsory, aided by cordoning and a quantity of 1,27,138 tons of Aman rice was procured. On the otherhand, in 1975-76 the method of procurement was voluntary, but the target of 3 lac tons was reached by February, 1976 and government had to suspend further procurement due to storage problem, paucity of fund, etc. Compulsory procurement was always resented by the producers.

1.08.3. Under enforced purchases i.e. levy there is always discontentment among the farmers about wrong and unjustifiable assessment. A large number of civil suits, including writ petitions, used to be filed against government for wrong assessment of levy. Government also file a number of cases against the producers for non-delivery of assessed stocks. The procedure of enforced purchases rather developed not only into an unhealthy relation between the producers and the government but also had dampening effect on food production. Therefore since 1974-75 the procurement had been conducted on voluntary basis only.

1.08.4. The objective of government grain procurement in recent year has been to keep "the farmer prices at an incentive level" in order to accelerate the production of foodgrains on the one hand and to secure as much of foodgrain for distribution from domestic supply as possible.

The procurement scheme was recast after the famine of 1974 and the voluntary procurement was given emphasis followed by price support scheme as an incentive to encourage greater use of modern inputs. Procurement centres were made easily accessible to small farmers

by opening a large number of temporary purchase centres and the system of Approved Grain Dealers System was withdrawn. The present procurement policy is more concerned with price support policy than procurement of food for distribution.

1.09. FAMINE OF 1974 : BEGINNING OF FOOD POLICY PLANNING:

1.09.1. Bangladesh has continued to be chronically food deficit country in spite of efforts for food autarky since the beginning of 1960's. The country has also been frequently facing severe food crisis arising from droughts, floods, and other natural vagaries. These crises are often accentuated by the balance of payment crisis. A severe food crisis was faced in the post-flood period of 1974 when the government stock position in the month of October came down to 1.06 lakh tons. About 5.35 lakh tons of foodgrain were lost in the flood of 1974; though it was 4.8% of output it occurred in lean season and in the following famine situation thousands of people died. This poignantly brought forth the point that if there existed proper food policy, such a famine could have been avoided, but it came to be realized only slowly as the national policy of food autarky was pursued. Since 1960s official policy continued to maintain its emphasis on production in isolation from distribution as if supply produces its own demand; but production does not necessarily tend to a distribution that meets demand of every household. Lack of purchasing power due to poverty and unemployment in fact upsets the Say's Law more so when the modern technology of water, seed and fertilizer is more augmenting (i.e. yield increasing) than labour using, thereby creating a gap in supply and effective demand. It is, however, in the face of chronic food shortages that the international organisations became concerned with the food policy. A World Bank Mission visited Bangladesh in 1977 reviewed the overall food sector position and produced a report.

1.09.2. The 1977 World Bank Report identified the main problems as follows:

- (a) Foodgrain production is constrained by scarcity of cultivable land (to require intensive cultivation).

- (b) Population growth is higher than that of production growth (creating food gap).
- (c) In addition to natural constraint like flood, drought, etc. some physical constraint like inputs supply, irrigation facilities, credit facilities hampered food-grain production (at the intensive margin).
- (d) For building the stock level government depends mainly on import and aid.
- (e) Domestic procurement is much less due to inadequate storage and purchasing centres and lack of transport facilities.
- (f) Public foodgrain distribution does not help the poor, but serves middle class entailing huge subsidy in distribution of foodgrain.

1.09.3. The Mission recommended setting up a food policy unit with full-time professional secretariat to:

- (i) Monitor and project food production, prices, stocks, off-take, procurement and imports,
- (ii) devise and operate an early warning system,
- (iii) analyse food policy issues and
- (iv) advise the government on needed policy reforms.

1.09.4. The Bank Report recommended improving the food management in the areas of procurement and distribution. Concerning the procurement of foodgrain its suggestions were:

- (a) the procurement price should provide adequate incentive to encourage greater use of high yielding varieties of seeds, fertilizer and irrigation water,
- (b) the procurement price should be made an effective support price by government purchases of all grains of specified standards offered to it at that price,

- (c) access to procurement centres should be easier for small farmers; and
- (d) the procurement price should be based upon more accurate data from periodic surveys of farm costs and returns.

1.09.5: Concerning food distribution through the rationing system the recommendations were:

- (a) reducing the subsidy elements in ration system;
- (b) directing a greater proportion of the ration distribution to the poor; and
- (c) using government rice stock for open market sales to reduce seasonal and annual market price fluctuations rather than for ration system.

These recommendations were endorsed in the 1978 Food Aid Group meeting. The Government realised the need for execution of the Bank's recommendations in the face of food crisis of 1979 following the prolonged drought. In the same year the cabinet level council committee on food was reconstituted with the President as Chairman and the Minister for Planning as Co-ordinator (vide memo no.4/22/78 committee/109 dated May 23, 1979). The other members of the committee were (1) Prime Minister, (2) Deputy Prime Minister and Ministers for Water, Power and Irrigation, Agriculture, Food, Finance, Foreign Affairs, Commerce, Post-Shipping and Inland Water Transport and Railway, Roads, Highways and Road Transport.

1.09.6: A Food Planning and Monitoring Unit was also set up under the same notification with Planning Minister as Convenor and Secretaries of Ministries of Food, Agriculture, Finance, Statistics and the Member of Planning Commission as members. To provide staff service to the unit a secretariat was established.

1.09.7: The committee regularly met twice a week and reviewed food stock, distribution, transportation, arrival schedule of import

and identified the areas for the special need of Food For Works, Modified Ration, Relief, etc. With these measures the severity of crisis of 1979-80 was substantially mitigated.

1.10: FOOD POLICY OF THE 1981:

1.10.1: The national food policy of Bangladesh as formulated in November, 1980 aims at a rational food policy and strategy and includes, inter alia, the following:

- (a) Food production and its distribution to consumers with least possible use of resources,
- (b) Production, distribution and consumption of food to be integrated in a way as to avoid extreme fluctuations,
- (c) Remodelling public distribution system for attainment of a measure of fairness in food distribution and ensuring food for the needy. Reduction of ration quota gradually and increase in distribution price in view of lowering down the amount of subsidies,
- (d) Accelerated production for attainment of food self sufficiency in the shortest possible time,
- (e) Adequate stock building for stabilising market and meeting unforeseen emergencies,
- (f) Proper incentive to growers by ensuring economic price through procurement and market mechanism,
- (g) Encouragement to private trade for increased production and self-sufficiency.

1.11: FOOD PRODUCTION:

1.11.1: Measures for increasing production for self-sufficiency in foodgrain were further strengthened. As a logical step of the food policy a medium term food production plan (MTFPP) was adopted with a production target of 20 million tons. The target was revised downward at 17.5 million tons because of severe resource shortfall. Efforts were stepped up in supplying HYV Seeds, fertilizer, irrigation equipment, etc.

1.11.2: Fertilizer distribution in last few years have undergone a rapid increase. In 1974-75 only 2.79 lakh tons of chemical fertilizer was distributed which stood at 12.62 tons in 1984-85. The annual growth rate was 16% during the last 10 years time. Similarly the irrigation facilities have also increased. In 1983-84 about 47.44 lakh acres were irrigated compared with 35.61 lakh acres irrigated in 1974-75. The annual growth rate was 3%.

But due to frequent natural calamities like floods and droughts, etc. production of foodgrain could not reach its targeted level. The yearly target and achievements of foodgrain production during Second Five Year Plan were as shown below:

Table : I - 9
TARGET & ACTUAL PRODUCTION OF FOODGRAIN

Year	TARGET		Achievement
	As per MTEPP	Annually set by Govt.	
1	2	3	4
1980-81	154	148	147
1981-82	162	162	144
1982-83	173	155	151
1983-84	186	161	155
1984-85	200	167	161

(Lakh Ton)

Source: Planning Commission & BBS.

1.12: FOOD PROCUREMENT:

1.12.1: Procurement of foodgrain from domestic production introduced mainly for building up the reserve stock for support to the ration system changed under the new policy for stabilising the prices in favour of consumers as well as giving incentive price to the farmers. The procurement prices of foodgrain are fixed every year considering the cost of production of different crop so that the farmers can be benefited through government procurement.

Prices of inputs, labour, irrigation, etc. are important determinant of procurement prices. The major improvements in policies over the past few years have been the announcement of procurement prices in advance of crop planting in order to have maximum impact on farmers decisions, Procurement price sometimes increased twice in a year considering higher market price. In 1984-85 aman procurement prices first fixed at Tk.165 per md. of paddy and Tk.248 per md. of rice later were changed to Tk. 175 per md. of paddy and Tk.263 per md. of rice in the face of higher market price.

1.12.2: After the shift in government policy procurement from domestic output has increased. In the year 1980-81 more than 10 lakh tons of foodgrain were procured. But in the past few years continuous flood/drought problems and rising, market prices, have caused increasing difficulties in procurement. Domestic procurement has been very low compared with 1980/81's. In 1983-84 only 2.66 lakh tons of foodgrain were procured, in 1984-85 it picked up little (3.49 lakh tons). Crop wise procurement for the last 5 years were as below:

Table : I - 10
CROP-WISE PROCUREMENT OF FOODGRAIN

Crop	('000' tons)				
	1980-81	1981-82	1982-83	1983-84	1984-85
1	2	3	4	5	6
Aus	86.85	19.41	0.98	10.96	1.57
Aman	501.29	116.97	93.38	83.77	75.82
Boro	252.78	148.32	74.12	50.66	56.08
Wheat	175.08	13.31	23.59	121.06	215.46
Total :	1016.00	298.01	192.07	266.45	348.93

1.13: DISTRIBUTION:

1.13.1. Similarly a number of improvements have been made over the past few years in the management of public foodgrain operations. Shifting its focus from that of providing subsidized foodgrain to the urban and other protected sectors towards the poor and stabilizing market prices throughout the year at levels which are within

the reach of the poor and consistent with the objectives of providing adequate economic incentives to producers. In keeping with these objectives, entitlements and quotas for some preferred groups have been reduced and the shares of rice and wheat in the quotas have been shifted in favour of lower cost and less subsidized wheat. The sale prices of grains sold to preferred groups have also been increased gradually to reduce the gap between procurement as issue prices so as to reduce the size of food subsidies, shift the better-off consumers from ration system to market and reduce the seasonal spread in market prices. These changes have made it possible for the government to embark upon and expand the open market sales of food-grain, particularly of rice and increase the share of Food For Works and other target groups. The shift in these directions has already been shown at the beginning in Table: I-1. As under non-monetized channels foodgrains are valued at cost the shift away from commercial channels helped reduce financial subsidy.

1.13.2: As policy of gradually reducing subsidies the gap between procurement price and issue (distribution) price has also been reduced substantially affecting unit subsidy.

Table below shows the year-wise procurement and issue prices of foodgrain:

Table : I - 11
PROCUREMENT & ISSUE PRICE OF RICE

Year	Procurement Price	Issue Price (at consumer's level)	(Tk. per md.)	
			Gap (Absolute)	Average Gap
1	2	3	4	5
1975-76	121	70	51	42
1976-77	122	90	32	26
1977-78	132	100	32	24
1978-79	132	120	12	9
1979-80	170	140.00	30	18
1980-81	190	155.20	34.8	18
1981-82	210	175.00	35	17
1982-83	215	195.00	20	9
1983-84	225	215.00	10	4
1984-85	248	268.00	-20	-8

Source: Ministry of Food.

1.14. SUMMARY OVERVIEW:

1. The foodgrain rationing system have been introduced after the Great Famine of 1943 limiting to only Statutory Rationing, gradually expanding to the Modified Rationing.
2. After the Partition of India in 1947 a new channel of rationing was introduced known as Essential Priorities which was followed by other priority group channel.
3. Rationing System was abolished in 1956 which was followed to a food crisis within a few months and the rationing system was re-introduced by bringing all the district headquarters under the Statutory Rationing (SR) areas for a short period.
4. The rationing system has always been pursued in favour of the consumers, particularly the urban consumers.
5. In the domestic procurement scheme there has been total shift from compulsory procurement to the voluntary one by 1974-75 while in 1973-74 about 22 thousand tons were procured under levy and 48.5 thousand tons under voluntary purchase. In 1984-85, ten years after that whole amount of procurement of 3.48 lakh tons was on voluntary basis.
6. The Food policy planning was given due voightage after the Famine of 1974 and in 1979 the Food Planning and Monitoring Unit was set up.
7. The domestic procurement policy had been diverted towards price support policy for accelerated production rather than for procurement to support distribution.
8. The policy of foodgrain distribution has been shifted from that of providing subsidized foodgrain to urban and other protected sectors towards the poor and market price stabilization.
9. The foodgrain distribution channels increased to 12 and may be classified as commercial (monetized) and non-commercial (non-monetized) channel. The monetized channels include the SR, MR, OP, EP, LE, FM, OMS and MO while the non-monetized channel only include the FFW, GR, VGF and CD.

CHAPTER - II
STATE OF FOOD BUDGET

2.01. FOOD BUDGET - ITS MECHANISM AND STRUCTURE:

2.01.1. The food budget under Head 184 is prepared on cash basis and it shows (a) the gross outlay on procurement programme, (b) the receipts and recoveries on account of foodgrain distributed through the different channels and (c) the net outlay for transactions during the year together with adjustment for subsidy to be claimed from the revenue account. The budget is concerned with cash flows - ins and outs during a year, including food aid which, though involve no actual cash inflows is nevertheless treated as a cash flow in the constructive sense. As regards deferred payment purchases, both the down payments on account of purchases during the budget year and the payments on account of earlier purchases are included in the budget. In respect of deferred payment purchases there is thus deviation between costs and benefits of the food budget operation in a year. The two will differ to the extent of the difference between the down payment on current deferred payment purchases and arrear payment on purchases of earlier years. Gross outlay includes cost of food purchases and food aid freight, incidental cost, losses and overheads. It is to note that food budget also includes such items as edible oil, sugar, salt, etc.

2.01.2. A Consolidated View of the Budget:

As an illustration, a consolidated view of the food budget for 1984/85 and 1985/86 showing the funds committed in local currency and in foreign exchange classified into aid and commercial imports is presented in Table : II - 1 below:

Table : II - 1
FOOD BUDGET & GROSS OUTLAY

Year	Quantity '000' tons Value Taka Crores					
	1985-86			1984-85		
	Qty	Value	%	Qty	Value	%
1	2	3	4	5	6	7
<u>I. External Procurement</u>						
<u>Grants</u>						
Foodgrains	1480	645		1435	575	
Non-foodgrains		10			9	
		<u>655</u>	<u>(39.17)</u>		<u>584</u>	<u>(35.59)</u>
<u>Own Resources</u>						
Foodgrains	20	8		245	129	
Foodgrain deferred(a)	200	(75)		1043	(439)	
Non-foodgrains		59			47	
Down payment		10			67	
Arrears (b)		225			163	
Freight		90			117	
	<u>220</u>	<u>392</u>	<u>(23.45)</u>	<u>1278</u>	<u>523</u>	<u>(32.42)</u>
Total (Foreign):	1700	1047	(62.62)	2713	1097	(68.01)
<u>II. Internal Procurement</u>						
Foodgrains	500	298		300	165	
Non-foodgrains		119			99	
Operating expenses		208			252	
Total(Domestic)	<u>500</u>	<u>625</u>	<u>(37.38)</u>	<u>300</u>	<u>516</u>	<u>(31.99)</u>
Total Cash Outlay	2200	1672	(100)	3013	1615	(100)
Adjustment for deferred payment (a-b)	(-)	150			276	
Gross outlay		<u>1522</u>			<u>1899</u>	

Source: GOB Food Budget & Consultant.

The freight figures include freight on PL 480 Title III imports and that on imports under deferred payment terms. It is to be seen that deferred payment imports have implication for subsequent budgets for payments of arrear and interest. It is also to be noted that food budget includes non-foodgrain items like edible oil, the sale of which is also subsidized.

2.01.3. Receipts and Recoveries:

On the receipts and recoveries side, proceeds from cash sale together with value of food issued for Food for Works Programme, relief and vulnerable group feeding and stock decreases/increases are matched against the gross outlay. The difference between the two sides - fund commitments and receipts & recoveries, is the subsidy to be transferred from the revenue budget to the food budget. The receipts and recovery side of the budget operation is shown below in Table : II - 2 for the two years, 1984-85 and 1985-86.

Table : II - 2
FOOD BUDGET - RECEIPTS, RECOVERIES AND SUBSIDY

	Quantity '000' tons Value in Taka Crores			
	1985-86		1984-85	
	Quantity	Value	Quantity	Value
1	2	3	4	5
(a) Commitment of funds from Table : II-1	2200	1522	3013	1889
(b) <u>Receipts and Recoveries</u>				
1. Cash Sales Proceeds	1400	713	1900	867
2. Non foodgrain sales	-	175	-	149
3. Valuation of FFW/ Relief issues	600	287	750	327
4. Increase (net outlay in stocks)	200	157	363	296
Total :	2200	1332	3013	1639
(c) Cash deficit (Subsidy)	-	190	-	250
Total = (a) above	2200	1522	3013	1889

Source: Food Budget (GOB).

2.02. BUDGETARY SUBSIDY:

2.02.1. As may be seen from the above budgeting system subsidy is derived as a balancing item between the commitment of funds and receipts & recoveries. Thus in 1984-85, total funds commitment was Tk. 1889 crores and total of receipts & recoveries was Tk.1639 crores. The difference between the two sides was Tk.2,50 crores being the food subsidy charged against the revenue budget.

2.02.2. Theoretically, though subsidies may not be unnecessary or unjustified, there surely remains a scope to examine how far Bangladesh can afford such volume of subsidy as the resources so used for consumption support have alternative uses. The main argument in favour of food subsidy is that it has a positive welfare effect, as it makes cheaper food available for consumption. The impact of subsidy on different socio-economic groups of population and the amount of subsidy received by different socio-economic groups, particularly the low income groups constitute the main focus of the study. The effects of food subsidy on the nutritional aspects of consumers also need to be assessed.

2.02.3. As the question of subsidy has become an issue of great importance only in recent years, very little literature are available in this context. Most of the reports and information available from national and international sources have dwelt upon the subject only in combination with other aspects of problem of development of the economy, particularly in the context of domestic resources mobilization as in a stagnating world trade and aid resource constraints became increasingly severe. However, the Report of the Committee on Gradual Reduction of Food Subsidy^{/1} seems to be a relevant starting point in connection with the proposed study. The aims of the referred study were to:

- (a) Estimate the actual amount and nature of subsidy that is being paid on account of food and examining the economic consequences of the subsidy both on the objective of the self sufficiency in food and on the availability of resources for development in the country.

/1 : Report of the Committee of Gradual Reduction of Food Subsidy by Planning Commission, Ministry of Planning Commission, Ministry of Planning (GOB), December, 1979.

- (b) Suggest a strategy and a programme for steady and gradual reduction of food subsidy.
- (c) Make policy recommendation that may be necessary to check any undesirable consequence that may follow from the changes suggested and to ensure a smooth transition.

This study was made at the expert level, possibly, based on the available statistics and reports without going into field investigation, rather with a limited objective of resource mobilization. The focus of the study was based on reduction of food subsidy without any specific reference to the welfare cost of pursuing such a policy.

The major findings are however as followings:

- (i) A reduction of the present volume of subsidy was thought essential on the grounds that more money is needed for development and the fact the government distribution mechanism is not responsive to market prices. People buy now from ration shops even when the supply in the open market is abundant.
- (ii) There is little justification for the supply of internally produced and procured items like rice and sugar at subsidy because it depresses the price artificially (except in the lean season) and acts as a disincentive towards increased production.
- (iii) Seasonal open market operations are good substitute of statutory rationing in normal times.
- (iv) At present the low price is being partly compensated by another heavy subsidy on farm inputs. Savings in the two kinds of subsidy will improve the revenue position of the government considerably to help government financing.

Thus their major recommendation was to reduce subsidy to the minimum, not to eliminate it all together. They further recommended that it has to be done in a manner that private trade cannot take advantage of the poor harvest in a year and with reduced scale of business the Food Ministry must reduce its cost by reduction of employment that would be unnecessary. On the basis of these recommendation the government has been taking some measure since then such as increasing of ration price almost every year and some are yet to be implemented.

Finally it may be mentioned here that in addition to the receipts and recoveries directly under the Food Budget there are receipts from EP groups accounted under the Head 34-Defence Receipts. There are also some receipts from other EP groups but the former receipts are substantial. It may also be noted that this subsidy is inclusive of rations (free food entitlement) as part of their service contract. These receipts arise because food is issued by the Food Ministry at certain price to various departments under EP channel but their beneficiaries are charged at different prices. In 1984/85, for example the estimated

additional receipt on account of such price differential amounted to Tk.17.75 crores - Tk.12.05 crores on account of rice and Tk.5.70 crores on account of wheat. The average issue price was Tk.58/md. for rice and Tk.52.7/md. for wheat, but the beneficiaries were charged on an average Tk.124.80/md. of rice and Tk.94.30/md. of wheat. Though the food budget showed a cash deficit (subsidy) of Tk.250 crores in 1984/85, as have been stated in **other** sections the net subsidy was Tk.232.25 crores because of receipts on EP channel out of the Food Budget.

2.02.4. Unit Subsidy:

It is to be recognized that all funds commitment and all funds received during a particular year do not relate to foodgrain distributed during that year; less so to food distributed on a commercial basis through monetized channels. Thus, for example, there may be on the commitment side, arrear payments which have no relevance to food distributed during the budget year. Similarly, there may be fund commitment for food which may not be distributed during the year of purchase, but which is used for stock build-up; on the other hand, stock may also be drawn down to augment current supply. A similar situation arises on the receipts and recoveries side, which as discussed in Chapter-I, comprises both monetized and non-monetized channels. This dichotomy of distribution raises the question whether unit subsidy - subsidy per unit value of food, should be calculated on total food distribution or should be related to monetized food distribution only. From the budgetary point of view the former has an obvious appeal since the PFDS system is one and a single system for all kinds of food distribution, monetized or not, entailing huge overhead and common cost in its operation and maintenance. The common costs include PFDS' establishment cost, transportation cost and godown storage costs including wastages. A second argument in favour of this view is that foodgrains, both rice and wheat, being fungible by type, it is difficult to differentiate between food distributed through different channels though foodgrains may be procured under different terms from different sources. Thus any attempt to calculate unit subsidy on any basis other than on the basis of overall operation of PFDS will involve allocation problems. An opposite position can be taken from the point of view of benefit. The argument underlying is as follows:

As there are two primary channels - monetized (e.g. SR) and non-monetized (e.g. FFW) and valuation of food distributed through the latter channel can be based on full cost, budget subsidy arises from monetized distribution only and accrues to recipients for such food. But as non-monetized distribution involves cash outlays for storage, transportation and establishment such an approach to unit subsidy calculation will require charging an appropriate share of incidental costs to non-monetized distribution also, but still keeping valuation of food distributed through the two channels separately because of food aid received for specific purposes such as under World Food Programme.

2.02.5. Three Ways of Calculating Unit Subsidy:

There are thus three ways of calculating unit subsidy as follows:

- (i) First, calculating it on the basis of total fund commitment expressing subsidy as a percentage of such commitment. Here all costs are pooled together.
- (ii) Secondly, calculating it from the point of beneficiaries expressing subsidy as a percentage of monetized distribution only. This will imply charging food distribution through non-monetized channel with its full cost; but it does not happen in reality as food received under World Food Programme is physically committed to such programme in full; thus all incidental costs are charged to monetized distribution even though part of such costs is incurred on account of non-monetized food distribution.
- (iii) A comparative position is to charge all the PFDS operation costs among the three components, namely, monetized distribution, non-monetized distribution and stock increase and calculate unit subsidy for monetized food distribution only. The compromise method will require charging food transferred to stock for proportionate share of PFDS cost as well as its proper valuation.

2.02.6. Calculation of Subsidy:

In the following table, the calculation of unit subsidy under the

three alternative methods are shown for the year 1984-85 as an illustration:

Table : II - 3
CALCULATION OF SUBSIDY, (1984-85)

Sl.No.	Item	Taka in Crores
1	2	3
1.	Commitment	1934
2.	Sales Proceeds	867
3.	Operational Cost	252
4.	Stock Increase	296
5.	Subsidy	244
6.	Subsidy net of operational cost for stock and non-monetized issues	151
7.	<u>Unit Subsidy (Percentage)</u>	
	(a) Commitment basis (5 : 1)	12.62%
	(b) Benefit basis (5 : 2)	28.14%
	(c) Adjustment basis (6 : 2)	17.42%

Source: Statement IV, Annual Budget Summary Statements (GOB).

Note : 1. The stock increase valuation of Tk. 296 crores includes its share of operational costs.

2. Tk. 6 crores have been deducted from the total subsidy figure of Tk.250 crores being attributable to non-foodgrain sales. The commitment figure likewise, excludes non-foodgrain procurement.

It should be borne in mind that these alternative methods of calculating unit subsidy are based on the concept of budget subsidy, for no adjustments have been made to prices and costs on any economic and efficiency consideration and all costs and prices are taken as they appear in the Budget. For such adjustments a detailed discussion of procurement and distribution is necessary as they differ in price, costs as also the objectives, an exercise to be undertaken in Chapter - III.

2.03. STRUCTURE OF PFDS - PROCUREMENT:

2.02.1 External Procurement:

Food is procured both externally and domestically at varying prices

and costs. External procurement is mainly done with the help of food aid, though in recent years commercial purchases have significantly increased in volume and value. The type of aid and its conditions vary from source to source. It could be (a) quantity and value specified aid and grant on C&F basis, without any restrictions on ocean freight, (b) quantity and value specified aid on FOB basis with obligation to transport a certain percentage of the quantities in the flag vessels of the donor country (e.g. PL 480 Title III, aid from USA), (c) value specified grants and (d) quantity specified grants. Though the negotiation for procurement of food under aid is done by the External Resources Division of the Ministry of Finance with donor countries/agencies, actual procurement is done by the Ministry of Food. All food aids are grants and shown together in a consolidated form in the budget. Freight for type (b) imports is included under freight in the budget. Since most food aid is bilaterally arranged, terms and conditions vary from donor to donor in respect of price, freight, distribution and use of sale proceeds. Food is sometimes also imported under loans and credits from various countries (e.g. Long Term Credit from Japan) under bilateral arrangements.

2.03.2: Internal Procurement:

Internal procurement of foodgrains was introduced mainly for supporting the rationing system. The objective was modified later to put the emphasis on stabilizing the procurement prices at a level which would provide farmers an incentive to expand production of foodgrains. To that end, the procurement prices are annually fixed by the Government at the beginning of the sowing season. The financing of procurement is done under 3 months cash credit arrangements with various banks. Payments are made by banks to growers/approved dealers against "weight, quality and stock certificates" (WQSC) issued by the purchase officers at the purchase centres. The banks send fortnightly bills for all payments made for purchases to the Directorate of Food Accounts for checking and recording. The bills are then sent to the AG's Office for settlement of the banks' claims. The present system entails payments of interest charges to banks for its 3 month-accommodation, a substantial part of which could probably have been avoided with some procedural changes. Though the

method of financing domestic procurement is outside the scope of this study, it cannot be overlooked that the method has bearing on the cost of PFDS' operation. There are also laid down procedures for payment/adjustment of transportation bills of the Railway/BIWTC/ other carriers and for the payment of other incidental charges. Again stepping into the accounting procedures is not the purpose of this study though a good accounting system can contribute of the efficient operation of PFDS. In fact, a study on the accounting system was done in 1981 by the FPMS.

2.03.3. Source-Wise Financing:

Source-wise financing of procurement of foodgrains is shown in Table : II - 4 below:

Table : II - 4

SOURCE-WISE FINANCING OF PROCUREMENT

	(a) <u>RICE</u>				
	(Quantity in 000 tons)				
	1980/81	1981/82	1982/83	1983/84	1984/85
1	2	3	4	5	6
1. Total	910	504	480	316	407
2. Aid/Grant	84 (9.23)	30 (5.95)	232 (48.33)	163 (51.58)	130 (31.94)
3. Cash Imports	-	189 (37.50)	80 (16.67)	7 (2.22)	145 (35.62)
4. Domestic Procurement	826 (90.77)	285 (56.55)	168 (35.00)	146 (46.22)	132 (32.42)

(b) WHEAT

1. Total	1168	1133	1568	1655	2754
2. Aid/Grant	697 (59.68)	1120 (98.85)	835 (54.14)	1320 (79.78)	1405 (51.02)
3. Cash Imports	302 (25.85)	-	689 (11.50)	214 (12.95)	1134 (41.17)
4. Domestic Procurement	169 (14.47)	13 (1.15)	24 (1.36)	121 (7.31)	215 (7.80)

Note: Figures in parentheses are percentages of total.

It is to be noticed that source-wise procurement shows great fluctuation from year to year. Share of domestic procurement has significantly declined since 1980-81 in respect of both rice and wheat. The main reason of this fluctuation is domestic harvest condition. The shift in the procurement structure has however considerable bearing on food subsidies as both distribution and price structure change with it. A higher share of external procurement also changed the commodity structure of PFDS from rice to wheat affecting thereby unit value of foodgrain and unit subsidy.

2.03.4. Wheat & Rice Composition:

The proportion of wheat in the total procurement is uniformly higher than that of rice, ranging from 36.23% in 1981-82 to 74.13% in 1984-85. The commodity structure of PFDS on the procurement side for the second plan period is shown below:

Table : II - 3

WHEAT & RICE COMPOSITION OF PFDS ACQUISITION

1	RICE			WHEAT		
	Quantity	Value	Cost per 100	Quantity	Value	Cost per 100
	2	3	4	5	6	7
1980-81	910 (43.79)	542	5950	1108 (26.21)	431	3684
1981-82	504 (30.79)	325	6640	1133 (49.21)	404	4273
1982-83	480 (22.55)	321	6143	1368 (37.45)	259	4901
1983-84	316 (16.02)	256	8040	1656 (93.98)	283	4731
1984-85	840 (27.88)	706	8340	2173 (32.12)	207	4240

Note: Figures in parentheses are percentages.

Source: Ministry of Food, 1985.

It is to be seen that between 1980-81 and 1983-84, share of rice in total procurement had declined to less than one-sixth and its quantity had more than halved while that of wheat has increased by more than 40%. This coupled with the fact that ton for ton of wheat had been consistently cheaper than rice ranging from between 42% of the price of rice in 1980-81 to only about one-third in 1983-84, which had significant bearing on food subsidy.

2.04. STRUCTURE OF PROCUREMENT PRICES:

2.04.1. Internal Procurement Price:

Table : II - 6 below shows the movement of procurement prices over the Second Plan period.

Table : II - 6
SCHEDULE OF INTERNAL PROCUREMENT PRICES
1979/80 to 1984/85

Year	Effective date	(Taka per md.)		
		Paddy all varieties	Rice all varieties	Wheat
1979/80	Nov.15,1979	105 + 5	165 + 5	105 + 5
1980/81	Nov.4, 1980	110 + 5	170 + 5	110 + 5
1981/82	Dec. 7,1981	119 + 5	185 + 5	119 + 5
1982/83	Nov. 7,1982	130 + 5	205 + 5	130 + 5
1983/84	Nov.15,1983	139 + 5	220 + 5	139 + 5
1984/85	July 1,1984	160 + 5	243 + 5	157 + 5
		(Aus & Boro)	(Aus & Boro)	
		& 170 + 5 (Aman)	& 258 + 5 (Aman)	

Note: (1) Taka 5 per md. is paid as transport bonus.

(2) It would be seen that between 1980/81 and 1984/85 domestic procurement prices have increased by 52% for paddy, 50% for rice and 41% for wheat.

Source: Ministry of Food, GOB.

2.04.2. International Prices:

The international prices of foodgrains have, on the other hand, moved downward during the same period as Table : II - 6A below would show thus :

Table : II - 6A
INTERNATIONAL PROCUREMENT PRICES

US dollars per metric ton C&F

	RICE		WHEAT	
	Aid Imports	Cash Imports	Aid Imports	Cash Imports
1	2	3	4	5
1980-81	493.17	-	180.96	182.23
1981-82	392.58	247.83	151.57	-
1982-83	371.85	229.45	168.10	147.69
1983-84	373.90	204.65	161.27	160.26
1984-85	348.24	253.58	155.73	142.40

Source: Ministry of Food, GOB.

It would be noticed that 1980-81 was a year of high international foodgrain prices. The differential price between procurement of rice under aid and on commercial basis is attributed to the fact that procurement under aid is done from countries other than lower price sources in East Asia (Thailand and Burma) or under special terms like long term credit from Japan. For wheat, however, the difference are much less pronounced. The benefit of declining prices could not be passed on to consumers because of depreciation of Taka in relation to the US dollar, from Tk. 16.26 to Tk. 25.29 (55.54%) over the said period.

2.05. INCIDENTAL COSTS:

Besides cost of procurement which includes also ocean freight, PFDS has to incur incidental costs covering inland transportation, bagging and re-bagging, other operating expenses, establishment costs and bank charges and interest, Total provision for such incidental costs appeared as follows:

Table : II - 7
BUDGET ESTIMATES

Year	Incidental costs Tk. Crores	Per ton of procurement (in Taka)	As percen- tage of outlay	Subsidy Tk. Crores
1	2	3	4	5
1980/81	149.40	719	15.09	109
1981/82	201.43	1227	24.05	182
1982/83	228.38	1124	22.15	193
1983/84	140.93	715	12.47	160
1984/85	252.00	836	13.34	250

Note: A small part of the incidental costs is chargeable to non-foodgrains.

Source: Ministry of Food, GOB and the National Budget.

It is to note that incidental costs as percentage of total outlays show great fluctuations from as high as 24% to as low as 12.5% of total outlay. Explanations underlying such fluctuations are the nature of costs entering incidental costs and the volume and cost of food procured. First, some costs such as transportation are variable and depend on the volume of transactions while some costs such as establishment costs are more or less fixed - independent of the volume of transactions. Secondly, total outlay depends on volume and price. It is to recall (Table:II-4) that in 1981/82, the volume of transaction was at its minimum (16.3 lakh tons) when the percentage of incidental costs was also the highest. A comparison of Table I II-4 and Table : II-7 brings out close correlation between the incidental costs and volume of procurement. Ocean freight is not included under the existing practice of calculating incidental cost, as it is included in external procurement cost. It is to be stressed that incidental cost is not for procurement alone but also for distribution. In view of this dual nature, such cost may be viewed as cost of food delivery from the ports and purchase centres to final points of distribution (LSD/CSD) of the PFDS system. The subsidy figure is mentioned as comparison to indicate that the subsidy is, in effect, a charge to cover incidental costs.

2.06. STRUCTURE OF PFDS - DISTRIBUTION CHANNELS:

2.06.1. There are 12 channels for distribution of food under PFDS; of these eight are monetized and four non-monetized. A monetized channel means a channel through which food is sold at a given price. A non-monetized channel means a channel through which food is distributed for no money value. The monetized channels are statutory rationing (SR), modified rationing (MR), essential priority group (EP), other priorities (OP), large employees (LE), flour mills (FM), free sale (FS) and open market sales (OMS). The four non-monetized channels are Food for Works (FFW), Vulnerable Group Feeding (VGF), Gratuitous Relief (GR) and Canal Digging (CD). The latter is however discontinued now. For purposes of the budget, sale proceeds through all eight monetized channels are shown together as a consolidated amount in the budget. Food distributed through non-monetized channels is shown separately at their imputed values. Table : II - 8 below shows the volume distributed through different channels from 1978-79 to 1984-85.

Table : II - 8

CHANNEL-WISE SHARE OF DISTRIBUTION

(Quantity in 000 tons)						
Year	SR	MR	Priority Groups	OMS/FM	Relief/FFW	Total
1	2	3	4	5	6	7
1978-79	417 (23.2)	312 (17.4)	754 (42.0)	52 (2.9)	261 (14.5)	1796
1979-80	492 (20.5)	385 (16.0)	907 (37.8)	121 (5)	497 (20.7)	2402
1980-81	343 (22.5)	179 (11.8)	601 (39.5)	-	399 (26.2)	1522
1981-82	307 (15.1)	483 (23.7)	656 (32.3)	154 (21.3)	435 (21.4)	2035
1982-83	307 (15.9)	368 (19.0)	647 (33.4)	118 (6.1)	495 (25.6)	1935
1983-84	293 (14.3)	399 (19.4)	641 (31.2)	158 (7.7)	561 (27.4)	2052
1984-85	205 (9.5)	342 (15.6)	555 (25.6)	138 (7.3)	906 (41.8)	2166

Note: Figures in parentheses are percentages.
Source: Ministry of Food.

2.06.2. From the budget point of view, as discussed in para 2.03, it is the monetized channels which are directly concerned with the subsidy issue as food distributed through the non-monetized channels is valued at cost. The ratio of distribution between the two basic categories of channels changed significantly between 1978-79 and 1984-85, the share of non-monetized channels increasing from 14.50% in 1978-79 to 41.85% in 1984-85. As a matter of fact, a steady shift in favour of non-monetized channels is discernible. Against this, the share of SR steadily declined to below 10% in 1984/85 from 23.2% in 1978/79. This change in the distribution structure has obvious implication for subsidy as non-monetized channels are charged at full cost. The share of OMS has also improved; as its price rule is different from SR, increase in its share has also helped lessen the burden of subsidy. The share of the priority groups has also significantly declined relieving pressure on subsidy.

2.06.3. Besides its impact on subsidy, the changing structure of the PFDS distribution system has also significant welfare implications. First, the increase in non-monetized channels' share means more food for poor people such as the vulnerable and the unemployed. Secondly, a reduction in the share of SR means reduction of benefit of subsidized food for the better-off families.

2.06.4. However, an increase in the share of non-monetized channels means incidental costs of PFDS operation have to be borne more by the monetized channels as the former are charged actual cost of procurement; so it would mean an increase in subsidy depending on the gap between issue price and full cost of distribution.

2.07. STRUCTURE OF ISSUE PRICES:

2.07.1. The pricing structure of PFDS shows considerable diversities with respect of distribution channels. Issue prices are fixed every year by the government. They are fixed with the objective of supplying foodgrains to the beneficiaries of PFDS at prices which are considered reasonable both in relation to the market

prices and the purchasing power of the target groups of consumers. Prices under monetized channels are fixed explicitly while under non-monetized channels they are implicit as their beneficiaries are not to pay in cash for food received. Pricing for different channels is discussed below:

(a) SR, MR and OP:

The bulk of cash sales are made through SR, MR and OP channels. They have similar prices. The considerations underlying their prices include provisions of foodgrains at prices which are within the reach of consumers, the procurement cost, social equity and the moderation of seasonal fluctuation in market prices. Over time one can observe the tendency of the three sets of prices - market prices, procurement prices and issue prices to come closer to each other. Table:II-9 below shows the position of SR/MR/OP prices in relation to market prices of coarse rice and procurement price.

Table : II - 9
MOVEMENT OF PRICES

Year	Tk./md.					
	Whole sale market price		Procurement price		SR/MR/OP Price (ex-godown)	
	Coarse Rice	Wheat	Rice	Wheat	Rice	Wheat
1	2	3	4	5	6	7
1980-81	168.44	110.46	172.25	113.29	139.6	107.61
1981-82	220.40	135.09	183.54	120.13	162.17	116.43
1982-83	239.61	162.33	203.00	125.83	190.90	129.91
1983-84	261.63	166.67	219.58	140.74	209.90	139.45
1984-85	280.00	165.00	263.00	165.00	245.57 (avge.) 268.00 (high)	158.04 (avge.) 167.00 (high)

Note: These are yearly average prices.

Source: Ministry of Food & Directorate of Agriculture Marketing.

It is to be noted here that in 1984/85, the issue price crossed over the procurement price. This means that issue prices covered part of the PFDS's operation cost in 1984/85, while in earlier years issue prices were lower than the procurement costs, indicating a level of subsidy exceeding the cost of PFDS operation. A point that must not be overlooked is that in 1984/85, issue price of wheat even exceeded the market price. This should not however be construed as earning profit on wheat account because full cost of wheat including incidental costs (Tk. 192.87 per md.) was higher than the issue price of Tk. 167.00 per maund.

(b) LE and FM:

The price for large employees is about 6% and that for flour mills is about 11% higher than SR/MR rates. For example, the present rate for large employees is Tk.177.61 and that for flour mills is Tk.186.57 per md. of wheat in place of Tk.167.00 per md. under SR/MR. Under these channels wheat is the main commodity supplied by PFDS. In 1984/85, for example, LE received 63 thousand tons of food grains of which only one thousand tons were rice.

(c) EP:

The prices for essential priority groups are set at considerably lower levels than those of SR/MR. Since 1977-78 until the end of 1984-85 EP rates have remained stationary at Tk.48.00 per md. for wheat and Tk.58.00 for rice, when SR/MR prices have advanced from Tk.97.00 per md. to Tk.262.00 per md. for rice and from Tk.80.00 per md. to Tk. 167.00 per md. for wheat. This reflects the policy under which inmates of hospital, jails and hostels, and members of defence forces are issued rations at particularly concessional rates which had not been raised for several years.

(d) OMS:

Open Market Sales (OMS) is an expedient measure for moderating market prices when they are on the rise. OMS begins when prices in the market rise beyond 1% of the procurement price for rice,

and 20% for wheat. These are called trigger points. The issue prices under OMS are the trigger prices plus an amount equal to 50% of the difference between trigger price and market price. Based on this principle, different rates are fixed in advance for different slabs of market price over the trigger price. The OMS price for non-SR areas is slightly lower than that for SR areas, the difference being of the order of about five percent. In case of rising market prices OMS prices can earn profit and can contribute to the reduction of food subsidy, while having at the same time a smoothening effect on markets.

(e) FFW, VGF and Test Relief:

Valuation for issues through these non-monetized channels were shown in the budget at a price equal to OMS rate plus Tk.10/- per md. This price has no relation to the procurement price, nor to the valuation of the year end inventory, which is valued on a pooled cost basis. The issues of foodgrain through non-monetized channels are valued in a constructive sense, and there is no inflow of real resources from the beneficiaries. But because of the higher valuation than for monetized channels, the net effect is a reduction of the budgetary subsidy.

2.07.2. The following table shows the issue prices from 1975-76 to 1984-85:

Table : II - 10

WHOLESALE ISSUE PRICES UNDER SR/MR

Year	Effective date	Taka per md.	
		Rice	Wheat
1	2	3	4
1975-76	10 to 19 Dec. 1975	58.00	48.00
	20 December, 1975	68.00	53.00
	7 February, 1976	87.00	67.00
1976-77	-	87.00	67.00
1977-78	31 December, 1977	97.10	-
1978-79	19 May, 1979	117.00	87.00
1979-80	3 May, 1980	137.00	107.00
1980-81	13 November, 1980	136.00	106.00
	11 April, 1981	151.20	112.00
1981-82	12 December, 1981	171.00	120.00
1982-83	3 July, 1982	191.00	130.00
1983-84	2 January, 1984	229.00	149.00
1984-85	31 December, 1984	268.00	167.00

Source: Ministry of Food, GOB.

It is impressive that between 1975/76 and 1984/85 there was nearly a fourfold increase in the wholesale issue price of rice, giving an annual increase rate of 16%, while over the same period whole sale market price of rice is shown in Table :II-9 which increased at an annual rate of 8.9% only. Similarly, in case of wheat, the whole-sale issue price rose at the rate of 12.9% a year against an annual increase of 8.4% in market prices. This means that the gap between the market and the rationing system had declined rapidly and the privilege of SR/MR beneficiary groups much reduced, as could be seen in Table : II - 9.

2.08. DIFFERENCE BETWEEN PROCUREMENT PRICES AND RATION PRICES:

There has always been a difference between average procurement prices and average ration prices. In spite of successive revisions over the year, the difference still remains substantial as may be seen in Table below:

Table : II - 11

COMPARATIVE PROCUREMENT COST AND RATION PRICE

(a) RICE (Taka per metric ton)

Year	AVERAGE				SR/MR Price (ex-godown)	DIFFERENCE				Percentage 5:4
	Import Aid/Grant	Import Own Resources	Domes-tic Procurement	All Sour-ces weigh-ted		1-5	2-5	3-5	4-5	
	(1)	(2)	(3)	(4)	(5)					
1980-81	8734	-	5672	5960	3481	5253	-	2196	2479	38.4
1981-82	9106	6201	6319	6640	4285	4821	1646	2034	2355	64.53
1982-83	9974	6213	6734	8148	5357	4617	856	1677	2719	65.75
1983-84	10040	5818	6745	8424	5916	4122	- 97	828	2508	70.22
1984-85	9643	7759	7503	8840	6581	2962	668	922	2259	74.44

(b) WHEAT

1980-81	3661	3682	3049	3684	2892	169	790	857	802	78.50
1981-82	4269	-	4554	4373	3006	1263	-	1548	1266	70.34
1982-83	4945	4639	4670	4901	3615	1330	1224	1055	1286	73.76
1983-84	4737	4712	4690	4731	3910	827	802	180	821	82.64
1984-85	4501	4436	5169	4540	4235	206	199	954	305	93.28

Note: The figures include incidental costs. It may be seen that

high incidental costs per ton of procurement during 1981-82 and 1982-83 (Tk.1227 and 1124 respectively against Tk.719 for 1980-81, Tk. 715 for 1983 and Tk. 836 for 1984-85) cause the procurement prices of these two years to appear inflated.

Source : Ministry of Food, GOB.

Commercial imports appear to be the least expensive method of procurement both for rice and wheat. It would also be noticed that inspite of an increase of 89.0% in the SR/MR price of rice and 46.44% for wheat between 1980-81 and 1984-85, the ration price to procurement cost ratio has not changed very significantly. The ratio for rice rose from 58.42% to 74.44% and wheat from 78.50% to 93.28%. One reason is the depreciation of the value of Taka (from Taka 16.26 to 24.94 to the US Dollar) over the same period affecting the cost of imported food, particularly aid/import, which is by far the most important source of food procurement.

2.09. BUDGET SUBSIDY:

2.09.1. The amount of subsidy which appears as a balancing element between cash outlays and cash receipts from sale of foodgrains is the concept of budgetary subsidy. It is the net resource loss to the government treasury as a result of purchase and subsequent re-sale of foodgrains through PFDS. Against the gross outlays are matched (a) the cash sales proceeds, (b) value of food issued to FFW and Relief Programmes and (c) value of increase/decrease in stocks. The difference is transferred from the revenue budget to the food budget as subsidy; hence the concept of budgetary subsidy. In the Food Ministry, the subsidy is calculated on foodgrains procured by government from its own resources, whether external or internal, and on food received under aid if such aid to be valued at given prices plus freight cost and incidentals. In respect of PL 480 Title II and III food aids, for example, sale proceeds below the agreed value need to be made up by transfer from the Revenue Budget to the special A/C. The budgetary concept of subsidy does not take into account non-financial charges like depreciation on owned

storage buildings/godowns and the transport fleet of the PFDS and stock losses. However, establishment costs, being part of the cash outlay, are included.

2.09.2. Subsidy as per budget definition for the five years upto June, 1985 are given below:

Table : II - 12
BUDGETARY SUBSIDY

Year	Off-take 000 tons	Budgetted subsidy Tk. Cr.	Subsidy per ton of Off-take	Unit Subsidy (Percentage)		
				(a)	(b)	(c)
1	2	3	4	5	6	7
1980-81.	1472	109	740	10.17	21.54	16.43
1981-82	1967	182	925	20.68	23.98	17.16
1982-83	1837	193	1051	18.19	26.36	18.12
1983-84	2051	1 60	780	12.20	19.72	14.34
1984-85	2650	214	920	11.33	28.14	17.42

Note: (a) Commitment basis, (b) Benefit basis and (c) Adjustment basis. Stock changes ignored for (c) for the year 1980-81 1983-84.

Source: Ministry of Food & Consultant.

The subsidy percentages (b) and (c) for 1984-85 reflect the high quantity procured (3,013,000 tons) and the high percentage of food-grains (41.8%) distributed through non-monetized channels. Otherwise the trend of unit subsidies by all methods is a declining one.

2.09.3. Shortcoming of Budget Subsidy:

These estimates are based on budgetted cost of procurement, but prices of food received under aid are different from world market prices as the Table : II-11 clearly shows. Similarly, some food aids carry conditions about use of donor countries' flag vessels where the freight rates may be different from international freight rates. Such deviations of rates and prices from international standards need adjustments for calculation of the true subsidy. There

might be also different views on incidental costs on ground of efficiency. Lastly, domestic procurement price may be above market prices such that the former ceases to be a market clearing price. All these problems are discussed in Chapter-III along with the alternative concepts of subsidy.

2.10.1. Historical Costs and Subsidy:

The historical or actual costs of PFDS and subsidy are different from the budgetted outlay and subsidy, because whereas the former represent facts, the latter are estimates. The two sets of values are shown for comparison:

Table : II - 13
HISTORIC COSTS AND BUDGETARY PROJECTIONS

1	1982-83		1983-84		1984-85	
	Budget	Actual	Budget	Actual	Budget	Actual
	2	3	4	5	6	7
<u>A. Outlay on PFDS</u>						
<u>1. Rice</u>						
Quantity (000 tons)	480	617	316	807	840	346
Value (Tk/Crores)	340	480	257	494	652	230
<u>2. Wheat</u>						
Quantity (000 tons)	1549	959	1656	1652	2173	1985
Value (Tk/Crores)	461	360	663	664	830	817
3. Arrears (Tk/Crores)	32	-	67	-	-	-
4. Freight (Tk/Crores)	-	-	183	-	-	-
5. Other costs (Tk/crores)	228	179	141	312	252	329
<u>6. Stock Decrease</u>						
Quantity (000 tons)	-	360	-	-	-	243
Values (Tk./crores)	-	117	-	-	-	142
<u>7. Total</u>						
Quantity (000 tons)	2029	1936	1972	2459	3013	2574
(of which wheat)	(1548)	(1440)	(1655)	(1652)	(2173)	(2166)
Value (Tk/Crores)	1061	1036	1311	1470	1734	1518

Table : II - 13 (contd...)

	1982-83		1983-84		1984-85	
	Budget	Actual	Budget	Actual	Budget	Actual
1	2	3	4	5	6	7
B. Receipts and Recoveries						
1. Cash Sales						
Quantity (000 tons)	1360	1440	1490	1440	1900	1648
Value (Tk/Crores)	584	585	708	594	867	792
Unit Price (Tk. ton)	4294	4063	4752	4125	4563	4806
Rice		4736		5067	6000	5849
Wheat		4736		3679	4050	4339
2. FFW, VGF & Relief						
Quantity (000 tons)	477	496	561	560	750	927
Value (Tk/Crores)	191	211	241	247	327	479
Unit Price (Tk. ton)	4009	4254	4296	4411	4360	5167
3. Sub-total						
Quantity (000 tons)	1837	1936	2051	2000	2650	2575
Value (Tk/Crores)	775	796	949	841	1194	1271
Unit Price (Tk. ton)	4219	4112	4637	4205	4505	4936
4. Stock increase						
Quantity (000 tons)	NA	-	NA	459	363	-
Value (Tk/Crores)	93	-	202	312	265	-
5. Total value (Tk/Crores)	868	796	1151	1153	1590	1271
6. Total Subsidy (A7-B5)	193	240	160	317	244	247
<u>Subsidy per ton of sales</u>	1419	1667	1074	2208	1284	1505
<u>Subsidy per ton of Distribution:</u>	1051	1240	780	1590	921	963
Rice:	3455	2574	3367	2209	2685	2174
Wheat:	245	966	2112	1175	580	770

Note: (i) These figures are compiled from data made available to us. They may differ from figures compiled by other authorities, because mainly (1) year and shipments may not be shown in the same year and (2) there could be some cost variation, particularly under other costs.

(ii) Stock decreases are treated as outlays. In 1982/83 it consisted of increase of rice stock by 103 thousand tons and decrease of wheat stock by 466 thousand tons. In 1983/84 rice stock increased by 333 thousand tons and wheat stock by 124 thousand tons and in 1984/85 decrease in stock consisted of 44 thousand tons of rice and 180 thousand tons of wheat.

2.10.2. Distribution of Subsidy by Channels:

Next an effort has been made to allocate subsidy by entitlement. The cost of subsidy/benefit of subsidy is broken down by channels of SR, LE, OP, EP and FM in the proportion of their participation in the distribution. The receipt by each is shown in the table:II-14, while the channel-wise distribution of rice and wheat have been shown in the table:II-15.

Table : II-14

DISTRIBUTION OF SUBSIDY BY CHANNEL(ACTUAL)

1	Quantity '000' tons Subsidy Tk.Crores									
	1982-83			1983-84			1984-85			
	Qty	Subsidy	%	Qty	Subsidy	%	Qty	Subsidy	%	
2	3	4	5	6	7	8	9	10		
A. Monetized Channels										
SR	308	40.74	16.96	293	47.48	14.99	264	28.28	11.44	
OP	343	45.14	18.80	345	55.67	17.57	390	41.65	16.85	
LE	77	6.58	2.74	60	8.62	2.72	64	5.38	2.18	
EP	98	47.53	19.79	108	55.31	17.46	117	64.39	26.05	
FM	129	9.04	3.76	128	16.60	5.24	145	9.74	3.94	
Sub-total (PG)	955	149.03	62.05	934	183.68	57.98	980	149.44	60.46	
OMS	118	11.01	4.58	107	12.87	4.06	202	11.60	4.69	
MR	368	58.14	24.21	399	63.91	20.18	466	49.52	20.03	
Total Monetized	1441	218.18	90.84	1440	260.46	82.22	1648	210.56	85.18	
B. Non-Monetized Channels										
FFW	410	18.27	7.61	440	44.20	13.96	572	22.97	9.29	
Other Relief	85	3.71	1.55	120	12.11	3.82	355	13.65	5.53	
Total Non-monetized	495	21.98	9.13	560	56.31	17.78	927	36.62	14.82	
Grand Total:	1936	240.16	100.0	2000	316.77	100.00	2575	247.18	100.0	

Source: Ministry of Food, GOB & Consultant.

In both absolute and percentage terms, the subsidy on EP has increased most (from Tk.47.53 crores and 19.79% to Tk.64.39 crores and 26.05%) over the three year period analyzed above. The share of SR has declined from Tk.40.74 crores and 16.96% to Tk.28.28 crores and 11.46%, and OP from Tk.45.14 crores and 19.80% to Tk.41.65 crores

and 16.8%. The share of MR has also declined from Tk.58.14 crores and 24.21% to Tk.49.15 crores and 20.05%. The share of monetized channels taken together has declined from Tk.218.18 crores and 90.84% to Tk.210.56 crores and 85.18%. There has been a corresponding increase in the share of non-monetized channels from Tk.21.98 crores and 9.15% to Tk.36.62 crores and 14.82%.

Table : II - 15
CHANNEL-WISE DISTRIBUTION OF RICE AND
WHEAT FOR THE PERIOD 1982-83 to 1984-85

Channel	('000' m. ton)								
	1982-83			1983-84			1984-85		
	Rice	Wheat	Total	Rice	Wheat	Total	Rice	Wheat	Total
1	2	3	4	5	6	7	8	9	10
Statutory Rationing	88	219	307	81	212	293	62	204	266
Modified Rationing	210	158	368	163	237	400	124	340	464
Essential Priorities	60	39	99	66	42	108	68	44	112
Other Priorities	95	248	343	102	242	344	92	296	388
Large Employees Industries	-	77	77	2	58	60	1	62	63
Marketing Operation	-	-	-	31	20	51	1	7	8
Flour Mills	-	128	128	-	128	128	-	148	148
Open Market Sales	37	81	118	25	81	106	44	157	201
Food for Works	6	404	410	28	413	441	4	567	571
Vulnerable	-	67	67	1	92	93	-	231	231
Group feeding Canal Digging	-	1	1	-	-	-	-	1	1
Gratuity Relief	-	17	17	4	23	27	2	107	109
Total :	496	1439	1935	503	1548	2051	400	2162	2562

Source: Ministry of Food.

2.11. SUBSIDY AND NUTRITION:

No previous studies are available correlating levels of subsidy to levels of nutrition in detail. However, the benefits of subsidy accruing per head in a year to members of 10 distinct socio-economic groups in the social scale, from landless farm workers to the formal urban class as published in the World Bank Publication "The Bangladesh Food and Nutrition Sector Review" of 31st January, 1985, have been quantified. This particular study (Table-6 of the publication cited) also gives the average daily calory intake and the foodgrain s upplied during year per head for each of the 10 groups. The table relating to the year 1982-83 is reproduced below:

Table : II - 16
BENEFICIARIES OF PFDS BY SOCIO-ECONOMIC GROUPS
 (1982 - 1983)

Groups	Popula- tion millions	Average calories per day/ per head	Foodgrain supplied by PFDS during year kgs. per head	Subsidy per head (Tk.)
1	2	3	4	5
1. Landless farm worker	19.3	1529	Rice - 6.5 Wheat - 20.1 Total - 26.7	68.4
2. Small farmers (1.5 acres)	11.1	1638	Rice - 3.8 Wheat - 3.1 Total - 6.9	15.1
3. Medium farmer (tenant) (1.5 - 5 acres)	11.3 (12.2)	1764	Rice - 1.9 Wheat - 1.5 Total - 3.4	7.4
4. Medium farmer (owner) (1.5-5.0 acres)	12.4 (13.3)	1965	Rice - 1.9 Wheat - 1.5 Total - 3.4	7.4
5. Large farmer (5.0 - 7.0 acres)	9.8 (10.0)	2150	-	-
6. Very large farmer (7.5 acres)	4.0 (4.0)	2087	-	-
7. Rural informal non-agr.(Non-agr. rural population minus rural formal)	10.0	1482	Rice - 4.4 Wheat - 15.9 Total - 20.3	52.8

Table : II - 16 (contd...)

Groups	Popula- tion millions	Average calories per day per head	Foodgrain supplied by PFDS during year kgs. per head	Subsidy per head (Taka)
8. Rural formal non-agr. permanent job with govt. or private sector	6.7 (7.2)	2118	Rice - 13.6 Wheat - 49.4 Total - 63.0	164.1
9. Urban informal (urban popula- tion minus urban formal)	5.1 (5.5)	1708	Rice - 19.8 Wheat - 44.1 Total - 63.9	164.7
10. Urban formal (Permanent job with govt. or private sector)	3.4 (3.7)	2080	Rice - 25.6 Wheat - 83.2 Total - 108.8	280.0
Total/Average	93.0 (100.0)	1782		21.4 54.3

Note: Figure in the parenthesis are percentages.

It would be observed from the above that the benefits of PFDS are heavily skewed in favour of the urban formal class, consisting of holders of permanent jobs in the government or in the private sector. The per head subsidy of Tk.280.9 per year to this group was instrumental in keeping the nutrition level of 2080 calories per head per day. The next privileged group was the urban informal with an annual subsidy of Tk.164.7 per head. Second next group was the rural formal non-agricultural group with an annual subsidy of Tk.164.1 per head. This particular group had, however a higher nutrition level (2118 calories per head per day) than the urban formal class. The landless farmers and small and medium tenant farmers (upto 5 acres landholding) had low levels of nutrition (below 1800 calories per day) and subsidy received by them was Tk.7.4 (medium farmers) to Tk.68.4 (landless farm worker) per year. The large and very large farmers (14.5% of the population) received no subsidy at all, but they were at the top of the nutrition scale (2150 and 2081 calories per day). The medium owner

farmer (13.3% of the population) receive only Tk.7.4 as subsidy in a year, but their average calory intake per day is 1965. The rural informal non-agricultural class (10.8%) of the pupolation had the lowest level of nutrition (1482 calories per day), and they received a subsidy of Tk.52.4 per head during the year.

2.11.1. Distribution of Subsidy between Urban and Rural:

The beneficiaries of (SR) in Dhaka, Chittagong, Khulna, Rajshahi, Narayanganj and Rangamati (covering more than four million people) may all be classified as urban. The beneficiaries of the LE, EP and OMS channels should also be classified as urban. The OP group covers government and semi-Govt. employees outside the Statutory Rationing area. The primary school teachers come under this group. But the larger member of these teachers in village schools should be classified as rural beneficiaries. In the absence of complete data, 90% of the OP beneficiaries is assumed as urban and the rest rural. Similarly, the beneficiaries of OMS cover both urban and rural groups. The respective shares of OMS accruing to the urban and rural elements has been noted as 72.73% and 27.27% for 1982-83 in Bangladesh Food and Nutrition Sector Review, January, 1985, World Bank (Table - 5, page 27). The beneficiaries of Modified Rationing should all be classified under "rural". The beneficiaries of food for works programme are also all rural. It has been stated in the World Bank Report cited above that on the basis of 98 million man-days generated under the programme, 2.3 million families or 15 million people received its benefit during 1982-83. The VGF and GR channels, also rural, have been stated to have benefitted 50,000 persons in the same year.

Subsidy distribution by percentage

<u>Channel</u>	<u>Urban</u>	<u>Rural</u>
SR, EP, LE, FM	100	-
OP	90	10
OMS	73	27
MR	-	100
FFW, VGF, GR	-	100

On the above basis, the distribution of subsidy between rural and urban population for 3 years may be shown as follows:

	<u>Total</u>	<u>Urban</u>	<u>Tk. Crores</u> <u>Rural</u>
1982-83	240.00 (100%)	152.44 (63.52%)	87.56 (36.48%)
1983-84	317.00 (100%)	187.62 (39.19%)	129.38 (40.81%)
1984-85	247.00 (100%)	153.65 (62.20%)	93.35 (37.80%)

It would be noticed from the above table that the relative weights of the urban and rural components of the PFDS subsidy have practically not changed during the three years' period.

2.12. SUMMARY:

The food budget is prepared on cash flow basis, sharing gross outlay on procurement on the one hand and receipt & recoveries from distribution on the other and the resource gap to be covered by claiming subsidy from the revenue account. Because of stock adjustments and deferred payment purchases, the food budget has unstated elements of carry over from the past and implications for future budgets.

The gross outlay includes foreign aid, purchases in cash foreign exchange and taka expenditure on domestic procurement and operational expenses. The receipts and recoveries include cash sales through monetized channels, and a valuation for foodgrain distributed through non-monetized channels. Subsidy is equal to the net cash outflow, often adjustments for changes in years and stock levels. Different views may be taken of the nature of subsidy. The question of consumer subsidy has been engaging much attention of late. Three ways of calculating subsidy have been noticed.

There are four types of food aid, Quantity and value specified aids and grants on C&F basis, with no restriction on ocean transportation, the same but on f.o.b. basis with obligation to transport stated quantities in donor countrys' flag vessels, value specified grants and quantity specified grants. Some food is also imported under loans and long term credits. Foreign purchases may be for cash or under deferred payment terms. Domestic procurement is primarily aimed at providing a reasonable price for growers under well-defined procurement procedures. Source-wise procurement shows great fluctuation from year to year. Share of domestic procurement has significantly declined since 1980-81. The share of rice in the total food procurement shown a declining trend.

The internal procurement prices have increased by 50% for rice and 41% for wheat between 1980/81 and 1984/85, but international prices have moved downward (in dollar terms) during the same period. The advantage could not be passed on to consumers because of the 5% depreciation of the Taka's exchange value during the period.

Incidental costs are a significant item in the total of procurement costs. There are wide variations in their per ton incidence from year to year.

Foodgrain is distributed through (a) statutory rationing, modified rationing, open market sales and six other monetized channels, and (b) through Food For Works and three other non-monetized channels. The share of non-monetized channels has increased from 14.50% to 41.85% between 1978-79 and 1984-85. The share of Statutory Rationing, on the other hand has decreased from 23.2% to below 10% over the same period.

Tariff for the monetized channels show diversity interese, the rates for the Essential Priority channel being much lower than for others, MR/SR/OP prices are uniform, and these are lower than both the market prices and the procurement prices. The prices have advanced

from Tk.58 to Tk. 268 for rice and from Tk.48 to Tk.167 for wheat between 1975-76 and 1984-85. The rate of increase is much faster than that of the market rates, substantially reducing the privilege accruing to the SR/MR/OP beneficiary groups. The SR/MR/OP prices amounted to 38.40% of the total procurement cost of rice and 78.50% of wheat in 1980/81, but to 74.44% and 93.28% respectively in 1984/85.

In absolute terms, budgetary subsidy has increased from Tk.109 crores to Tk.244 crores between 1980/81 and 1984/85, though subsidy per ton of off-take has only increased from Tk.740 to Tk.920. On historic costs, subsidy per ton distributed has actually decreased from Tk.1200 in 1982-83 to Tk.963 in 1984/85. The level of subsidy has decreased for most of the monetized channels during the period, the major exception being that for Essential Priorities. The subsidy on non-monetized channels has increased during the period from Tk.21.98 crores to Tk.36.62 crores, but this is due to an increase of 87% in the volume distributed.

In the absence of adequate data, correlation between subsidy and nutrition of the target groups may not be meaningful. But assumption have been made about the relative weights of the rural and urban components of the PFDS. On this basis by far the greater advantage of PFDS accrues to the urban component.

CHAPTER - III
HISTORIC COSTS, ADJUSTMENTS AND ECONOMIC SUBSIDY

3.01. HISTORIC COSTS:

3.01.1. The historic or actual costs of PFDS differ from the budget estimates both for volume and outlays, and again, for receipts and recoveries. The differences arise from shortfall/excess in the procurement as well as in the distribution programme and difference in unit prices from the budgetary projections. The position may be seen as follows:

Table : III - 1
HISTORIC COSTS AND BUDGETARY PROJECTIONS

	1982-83		1983-84		1984-85	
	Budget	Actual	Budget	Actual	Budget	Actual
1	2	3	4	5	6	7
A. <u>Outlays on PFDS</u>						
1. <u>Rice</u>						
Quantity(000 tons)	480	617	316	807	840	346
Value (Tk/Crores)	340	380	257	494	652	230
2. <u>Wheat</u>						
Quantity(000 tons)	1549	959	1656	1652	2173	1985
Value (Tk/Crores)	461	360	663	664	830	817
3. Arrears(Tk/Crores)	32	-	67	-	-	-
4. Freight (Tk/Crores)	-	-	183	-	-	-
5. Other Costs (Tk/Crores)	228	179	141	312	252	329
6. <u>Stock Decrease</u>						
Quantity (000 tons)	-	360	-	-	-	243
Value(Tk/Crores)	-	117	-	-	-	142
7. <u>Total</u>						
Quantity(000 tons)	2029	1936	1972	2459	3013	2574
Value(Tk/Crores)	1061	1036	1311	1470	1734	1518
Unit Cost (Average)	5232	5351	6648	5978	5755	5901

Table : III-1 (contd...)
HISTORIC COSTS AND BUDGETARY PROJECTIONS

	1982-83		1983-84		1984-85	
	Budget	Actual	Budget	Actual	Budget	Actual
1	2	3	4	5	6	7
B. Receipts and Recoveries						
1. Cash Sales						
Quantity (000 tons)	1360	1440	1490	1440	1900	1648
Value (Tk/Crores)	584	585	708	594	867	792
Unit Price (Tk./ton)	4294	4063	4752	4125	4563	4806
2. FFW & Relief						
Quantity (000 tons)	477	494	561	560	750	927
Value (Tk/Crores)	191	211	241	247	327	479
Unit Price (Tk/ ton)	4009	4254	4296	4411	4360	5167
3. Sub-Total						
Quantity (000 tons)	1837	1936	2051	2000	2650	2575
Value (Tk/Crores)	775	796	949	841	1194	1271
Unit Price (Tk./ ton)	4219	4112	4637	4205	4505	4936
4. Stock Increase						
Quantity (000 tons)	NA	-	NA	459	363	-
Value (Tk/Crores)	93	-	202	312	265	-
5. Total value (Tk/Crores)	868	796	1151	1153	1590	1271
6. Total Subsidy (A.7 - B.5)	193	240	160	317	244	247
<u>Subsidy per ton of sales:</u>	1419	1667	1074	2208	1284	1505
<u>Subsidy per ton of distribution</u>	1051	1240	780	1590	921	963

Notes: (i) These figures are compiled from data made available to us by MOF. They may differ from figures compiled by other authorities, mainly because (1) yearend shipments may not be shown in the same year and (2) there could be some cost variations, particularly under other items of cost.

(ii) Stock decreases are treated as outlays. In 1982/83 it consisted of increase of rice stock by 103 thousand tons and decrease of wheat stock by 466 thousand tons. In 1983/84 rice stock increased by 333 thousand tons wheat stock by 124 thousand tons and in 1984/85 decrease in stock consisted of 44 thousand tons of rice and 180 thousand tons of wheat.

3.01.2. This deviation between the budget estimates and actuals have two important implications both for PFDS and the government expenditure and revenue. First, deviation implies either an excess or lower demand on government revenues as increased cost of operating PFDS or a net contribution to budget as a result of drawdown of stock. It is to recall that the food budget and the revenue budget are inter-laced with on the expenditure and the receipt sides of the budgets. Revenue budget incurs cost on account of the food budget in procurement of food and receive revenue on account of sales - the net of inflow and outflow after adjustment for stock is treated as surplus or subsidy. These ebbs and tides of the budget cause ups and downs in public fund; that, food budget may work as a source of instability of the budget in years of good and bad harvests, particularly in the year of good harvest when domestic procurement and sales would tend to deviate significantly. In a year of bad harvest there will be pressure on budget for external procurement to be compensated by increased domestic sales, but only at the cost increased subsidy. The second point which follows from this is that the role of the budget as a control on public expenditure is much weakened as a result of deviation between the food budget estimates and its actuals. With food production largely dependent on weather it is difficult to protect the revenue budget against weather for its two-day linkage with the food budget and it has to take the full impact of fluctuation in domestic output and distribution of food under PFDS. Such impact is not fully known until the close of the fiscal year such that the budget ends up with an unexpected debit or credit with the Central Bank. Where the balance is a debit it means unwarranted deficit financing and where it is a credit balance it means resource remaining idle which would be available for stock replenishment in the following years. Thus in actual operation-adjustment it takes place through A/C No.2 maintained with the Central Bank in its final analysis. But in between flows in and out the budget may undergo considerable fluctuations affecting budgetary allocation and its control. In view of this as also in the interest of budget stability it is worth considering whether the operation of the food budget should be separated from the revenue budget making it totally dependent on bank borrowing except

for one final adjustment on budget subsidy as is the practice in some of the South-East Asian Countries having public procurement and distribution programmes. The advantage of such mechanism is that it will free the revenue budget from pressure caused by weather and improve budgetary control.

3.01.3. The cash subsidy figures given above should appear to be the final magnitudes except for items not ascertained conclusively. Such an inclusive item is stock adjustment which is residually determined in quantitative terms, the quantity so determined may not exist wholly because of actual loss in movement exceeding the standard estimate. In other words, the loss in movement is credited to stock, even though such loss is incurred in maintaining the PFDS system of which stock and distribution are components. As a result stock may be over-estimated and cost of distribution under-estimated to the extent loss is attributable to distribution. It is also to note here that such losses are allowed on an arbitrary basis at a rate 4.2%. There are other reasons why the historical or actual cost figures materially differ from what they would have been under competitive condition.

Some of food aids are costly exceeding international prices while the standard of domestic operation may be considered as less than efficient one. There are wastages in movements and storage which may be considered unduly high. Consequently, subsidy cannot be termed as proper and justified unless all these also are adjusted to reflect efficiency cost. These are discussed in the following sections.

3.02. ADJUSTMENT OF PROCUREMENT COST:

3.02.1. Import-Aid, International Price & Internal Transfer:

The bulk of imported foodgrains are financed under aid and their implications for subsidy vary with the nature of agreement with the donor countries/agencies. The three usual types of food aids are:

- (a) Quantity and value specified aid
- (b) Quantity specified aid
- (c) Value specified aid

An example of (a) above is the commodity agreement dated March 8, 1982 with the US Agency for International Development under US PL-480, Title III for the sale of 175,000 MT wheat and 23,000 MT rice, among other things. The agreement laid down several conditions including no increase in quantities if prices declined, no export of foodgrains during year of procurement, no re-sale or diversion in transit and obligation to carry a certain percentage of the foodgrains in US Flag vessels. It also required a phasing down of the ration system, a reduction of the rice portion of ration and a lowering of the ration quota. It also spelled out a programme for development of the agricultural sector, which included a managed security/reserve system, OMS and incentive prices among others.

An example of the quantity specified aid is the Australian Grant of 55000 MT wheat for the year 1984-85 for which no value was stated. The agreement stated that the objectives of the grant were primarily to meet the food needs of the poorest groups in the community and it specifically asked for an allocation of at least 20,000 tons for the Food For Works Programme and 12,965 tons for Vulnerable Group Feeding Project. The balance could be sold through ration outlets and open market sales, but the proceeds were to be applied to development projects under ADP, and costs for the improvement of the effectiveness of the FFW Programme. Freight and lighterage were to be borne by the Government of Bangladesh.

An example of the value specified aid is the provision for the import of wheat and other foodstuff from Canada upto Canadian Dollars 60 million in each of the fiscal years 1983-84 and 1984-85, subject to appropriation by the Canadian Parliament. The transportation arrangements and costs were the responsibility of the Government of Bangladesh. This was pursuant to an amendment to the memorandum of understanding between the Canadian and Bangladesh

Government for the provision of Canadian Food Aid Assistance signed on the 28th April, 1983.

Prices under (a) is stated mostly on C&F basis, but for a certain category of imports they are also stated on FOB basis a provision that 50% of the total cargo in question be carried in vessels under the flags of the (exporting) donor country. For both C&F and FOB imports, the invoice prices may not necessarily resemble prices in the international market. For example, the average price of rice imported under aids during 1982-83 has been Tk.6889/- on C&F basis per metric ton, while the C&F cost of rice imported on commercial basis in the same year was Tk.5235/- per MT. However, such prices may vary from time to time to cause difference in average prices but there is no question that import under aid is costlier than purchases in the world market since most of the food donors pursue agricultural price support policy. So there is an obvious case for adjustment of cost of food imports under aid. Against this, prices under (b) and (c) are imputed on the basis of commercial imports and the need for their adjustment is much less apparent.

3.02.2. Import-Cash Purchases:

Cash imports of foodgrains are restricted to a small number of countries, usually the ones which have been consistently exporting foodgrains to Bangladesh over a long period. C&F price is the major consideration for commercial imports. Though procurement is made on a price competitive basis, source of supply, quantity consideration, delivery schedule and terms of payment affect price actually paid for commercial imports. As a result such price may also show some deviation from the world price.

3.02.3. Local Procurement-Cash:

Local procurement is done on cash basis at prices fixed annually by the government. These prices are a function of the internal production plan given input and output prices prevailing in the domestic market within the overall objective of reaching food self-sufficiency. As the following table shows, the procurement

prices have kept in increasing from year to year, by 53% for rice and 46% for wheat between 1980/81 and 1984/85, while the market prices had advanced by 66% and 50% respectively over the same period. In 1980/81, the procurement prices were marginally higher than the wholesale market price, but since then they have remained at lower levels.

Table : III - 2
MOVEMENT ON INTERNAL PROCUREMENT PRICES

Year	Wholesale market price		Procurement price		(Tk./md.) Difference per md.	
	Coarse Rice	Wheat	Rice	Wheat	Rice	Wheat
	2	3	4	5	6	7
1980/81	168.44	110.46	172.25	112.29	3.81	2.83
1981/82	220.40	135.09	183.54	120.13	(36.87)	(14.96)
1982/83	239.61	162.35	203.00	125.83	(36.61)	(36.50)
1983/84	261.63	166.67	219.58	140.71	(42.05)	(25.93)
1984/85	280.00	165.00	263.00	165.00	(17.00)	(0.00)

Note: These are yearly average prices. Difference between higher market prices and procurement prices have been placed within parentheses.

Source: BBS & Ministry of Food.

3.02.4. Overall Adjustments for Procurement Prices:

Table III-3 below shows the adjustment needed to the procurement prices for arriving at a fair price for the total volume of procurement. For the purpose of this section, a fair ^{price} may be stated as the international price at which foodgrains were economically available from the usual sources of supply.

Table : III - 3

ADJUSTMENT FOR PROCUREMENT PRICES BY SOURCES

(Tk. per metric ton)

	1982/83			1983/84			1984/85		
	Grant Import ts	Cumml. Import ts	Local Procurement	Grant Import ts	Cumml. Import ts	Local Procurement	Grant Import ts	Cumml. Import ts	Local Procurement
1	2	3	4	5	6	7	8	9	10
A. Rice									
1. Actual Price of Procurement	6588	5234	5628	6154	6131	6014	7809	5286	6646
2. C&F Price (Cash)	-	5234	-	-	6131	-	-	5286	-
3. Price Difference	1354	-	394	23	-	(17)	2523	-	1360
4. Import volume (000 tons)	374	75	-	173	489	-	113.5	99.5	-
5. Local Procurement (000 tons)	-	-	168	-	-	145	-	-	133.5
6. Difference in value to be adjusted (Tk/crores)	50.64	-	6.62	.40	-	(.25)	28.64	-	18.16
7. Total Adjustment for Rice		57.26			.15	.1		46.80	
B. Wheat									
1. Actual Price of Procurement	3874	3614	3618	4183	3862	3859	4140	4002	4342
2. C&F Price (Cash)	-	3614	-	-	3862	-	-	4002	-
3. Difference in prices	260	-	4	321	-	(3)	138	-	340
4. Import Volume (000 tons)	511	424	-	819	712	-	1072	700	-
5. Local Procurement (000 tons)	-	-	24	-	-	121	-	-	211
6. Difference in value to be adjusted	13.29	-	.01	26.29	-	(.04)	14.82	-	7.17
7. Total adjustment for wheat		13.30	-	-	25.25	-	-	21.99	-
Total adjustment (Tk. in crore)		70.56			25.40			68.79	

Note: Figures in parenthesis mean higher C&F prices.

Source: Ministry of Food.

Grant imports cost more than commercial imports. In 1984/85, for example, grant rice from the US under PL 480(III) cost \$ 335/- C&F per metric ton, against \$ 256/- C F for commercial imports from Thailand. Similarly PL 480 (III) wheat cost \$ 163/- C&F per MT as against \$ 157/- CF per MT from Australia on commercial basis. Grant imports of wheat from all EEC countries, WFP and PL 480 (II) have all been value at the GSM Rate of \$ 160.75 C&F per MT.

There is difference between the free market rates of Burma Rice (\$212.50 C&F), and that for Thailand Rice (\$256.00 C&F per MT) in 1984/85. If quality difference is allowed ~~this is not~~ of much significance.

3.03. ADJUSTMENTS OF FREIGHT COSTS:

3.03.1. The second area which require adjustment of actual cost is on account of ocean freight paid by Government of Bangladesh for deferred payment import and imports from USA under PL 480, Title III. Although deferred payment imports are also mostly made from USA, they suffer from no restrictions regarding the use of particular flag vessels, and they are shipped at usual international freight rates between USA and Bangladesh. If such procurement is revalued at international C&F price the excess freight on account of distance is automatically covered but where FOB price is used even there freight would need to be adjusted because of distance..

3.03.2. For Title III imports 50% of the total cargo is required to be carried in US flag vessels. The difference between normal international freight and freight by US flag vessels is supposed to be paid by US Government, but because of the shipment in the vessels of Bangladesh Shipping Corporation owned or chartered, the actual freight differential may be smaller in such case, international freight differential is partly paid by the Ministry of Food and the balance is paid by the US Govt. as actual freight differential. Such splitting of freight differential is a loss to the country and an extra cost to PFDS. The situation for two years, 1983/84 and 1984/85 is shown below:

Table : III - 4
VARIATION IN OCEAN TRANSPORTATION COST

Commodity	Quantity (MT)	Freight rate per ton		Freight Rate paid by Ministry of Food	Differ- ence
		US Flag	Non-US flag		
1	2	3	4	5	6
<u>1983/84</u>					
(i) Wheat	220,522	\$ 76.00	\$ 26.00	\$ 43.00	\$ 33.00
(ii) Rice	67,164	\$ 101.11	\$ 58.35	\$ 64.00	\$ 37.11
<u>1984/85</u>					
(i) Wheat	373,445	\$ 57.99	\$ 28.95	\$ 30.00	\$ 27.99
(ii) Rice	75,166	\$ 99.11	\$ 64.00	\$ 70.05	\$ 29.06

Source: Ministry of Food.

It will be seen that the Food Department paid \$17 (\$43-26) extra per ton of wheat and \$ 5.65 (\$64-58.35) for rice in C&F basis, no fresh adjustment will be required on this ground.

3.04. ADJUSTMENTS OF INCIDENTAL & ESTABLISHMENT COSTS:

3.04.1. It may be recalled (Chapter-II, Table : II-7) that actual subsidy has come to be close to the actual cost of operation of PFDS as sales prices were moved along with procurement prices. Therefore, any further reduction will have come from narrowing the spread between the procurement and sales prices. This can happen either through a more than proportionate increase in sales prices in comparison with the procurement price and/or reduction of operation cost of PFDS. Table : II-7, Chapter-II shows that incidental costs show a rising trend along with the volume of subsidy partly due to inflation and partly to quantity change; so before passing over the increased incidental cost to consumers under PFDS in the form of higher sales prices, it is essential to establish the reasonableness of such cost on efficiency ground.

3.04.2. ^{3.04.2.} Incidental costs include many things in PFDS. These cover port dues, insurance, handling expenses, internal transportation, bagging, storage expenses, bank interest on cash credit and commission on letters of credit, depreciation on capital assets and stock losses, establishment charges are shown separately. Break up of incidental costs for 1983-84 is given below for local procurement and imports (both rice and wheat). The data in the form of per maund costs have been obtained from the Accounts Directorate. Item-wise total costs for the year were not available.

Break-up of Incidental Costs, 1983-84:

1. Internally Procured Grains (Rice & Wheat)

Procure^{ment} price 225/= per md. (Rice) & 144/= per md. (Wheat)

	Rice (Tk./md.)	Wheat (Tk./md.)
a) Bank commission @ .75% of procurement price	1.69	1.08
b) Bank Interest on c.c. advance for 3 months @ 10.75%	6.09	3.90
c) Gunnies @ 14.75 per two maund bag	7.38	6.41
d) Internal freight and handling charges	13.60	13.60
e) Storage surcharge	0.29	0.29
f) Margin to cover deterioration, bebagging and depreciation of capital assets	0.50	0.50
g) Establishment charges	3.71	3.71
h) Storage, handling and transit loss @ 4.25% of procurement cost and incidentals	10.94	7.34

Total : 44.20 36.83

2. Imported Grains (Rice & Wheat)

Average CI&F price Tk.292.83 per md. (Rice) & Tk.149.59 per md. (Wheat)

a) L/C commission and interest for retirement of documents @16% for two months	7.81	3.99
b) Port dues	0.62	0.62
c) Internal freight	9.06	9.06

	Rice (Tk./md.)	Wheat (Tk./md.)
d) Margin to cover deterioration, rebagging, etc.	0.50	0.50
e) Storage surcharge	0.29	0.29
f) Interest on c.c. advance 3 months	8.08	4.13
g) Other incidental charges	9.65	9.65
h) Establishment charges	3.71	3.71
i) Cost of gunny bags	-	6.41
j) Storage, handling and transit losses @ 4.25% of procurement and incidental cost	14.10	7.95

Total : 53.82 46.31

Source: Directorate of Accounts/Food Directorate.

3.04.3. The important items would appear to be (i) bank commission and interest, (ii) gunnies, (iii) internal freight and handling, (iv) establishment charges, and (v) stock losses. Below are discussed the possibilities of reducing the incidental costs in some areas.

(a) Bank Commission and Interest:

The bank commission at 0.75% on internal procurement price is the payment for services rendered by the banks for making payments to growers and authorized grain dealers. Bank also charge interest on temporary (3 month) accommodation provided by them. The rate of interest on local procurement is 10.7%. If payments were made directly from the government treasury to the growers etc., there would have been no interest charges payable. But administration of such payment may be difficult as this may require purchase officer having cheque issuing authority at spot. An alternative possibility is to have a system with designated banks on an imprest system so that it is the government money that may be used by their branches for payments to growers/dealers. Otherwise, the terms of accommodation could be reduced to one month, if the banks can be re-imbursed from the district/upazila treasury rather than centrally by the Accountant General. Though such arrangements will help reduce financial cost of PFDS operation, it is to be emphasized that the economical cost of procurement will remain unaffected on ground of interest on working capital.

(b) Interest on Retirement of Documents @16%:

This is the interest charged by the banks on L/C value for the period between their payment to their foreign correspondents against the shipping documents and their getting reimbursement from government account. Two months are too long a period for the purpose. Fifteen days should have been in order. An adjustment to the extent of 75% of such cost is indicated as a possibility.

(c) Internal handling and freight costs:

Handling and freight costs show considerable variation between different modes of transport. Some modes are cheaper than others both in terms of cash cost and losses. Railway transport proved to be most costly in terms of losses and trucking most efficient. In considering the cost of freight however one has to take into account the length of the haulage, the point of origin, the capacity of individual mode of transport and the time and season of movement. For these diversity of the circumstances involving movement of food it is very difficult to establish efficiency of any single mode of transportation but it cannot be denied that some of the losses (e.g. Rly. Loss) can be minimized by improvement of management. Physical losses are discussed under a separate section on loss.

(d) Establishment Charges:

These are mainly personnel costs, the balance being maintenance and operation of facilities. As efficiency in office management in Bangladesh is usually low, (Ref. FAO Report on Food Corporation) a saving of at least 10% should be possible through improvement and a cost adjustment of that order should be justified.

(e) Stock Losses:

Physical losses arise from/during ocean transport, internal movement and in storage. These three sources of losses are discussed below:

(i) Ocean Transportation Loss:

Such loss leading to short-landing is easily detectable. A limit of 1% is allowed as a more and excess shortlanding claims are to be made against the carriers/their agents for lighterage operators. Actual losses on this account are:

Table : III - 6

(000 metric tons)			
Year	Quantity Imported	Quantity Shortlanded	As percentage of imports
1	2	3	4
1975/76	1322	22	1.66
1976/77	794	15	1.89
1977/78	1649	17	1.03
1978/79	1489	20	1.34
1979/80	2590	57	2.20
1980/81	944	23	2.43

Source: Accounts Directorate.

The figures for 1979/80 and 1980/81 show an upward trend. At more than 2% of the quantity imported, the short landed figure is more than double of the allowable limit. No figure are available after 1980/81.

(ii) Inland Transportation/Storage Loss:

Standard losses as percentages of physical volume are allowed for movement and storage as follows:

For Movement:

By Rail	-	1.0%
By IWT	-	1.0%
By Country boat	-	0.5%
By Truck	-	0.2% to 1.0%

During Storage:

Upto 6 months	-	0.5%
Over 6, but upto 12 months	-	0.75%
Beyond 12 months, for every 3 months or part thereof.		0.25%

3.04.4. Every time foodgrain is moved, the standard loss could be claimed, regardless of how many times a shipment is carried during a year. On an average 40% of movements are carried by water, and 30% each by rail and road. Losses are reported to be lowest for road transport and highest for rail transport. Loss in transit has been recorded as follows, in percentage terms:

	<u>Road</u>	<u>Rail</u>	<u>River</u>	<u>Total</u>
<u>1978/79</u>				
CSD	.13	2.50	1.97	1.82
LSD	.14	4.62	1.64	1.20
<u>1980/81</u>				
CSD	.02	1.22	1.00	1.00
LSD	.08	1.63	.44	.68
<u>1984/85</u>				
CSD	0.23	3.05	0.76	1.84
LSD	0.36	1.67	0.40	0.51

Note: The figures for 1984/85 have taken from godown survey carried out for the current study while those for other years have been taken from BPMI Study (1982-83).

3.04.5. Losses are usually claimed as a matter of course on standard allowed. These may have no relation with the actual shortage. It is to note that the survey result is lower than the standard loss allowed for rail and water (IWT) transportation. Movement loss can however be estimated from movement warrants/receipts.

3.04.6. The storage losses figures collected by godown survey are as follows in percentage terms:

	<u>Rice</u>	<u>Wheat</u>
1978/79	4.00	3.60
1979/80	3.55	3.47
1980/81	3.47	3.47
1981/82	3.02	2.39
1984/85 (Survey)	3.38	3.12

3.04.7. An earlier study on losses at LSDs, CSDs and at Chittagong and Mongla godowns show the following percentages losses:

	<u>LSDs</u>	<u>CSDs</u>	<u>Percentage</u>	
			<u>Chittagong</u>	<u>Mongla</u>
1978/79	2.15	.51	1.50	4.17
1979/80	4.27	.45	3.34	1.25
1980/81	2.10	.58	2.67	1.81

The average loss per year was indicated to be 2.67%. The causes were given as long storage, unsatisfactory storage, pilferage and pests. This is much lower than the standard charge allowed.

3.04.8. Stock losses from all causes have been given as follows in World Bank's Bangladesh: Economic and Social Development Prospects, Vol. IV, 1985.

Table : III - 7
STOCK LOSSES 1977/78 to 1984/85

1	(Qty. 000 tons)		
	Total Distribution	Loss	Loss as percentage of distribution
	2	3	4
1977/78	1847	166	8.99
1978/79	1796	87	4.84
1979/80	2402	115	4.79
1980/81	1522	104	8.33
1981/82	2036	82	4.03
1982/83	1935	96	4.86
1983/84	2052	97	4.24
1984/85	2590	175	6.76

Note: Figures for 1984/85 are from Monthly Foodgrain Review for June, 1985.

3.04.9. The average for the past eight years is 5.86% and for the past 4 years is 4.97%. Although the trend is towards lower levels, the figure for 1984/85 is against the trend, and the stock loss figure is still substantial. A total loss figure of 3.7% from all causes, as had been the assumption in previous budgets should be accepted as the norm in absence of any critical analysis of actual loss and its justification and adjustment in the loss figure to that extent should be in order.

3.04.10. Suggested Adjustments:

Following adjustments are suggested under incidental costs for arriving at a reasonable estimate of subsidy under efficiency consideration:

- (i) Bank interest c.c. Advance : Maximum one month
- (ii) Bank Interest on L/C Retirement : Maximum 15 days
- (iii) Establishment charges : Ten percent reduction
- (iv) Stock Losses : Maximum three and half percent.

3.05. ADJUSTED COST OF SUBSIDY:

3.05.1. It will appear from the foregoing discussion that both procurement and operational costs of PFDS are more than can be justified and so need to be adjusted. The adjusted cost of supply works out as follows:

3.06. ADJUSTED SUBSIDY:

3.06.1. The adjusted subsidy is the difference between adjusted cost of supply and receipts and recoveries. A comparative statement of adjusted subsidy vis-a-vis actual subsidy for the three years under study is shown in Table : III - 9 below:

Table : III - 9
ADJUSTED SUBSIDY

Items	ACTUAL			ADJUSTED		
	1982-83	1983-84	1984-85	1982-83	1983-84	1984-85
1	2	3	4	5	6	7
A. Distribution Cost:						
1. Unit Costs per md (in Taka):						
Rice	273.60	275.65	296.42	267.65	268.17	248.87
Wheat	174.19	197.40	205.52	167.71	186.34	197.16
2. Quantity Distributed (000 tons)						
Rice	496	473	409	496	473	409
Wheat	1440	1527	2166	1440	1527	2166
	1936	2000	2575	1936	2000	2575
3. Total Cost of Distribution (Tk. crores)						
Rice	364	349	325	258	340	275
Wheat	672	809	1193	647	763	1144
	1036	1158	1598	945	1103	1419
B. Receipts and Recoveries (in Crores Taka)						
1. Monetized Channels						
SR, OP, MR, OMS, LE, FM, EP	585	594	792	No change		
2. Non-Monetized Channels						
FFW, VGF	211	247	479	No change		
Total receipts and recoveries	796	841	1271	796	841	1271
Subsidy (A-B)	240	317	247	199	262	146
Rice :	118	96	70	98	79	41
Wheat :	122	224	177	101	183	105

3.06.2. Comparison of Adjusted with Actual Subsidy:

It may be seen that the adjusted subsidy would be lower from the actual subsidy by Tk.41 crores for 1982/83, Tk. 55 crores for 1983/84 and Tk.101 crores for 1984/85. The difference is due to the varying rates of adjustment among the three years. For example the rate of adjustment was Tk. 47.43 per md. in 1984-85, compared to Tk.5.95 in 1982-83 and Tk. 7.48 in 1983-84. For wheat, it was Tk. 8.36 in 1984-85, Tk. 11.06 in 1983-84 and Tk. 6.48 in 1982-83. However, the basis of adjustment remained unaltered.

3.07. CHANNEL-WISE DISTRIBUTION OF ADJUSTED SUBSIDY:

Table : IIIⁱ - 10

DISTRIBUTION OF ADJUSTED SUBSIDY BY CHANNELS

Channels of Distribution	Quantity '000' tons Subsidy Tk. crores									
	1982-83			1983-84			1984-85			
	Qty	Sub-sidy	%	Qty	Sub-sidy	%	Qty	Sub-sidy	%	
A. Monetized Channels:										
SR	308	33.76	16.96	293	39.27	14.99	1264	16.70	11.44	
OP	343	37.41	18.80	345	46.04	17.57	390	24.60	16.85	
LE	77	5.46	2.74	60	7.13	2.72	64	3.16	2.18	
EP	98	39.38	19.79	108	45.75	7.46	117	38.04	26.05	
FM	129	7.49	3.76	128	13.73	5.24	145	5.75	3.94	
Sub-total (PG)	955	123.50	62.05	934	151.92	57.98	980	88.27	60.46	
OMS	118	9.12	4.58	107	10.64	4.06	202	6.85	4.69	
MR	368	48.17	24.21	399	52.80	30.18	466	29.25	20.03	
Total Monetized	1441	180.79	90.84	1440	215.42	82.22	1648	124.37	85.18	
B. Non-Monetized Channel:										
FFW	410	15.14	7.61	440	36.56	13.96	572	13.57	9.29	
Other Relief	85	3.07	1.55	120	10.02	3.82	355	8.06	5.53	
Total Non-monetized	495	18.21	9.16	560	46.58	17.78	927	21.63	14.82	
Grand Total	1936	199.00	100.00	2000	262.00	100.0	2575	146.00	100.00	

In both absolute and percentage terms the subsidy on EP has increased most (from Tk.39.38 crores and 19.79% to Taka 38.04 crores and 26.05%) over the three years period analyzed above. The share of SR has declined from Tk.33.76 crores and 16.96% to Tk.16.70 crores and 11.46%, and OP from Tk.37.41 crores and 18.80% to Tk.24.60 crores and 16.85%. The share of MR has also declined from Tk.48.17 crores and 24.21% to Tk.29.25 crores and 20.05%. The share of monetized channels taken together has declined from Tk.180.79 crores and 90.84% to Tk. 124.37 crores and 85.18%. There has been a corresponding increase in the share of non-monetized channels from Tk.18.21 crores and 9.15% to Tk.21.63 crores and 14.82%.

The distribution of adjusted subsidy by channels shows the same characteristics as in the distribution of actual subsidy by channels as in Chapter-II.

3.08. DISTRIBUTION OF ADJUSTED SUBSIDY BETWEEN URBAN AND RURAL:

	<u>Total</u>	<u>Urban</u>	<u>Rural</u>
1982/83	199	126 (63.52%)	73 (36.48%)
1983/84.	262	155 (59.19%)	107 (40.81%)
1984/85	146	91 (62.20%)	55 (37.80%)

This distribution also follows the same pattern as for the distribution of actual subsidy between urban and rural as in Chapter-II.

3.09. SUMMARY:

Historic costs of PFDS are the actual costs. They differ materially from the Budget Estimates in most respects. The deviations imply higher/lower demand on government revenues than budgetted, weakening the role of the budget as a control mechanism for public expenditure.

Historic costs may include cost of procurement at higher than internationally competitive prices, loss and wastage at unacceptable levels and costs of inefficient operation. Subsidy cannot

be termed as proper and justified unless adjustments are made for these factors:

Foodgrains received under aid, particularly rice, are usually priced at higher than world trade prices. It may include element for higher freight charges for obligation to transport a certain quantity of foodgrains in donor country's vessels. Cash imports are made on competitive basis, but delivery and quantity consideration and terms of payment have their detracting effects. Domestic procurement prices are a function of the internal production plan, but they are usually lower than open market prices. A fair price may be stated as the cash international price at which foodgrains were available from their usual sources of supply during the year of procurement.

Adjustment have to be made for freight for imports under US PL 480 Title III, and for imports under deferred payment on FOB basis.

Adjustments have also to be made against relatively high allowances for loss and wastage, more than justified provision for bank interest and for administrative overheads.

The adjusted cost of supply per md. is appreciably lower than the historic cost for both rice and wheat for the three year period studied here. The corresponding reduction in the subsidy level is seen as varying between Tk. 41 crores in 1982/83 and Tk. 101 crores in 1984/85. The channel-wise distribution of adjusted subsidy follows the same pattern as that of the unadjusted subsidy, as does its urban : rural incidence.

CHAPTER - IV
LOSS OF FOODGRAIN IN THE PUBLIC
SECTOR -AN EFFICIENCY CONSIDERATION

4.01: HISTORIC STUDIES:

4.01.1: Currently both procurement and distribution of foodgrain are widely spread out. Aid imports originate at ports thousands of miles away such as in America, Europe and Australia; that is, food under aid is moved over long distances. Even domestic procurement and distribution involve criss - cross movement of foodgrain across the country. This is obvious from the existing network of storage points consisting of silos, central supply depots and local supply depots numbering 619 units altogether, Storage movement and handling of an agricultural commodity like foodgrains risk all sorts of losses from natural perishability to theft. Since the establishment of the rationing system under The Bengal Rationing Order, 1943 efforts have however not been wanting to reduce the system loss. This is clear from the number of studies (completed untill recent times as listed below) directly addressing the question of loss.

- (i) Report of the "Transit Storage of Foodgrains on Railway Enquiry Committee, 1964"
- (ii) Feasibility Study of the Quality Control in Foodgrains by P.H.Giles and D.W.Hall; 1967
- (iii) Bangladesh Second Foodgrain Storage Project, W.B., 1978
- (iv) Feasibility Study for setting up of A Food Corporation in Bangladesh, 1979
- (v) Report of The Food Security Policy Formulation and Project Identification Mission to Bangladesh, 1982
- (vi) Study on Foodgrain Stock Management and Inventory Control System, 1982/83
- (vii) A Digest of Recent, Current and Proposed Technical Support Development for The Public Food Storage Sector in Bangladesh, FAO; 1984.

4.01.2: While all these studies focused on loss and its sources, the scope of the present study, it is to stress, is wider. Its purpose is to assess the implication of loss for subsidy calculation and therefore to decompose such loss as natural to the procurement and distribution system from loss due to system inefficiency. It is from this point of view that the existing practices allowing for loss and the findings of various studies as mentioned above will be first reviewed. The present study, to strengthen its analysis, has also carried out a sample survey of godowns with the dual objectives of assessing (a) transit loss in between points of origin and destination and (b) storage loss. Further the survey has been so designed that the transit loss can be identified by (ai) carrier (aii) season and (aiii) distance and the storage loss due to (bi) natural factors (e.g. moisture content), (bii) physical condition of storage and (biii) management factors (e.g. frequency of delivery/inventory control). The sole purpose is to identify avoidable loss, if any, and adjust "loss allowance" accordingly to arrive at a more reasonable estimate of such subsidy as benefiting the recipients of government foodgrains. The underlying argument is that inefficiency which is avoidable cannot be transferred to the consumers. Government should improve efficiency to reduce actual loss and should treat the unavoidable losses in the form of subsidy so that the consumers are not over burdened by high prices. For such transfer will not only be unjustified as a public policy but also indefensible for if full-cost pricing is used. Such price will exceed the opportunity cost to consumers unless market mechanism is more inefficient than the Public Food Distribution System (PFDS).

4.02: LOSS ALLOWANCE & REVIEW:

4.02.1: Currently in estimating the incidental cost the following normal allowance for loss is made:

(i) Allowance for Transit Loss

<u>Mode of transport</u>	<u>Permissible limit (%)</u>
1. Marine ...	1.0%
2. Rail ...	1.0%
3. Barge ...	1.0%
4. Country boat ...	0.5%
5. Truck ...	0.25%
6. Bullock cart ...	0.75%

Source: D G Food.

(ii) Allowance for Storage Loss for CSD and LSD

<u>Commodity</u>	<u>Period</u>	<u>Permissible limit (%)</u>
1. Rice	: Upto 6 months	0.5%
	: Upto 12 months	0.75%
2. Wheat	: Upto 6 months	0.5%
	: Upto 12 months	0.75%
3. Paddy	: Upto 6 months	0.75%
	: Upto 12 months	1.00%

Source: D G Food.

(iii) No allowance for storage loss in Silo is given.

4.02.2: Findings of the Earlier Studies:

As mentioned already a number of studies on the question of foodgrain loss have been completed until recent times. Their findings are briefly enumerated below:

(i) Report of the "Transit Shortage of Foodgrains in Railway Enquiry Committee, 1964":

The study was conducted in 1964 on the following terms of reference:

- (a) To investigate causes of high percentage of shortage of foodgrains while in transit on railway and the ways and means of reducing such shortages.

- (b) To suggest ways and means to expedite disposal of each claim of food department against the railways.

The study reveals the following losses presented in Table : IV - 1.

Table : IV - 1
TRANSIT LOSS TO DIFFERENT TYPES OF
GODOWNS BY TYPE OF FOODGRAIN

Years	Transit Loss in Percentage								
	Paddy			Rice			Wheat		
	CSD	LSD	Total	CSD	LSD	Total	CSD	LSD	Total
1.	2	3	4	5	6	7	8	9	10
1960-61	0.79	0.50	0.35	1.47	1.27	1.26	2.48	2.16	1.97
1961-62	2.77	0.56	0.47	2.17	1.60	1.65	1.92	1.87	1.70
1962-63	2.10	0.80	0.77	2.49	1.64	1.99	1.42	1.32	1.50
Overall	1.89	0.62	0.46	2.04	1.50	1.64	1.94	1.78	1.62

Source: Report of Railway Enquiry Committee, 1964

The percentage shortages for Flour, Suji and A.ta were 0.69%, 0.83% and 0.42% respectively.

The main causes behind transit loss were noted to be:

- (a) Theft on the way
- (b) Defective wagon
- (c) Pilferage and wastages at transshipment points
- (d) Second hand bags used for carrying of foodgrains from erstwhile West Pakistan
- (e) Shortage in bulk consignment received from USA was higher than consignment in bags.

(ii) A feasibility study of the quality control in foodgrains by P.H.Giles and D.W.Hall:

This study was conducted in 1967. It surveyed the extent of food handling and detailed the existing organizational machinery to minimize losses and deterioration of quality. The study was very subjective and recommendations were made mostly on re-organization

of food management and quality control efforts of the food department.

(iii) Bangladesh Second Foodgrain Storage Project, 1978; World Bank:

This document embarked upon the reorganization of procurement and storage system of foodgrain in Bangladesh. It has suggested the following criteria for minimum acceptable quality (MAQ) of foodgrains for minimization of loss and deterioration of quality:

Factor	Godown with Dryers	Godown without Dryers
1. Moisture content :	14%	20%
2. Foreign materials :	5%	5%
3. Admixture :	50%	50%
4. Immature grain :	3%	3%

It is observed that in addition to sub-standard nature of storage facilities in some locations environmental conditions of Bangladesh are favourable to rapid growth of insect and fungus. The Project proposals were limited to pest control, expansion and modernisation of testing laboratories and staff training. For control of storage loss, recommendations were focused on "equipment", "inspection", "testing laboratory" and "pest control". Estimated storage loss of paddy for difference of moisture content, as found in the study are given below:

Facility	Storage Period		Weighted average (6 months)	Monthly Percentage
	Dec-May	June-Oct		
(a) For 13% moisture content in Aman Paddy				
1. Private Sector Storage	4.5	9.0	6.0	1.0
2. Hired/Dilapidated tin shed	4	6.5	4.8	0.8
3. Dhaka Godowns	2.5	4	3.0	0.5
4. Dhaka with effective management	1	1.5	1.15	0.2

Contd....

Facility	Storage Period		Weighted average (6 months)	Monthly percentage
	Dec-May	June-Oct.		
(b) For 17% moisture content in Boro Paddy				
1. Dhaka Godowns	NA	8.0	-	1.35
2. Dhaka with effective management	NA	1.0	-	0.15

(iv) Feasibility Study for Setting up of a Food Corporation in Bangladesh, 1979:

The FAO Mission visited some godowns. Percentage variations of the storage loss observed in those godowns were as follows:

- (a) LSD of Modhupur = 0.31%
- (b) 21 LSD and TPC of Thakurgaon:
1. Paddy = 0.40%
 2. Rice = 0.29%
 3. Wheat = 0.28%

(v) Report of the Food Security Policy Formulation and Project Identification Mission to Bangladesh, 1982:

The mission identified some measures thought to be important, preventive as well as curative, for food security. The measures suggested are:

- (a) Improvement of storage facilities
- (b) Strengthening of grain quality control
- (c) Establishment of information system
- (d) Establishment of crop forecasting and early warning system.

(vi) Study on Foodgrain Stock Management and Inventory Control System:

This study was conducted by Bangladesh Project Management Institute (BPMI) during 1982-83 with special reference to spoiled stock

and inventory control. The study highlighted the quantum of transit and storage loss in details carefully touched qualitative deterioration and identified causes for quantitative loss. Findings of this study are noted below:

(a) Transit loss (%) by mode of transport, can be seen from the table : IV - 2 below:

Table : IV - 2
TRANSIT LOSS BY TYPE OF STORAGE AND BY MODE OF TRANSPORT

Mode of Transport	TYPE OF STORAGE				Total	
	CSD	LSD	SILLO	TPC		
1	2	3	4	5	6	7
<u>1978-79</u>	-	1.36	-	-	0.54	1.65
1. Road	-	0.21	-	-	-	0.20
2. Railway	-	3.07	-	-	-	3.07
3. River	-	2.61	-	-	0.54	0.35
<u>1979-80</u>	1.82	1.20	0.0005	0.04	0.19	1.20
1. Road	0.13	0.14	-	0.04	-	0.25
2. Railway	2.50	4.62	0.0005	-	-	4.64
3. River	4.97	1.64	-	-	0.19	0.63
<u>1980-81</u>	0.66	0.68	0.0004	0.09	0.11	1.67
1. Road	0.02	0.08	-	0.09	-	0.10
2. Railway	1.22	2.63	0.0004	-	-	2.67
3. River	1.00	0.44	-	-	0.11	0.30

Average Loss = 1.51%

The study shows significant variation by mode of transportation and storage type. Roads and railways loss is highest in case of LSDs but in case of river transport loss at CSD is higher than for LSD. This difference could be due to location and distances.

(b) Storage Loss (%) is presented in Table : IV - 3.

Table : IV - 3
STORAGE LOSS BY TYPE OF STORAGE

Type of Storage	Storage Loss (%)		
	1978-79	1979-80	1980-81
1	2	3	4
1. CSD	0.51	0.45	0.58
2. LSD	2.15	4.29	2.10
3. Silo	0.0006	-	0.003
4. TPC	0.22	0.54	0.48
5. Port			
(a) Chittagong	1.5	3.34	2.67
(b) Mongla	4.17	1.25	1.81
Overall :	2.85	1.81	3.32

From the table no pattern is discernible overtime, but generally loss is higher in case of LSD than for CSD. Taking the transit and storage losses together it appears that the main centre of loss is LSD, LSDs' loss is 4 to 9 times as high as in case of CSD.

The study also identified the causes of losses by storage types as shown below:

Reason for shortages are noted below in Table : IV - 4:

Table : IV - 4
CAUSES FOR STORAGE LOSS BY TYPE OF STORAGE

Type of Storage	(% of Response)								
	Defective scale	Defective handling at storage centres	Defective loading and unloading	Due to rats and other insects	Wrong measurement	Pilferage	Moisture evaporation	Natural drying	Long storage
1	2	3	4	5	6	7	8	9	10
1. CSD	57	100	43	86	43	29	43	14	14
2. LSD	64	100	57	100	50	29	66	14	5
3. SILO	-	100	-	-	-	-	-	-	-
4. TPC	16	-	21	53	-	-	21	-	-
5. Port	-	-	-	-	-	100	100	-	100

The table shows response rate in percentages. It reveals that Defective handling is the main common reason for storage loss. In LSD insects (100%), moisture content (66%) and defective loading (57%) are other factors of storage loss. This is also true for CSD.

Quality loss is primarily due to excessive moisture, heat, moulds and fungi, lack of timely checking and drying facilities. Quality deterioration to foodgrain occurs due to physical damage, biological damage, chemical changes, loss of palatability and heating. Infection of paddy kernel by different fungi and rates of insect/pest infestation on stored foodgrains in different types of godowns under various duration of storage are enumerated in this report. This qualitative loss leads ultimately to quantity loss as unfit for human consumption.

Foodgrain spoiled in CSD and LSD during 1978-81 is shown below:

<u>Storage Centre</u>	<u>1978-79</u>	<u>1979-80</u>	<u>1980-81</u>
LSD	7.60%	11%	5.67%
CSD	92.40%	84%	84.66%

(vii) A digest of recent current and proposed technical support development for the Public Food Storage Sector in Bangladesh, 1984 - FAO Food Security Project/BGD/O20/AUL.

This study stresses on organizational aspects of storage and quality control system. It has set of Refractive Index Specifications for quality determination. This study also highlighted the existing system of management of spoiled stock in terms of auction, OMS, etc. This study has opened a new horizon for assessment of loss through calculation of infestation rate. Some of the findings of this study are as below:

Storage Losses due to infestation:

1 insect adult consumes	: 2 cal/day
1 insect larvae consumes	: 4 cal/day
1 adult + larvae consumes	: 7 cal/day
(1 kg. foodgrains contain	: 3,300 k cal/kg.)

Infestation rate = Loss per quality over time

10 insects/kg = 21 g/ton/day

1000 insects/kg = 210 g/ton/day

The resulting annual loss from infestation has been estimated as follows:

(a) % of annual loss = 3.75%

(b) % of insect damaged grains = 0.33%

This study has maintained permissible limits to transit and storage losses and had compiled quantitative loss series from the documents of Ministry of Food which has as below:

<u>Year</u>	<u>Loss as % of Off-take</u>
1978-79	3.18%
1979-80	3.4%
1980-81	5.44%
1981-82	4.91%

4.02.3: Other Studies:

In addition to the above mentioned studies the following reports were also reviewed in this context:

- (i) Transportation of foodgrains by Road in Public Sector by Dr. A. Azim, 1982.
- (ii) Report of the investigation committee regarding pilferage of government food stuff - 1979.
- (iii) Report of the committee on the various problems relating to pilferage of stocks and other malpractices resorted to by different agencies at Mongla Port - 1981.
- (iv) Pest Control and stock management of foodgrains by USAID - 1977.

4.02.4: Analysis of Findings Pooled Together:

Transit loss has been found to be highest in rail (2.63%) particularly from LSD and smallest in Truck (.1%). Comparative transit

losses (%) can be seen from the following statement:

Table : IV - 5
TRANSIT LOSS BY MODE OF TRANSPORT

Mode of Transport	Railway Enquiry Committee (1964)	Food Stock Management and Inventory Control (1980-81)	Government allowance (upto 1985)
1	2	3	4
1. Marine	NA	NA	1.0%
2. Rail	1.64%	2.67%	1.0%
3. Barge	NA	0.30%	1.0%
4. Country boat	NA	NA	0.5%
5. Truck	NA	0.10%	0.25%
6. Bullock Cart	NA	NA	0.75%

In both the above studies transit loss in railway are excessively higher than the government allowance. In case of barge and truck the quantum of transit losses is within the permissible limits. Except for port, storage loss has been seen to be comparatively higher for paddy and smaller for wheat. A comparative statement of storage loss (%) for different foodgrains is presented below:

Table : IV - 6
STORAGE LOSS BY COMMODITY TYPE

Foodgrain	Feasibility study on Food Corporation (1979)	Report of BPMI (1982-83)	Report of World Bank (1978)	Government allowance
1	2	3	4	5
1. Paddy	0.04%	NA	0.67%	1%
2. Rice	0.29%	3.02%	NA	0.75%
3. Wheat	0.28%	2.39%	NA	0.75%

1/ Includes storage loss at the port.

The above table shows that storage loss including loss at ports are excessively higher than the government allowance but the losses at storage centres are within the permissible limits. A comparative statement of storage loss by type of storage centres are shown below:

Table : IV - 7
STORAGE LOSS BY TYPE OF STORAGE

Type of Storage Centres	Feasibility Study by FAO 1979	Report of BPMI (1982-83)	Government allowance
1	2	3	4
1. CSD	NA	0.58%	0.5 to 1%
2. LSD	0.32%	2.10%	0.75% to 1%
3. SILO	NA	0.003%	No allowance
4. TPC	NA	0.48%	NA
5. Port.	NA	2.24	NA

The above table shows that according to feasibility report storage loss at LSD during 1979 was within the prescribed limit but according to Report of BPMI in the year 1982-83 it was higher than the permissible limit. In case of CSD it was within limit but in cases of TPC, Silo and Ports the losses appear on the higher side. The study of BPMI has also identified the following causes for quality deterioration:

- (i) Rates of insect/pest infestation.
- (ii) Infestation by fungi.
- (iii) Damages in the form of colour, chemical changes and baking and milling quality.
- (iv) Spoiled stock.

In contrast, the FAO Food Security Project in its report on Public Food Storage Sector in Bangladesh (1984) has set some specifications and gradation for quality determination including rejection limits.

4.03.1: Incidence of Loss:

It will appear from the earlier studies that there are many factors contributing to losses and they originate in both movement and storage. Loss in the stage of movement occurs due to unsatisfactory packing, poor packing materials, careless loading and unloading, lack of supervision, insecure mode of transportation, pilferage/theft, etc. On the other hand storage loss occurs to poor storage facilities, unscientific stacking, longer storage time, absence of sufficient pest control facilities, lack of supervision and moral control and the presence of excessive moisture content. Loss incurred during 1980-81 to 1984-85 in both transit and storage is given below:

Table : IV - 8

STORAGE & TRANSIT LOSSES (%) BY TYPE OF STORAGE

(Fig. in %)

Type of Storage	Transit Loss		Storage Loss		Total	
	1980-81 a	1984-85 b	1980-81 a	1984-85 b	1980-81 a	1984-85 b
1	2	3	4	5	6	7
1. CSD	0.66	1.84	0.58	0.68	1.24	2.52
2. LSD	0.68	0.51	2.10	0.63	2.78	3.29
3. SILO	0.0004	0.58	0.003	0.0	0.0034	0.58
4. TPC	0.09	0.56	0.48	0.23	0.53	0.84
5. Port	0.00	0.00	2.66	2.66	2.66	2.66
6. Overall	0.35	0.87	3.46	3.5	3.81	4.03

Source: (a) BPMI Report and (b) Godown Survey by EUREKA (Bangladesh) Ltd

The above table shows that total loss of foodgrains has increased by about 5.8% during the period 1984-85 probably due to adverse effect of the factors mentioned above. As per physical verification report (PVR) the estimated stock loss will be 1.74%, 4.44% and 3.67% for Rice, Wheat and both Rice and Wheat respectively. Exact calculation of shortages on the basis of PVR from RC Food and CMS Chittagong and Khulna shows the following losses for the year 1985-86:

	<u>Rice</u>	<u>Wheat</u>	<u>Total</u>
Transit Loss	2.92%	.72%	1.10%
Storage Loss	1.06%	0.42%	0.57%
Shop Loss	0.01%	1.02%	0.98%
Overall	2.22%	1.56%	1.72%

The longitudinal data of storage loss and transit loss at CSD are presented below:

Year	Storage Loss			Transit Loss		
	Rice	Paddy	Wheat	Rice	Paddy	Wheat
1980-81	1.24%	2.53%	2.00%	1.34%	0.97%	5.25%
1981-82	1.47%	2.67%	1.45%	3.89%	8.00%	4.22%
1982-83	0.79%	4.60%	0.47%	2.83%	1.12%	4.62%
1983-84	0.70%	1.64%	0.40%	3.06%	7.18%	4.68%
1984-85	0.65%	2.27%	0.39%	4.68%	4.73%	2.10%
1985-86	0.95%	3.13%	0.40%	6.01%	2.17%	0.76%

Source: D G Food.

This shows that the figures of D G Food on stock loss for the year 1985-86 is slightly lower than that of EUREKA (Bangladesh) Ltd. but the time series of storage loss and transit loss in CSD are generally higher than the observed figures of this study and those of BPMI report.

4.03.2: Transit Loss:

Transit loss originate in lighters while unloading from sea vessels and accumulates at the stages of loading, while in transit and unloading from traditional transports for ultimate storing at the godowns. In case of local procurement transit loss originates while loading into traditional transport at the procurement centres and accumulate in the sameway as it is for imported grains. Transit loss is highest for Railway (1.30%) followed by truck (0.52%) and smallest for headload (0.01%). 24.1% of the total loss of foodgrains occurs as transit loss. Transit loss is highest for movement of foodgrain to CSD (1.84%) and smallest for LSD (0.51%).

4.03.3: Storage Loss:

Storage loss occurs at various points of storage, namely, Central Storage Depots (CSD), Local Storage Depots (LSD), Temporary Procurement Centre (TPC) and SILO and at the port. Storage loss has been found to be highest at port (2.66%) followed by CSD (0.68%), LSD (0.63%) and TPC (0.28%). Storage loss at LSD and TPC has shown decreasing trend since 1980 but it has shown increasing trend in CSD for the same period. Excluding losses at port transit loss is higher than storage loss but including loss at port storage loss is about 3.15 times more than transit loss.

4.04.1: Types of Loss:

Storage and transit loss can be broken down into two groups:

- (i) Quantitative Loss
- (ii) Qualitative Loss.

Qualitative loss if not abated merges into quantitative loss. Quantitative loss occurs due to unsatisfactory packing and packing material, mishandling of loading and unloading, insufficient precaution against theft, pilferage, insects, birds, rats, rains, moisture content, etc. On the contrary, quality deterioration is due to excessive moisture content, heat, fungi, lack of timely checking and segregation, lack of drying facilities and spraying of insecticides, etc. Time series for quantitative loss of food-grain for the year 1978 to 1985 as observed in different studies and records of food department are given below:

<u>Year</u>	<u>Quantitative Loss (%)</u>
1977-78	5.48
1978-79	3.68
1979-80	3.51
1980-81	3.47
1981-82	3.69
1984-85	3.16

The above figures show that ~~ex~~cept for slight increase for the year 1981-82 the quantitative loss shows monotonically decreasing tendency.

Besides, quantitative loss, quality deterioration occurs substantially to stored foodgrains. As a result some percentage of the stock become unfit for human consumption. Percentage of spoiled stock declared for auction was 0.68% and that declared Ekdam was 0.32% for the year 1981-82. As per BPMI Report in 84% of CSD and 5 to 10% LSD there had been incidence of spoiled stock during 1978-81.

4.05.1: Qualitative Loss:

From various studies basic causes for qualitative losses are identified as follows:

- (i) Excessive moisture content
- (ii) Admixture of inferior varieties
- (iii) Foreign matter, and
- (iv) Damaged grains.

Existence of more than 12% moisture content is an important reason for qualitative deterioration of foodgrain. The impact of moisture content becomes grave where there is no drying facility. Moisture content develops fungi infestation as well as insect infestation. Nutritional value of foodgrain reduces due to growth of microflora and insect infestation. Admixture of spoiled stock or inferior quality with normal grain gradually spoils the whole stock. Presence of foreign matters is favourable to fungal growth and hazardous to health and nutritional value of foodgrain. The amount of damaged grains depends on volume of pest infestation and damages by water, heat and fungi. Damages can be classified in three ways: Physical damage, biological damage and chemical damage. Design type and physical structure of godowns, sanitation and fumigation have also impact on the quality of foodgrain.

4.05.2: Qualitative Loss:

It is highly critical and difficult to determine loss due to quality deterioration. Specification for quality determination of paddy, rice and wheat is placed below:

Table : IV - 9
QUALITY SPECIFICATION

Refraction	Paddy		Rice		Wheat	
	FAQ(%)	Rejection limit (%)	FAQ(%)	Rejection limit(%)	FAQ(%)	Rejection limit(%)
11	2	3	4	5	6	7
1. Moisture	15	Above 15	15	Above 15	14	Above 14.
2. Foreign material	2	Above 2	0.5	Above 0.5	3	Above 3.
3. Damage grain	-	-	2	Above 2	3	Above 3
4. Shrivelled/ Immature	3	Above 3	4	Above 4	10	Above 10
5. Broken grain	-	-	25	Above 25	-	-
6. Admixture	10	Above 10	10	Above 10	-	-
7. Protein	NA	NA	NA	NA	9.5% Minimum	Below 9.5%
8. Living insect	NA	NA	NA	NA	NA	NA

Source: FAO Food Security Project, 1984.

FAQs : Stands for fairly average quality of foodgrain.

4.05.3: Laboratory Test for Quality:

Under the present study a number of samples were collected for laboratory test, but the test could not be carried out. As an alternative to the laboratory test of the sample foodgrains some past reports of physical and chemical tests of foodgrain have been compiled and are placed below to see the impact of different refractions:

Refractions	Paddy (Godown)	Rice (Godown)	Wheat	
			Port	Godown
a. Chemical Test				
1. Protein	-	-	-	-
2. Moisture	-	9.3%	14.4%	6.9%
3. Living Insect	-	-	7 kg.	-
4. Foreign materials	-	0.5%	0.75%	1.1%
5. Damaged karnels	-	-	1.3%	6.4%
6. Helde test (Mineral oil)	-	Positive	-	Positive
7. Glutin	-	-	-	8.8%
b. Physical Test				
1. Damaged grain	-	1.6%	-	-
2. Foreign matters	-	1.6%	-	-
3. Moisture	14%	13.4%	-	-
4. Colour and test	Huge	-	-	-

Source: Directorate of Inspection and Control.

It will appear that there are large gaps in existing information.

4.05.4: Quality Loss due to Moisture:

It has been observed that both the qualitative as well as partly quantitative losses of foodgrains occur mainly due to differences of moisture contents. The following table witnesses the above statement.

Table : IV - 10
LOSS DUE TO MOISTURE CONTENT

Foodgrain	Loss due to Percentage difference of Moisture Content		
	(Fig. in %)		
	14%	15%	Total
1	2	3	4
Paddy	1.30	0.44	0.53
Rice	0.73	0.46	0.72
Wheat	0.37	0.47	0.46
Overall :	0.73	0.47	0.57

Existence of moisture content in the foodgrain had direct bearing on the rate of insect infestation and fungal growth in the stored grains. According to the Godown Survey, in 11% cases qualitative loss had been reported to be due to fungus and 48% cases due to difference in moisture content.

4.05.5: Measures in Operation : Management of Spoiled Stock:

Quality of stored foodgrains are usually checked by the following methods:

- (i) Eye estimation - colour, coal, dust
- (ii) Moisture test
- (iii) Dust checking
- (iv) Teeth cutting
- (v) Use of pipe or fork
- (vi) Laboratory test, etc.

Due to longer stay in the storage and excess moisture content in the foodgrain the quality of foodgrain deteriorates and in many cases grains become unfit for human consumption. Some percentage of such stock is sold in the open market through auction, some destroyed and the rest retained. Such information were collected through a godown survey. The percentage distribution of commodities deteriorated as revealed by the godown survey under the present study is shown in table below:

Table : IV - 11

HANDLING OF SPOILED STOCK IN SAMPLE AREA BY TYPE OF FOODGRAIN

Foodgrain	Steps taken for Spoiled Stock			Overall
	Auctioned	Destroyed	Retained	
1	2	3	4	5
1. Paddy	-	-	-	-
2. Rice	0.611%	-	0.003%	0.614%
3. Wheat	0.539%	0.012%	0.04%	0.591%
4. Overall	0.575%	0.012%	0.022%	0.609%

The table shows that quality deterioration is highest for Rice (0.614%) followed by Wheat (0.591%). The average quality deterioration to foodgrain is 0.609%.

4.05.6: Seasonal Shift in The Structure of Foodgrain Production and Procurement:

During the past 5 year there has been significant change in the contribution of various foodgrains to total output in respect of harvest season. The shift as shown in the table below has been away from aus-aman harvest to boro-wheat harvest and therefore harvest season away from dry to wet season resulting in storage problem.

Table : IV - 12

YEARLY AGRICULTURE PRODUCTION BY TYPE OF CROP

(Figures within brackets are the percentage)

Output Crop	1979-80	1980-81	1881-82	1882-83	1883-84	1984-85
	2	3	4	5	6	7
Aus and Aman	10112 (75.85)	11074 (75.1%)	10313 (71.8%)	10501 (69.7%)	11250 (70.3%)	11600 (69.2%)
Boro	2427 (18.2%)	2589 (17.6%)	3102 (21.6%)	3490 (23.2%)	3600 (22.5%)	3850 (23.0%)
Wheat	810 (6.0%)	1075 (7.3%)	952 (6.6%)	1078 (7.1%)	1150 (7.2%)	1300 (7.8%)
Total :	13349 (100%)	14738 (100%)	14367 (100%)	15067 (100%)	16000 (100%)	16750 (100%)

Source: Bangladesh : Economic and Social Development Prospect, 1985
- World Bank

It is seen from the above table that the share of boro output has increased from 18.2% in 1979-80 to 23.0% in 1984-85 and wheat from 6.0% to 7.8% whereas aus-aman has decreased from 75.8% in 1979-80 to 69.2% in 1984-85. This has significant implication for moisture content because the harvest time of boro (May-June) coincides with the rainy season. Therefore, moisture content will become important. If measures for moisture control such as drying facilities lag behind government procurement will suffer and in turn domestic production will also be discouraged, on the other hand, if procurement programme is maintained, moisture control will become an important issue.

4.05.7: Recommendations:

For quality control the following measures have been recommended under various studies:

1. Establishment of laboratory test facilities at each Zila Headquarter.
2. Fixation of responsibility for quality loss and adoption of a punishment and reward policy for bad work and good work respectively, for the concerned personnel.
3. Control of excess moisture content from foodgrains through drying facilities.
4. Separation of inferior quality grains from that of superior quality.
5. Ensuring strict routine fumigation and other pest control measures in the godowns.

4.06: LOSS DUE TO SHORTAGE:

4.06.1: Loss due to shortage occurs at two stages viz. shortage in movement by carrier or transport loss and shortage in godown or storage loss. Food Division has set some tolerable limits to both the transport and storage losses.

4.06.2: Shortage in Movement/Transit Loss:

Transport loss is defined as the difference in weight recorded at port or procurement centres before loading into local transport media and the weight found at storage centre after unloading from transport. Hence it does not includes the loss that occurs at the port shed/godowns and the loss due to movement by lighters to Jetties. Rails, trucks, barges, boat, cart and head-lead are the usual mode of transport used for carrying foodgrains.

Government permissible limits to transport loss is given below:

Type of Storage	Permissible Limits		
	Rail	Road	River
LSD	1%	.75 to 1%	0.50%
CSD	1%	.75 to 1%	0.50%
TPC	1%	.75 to 1%	0.50%
SILO	1%	.75 to 1%	0.50%

To estimate loss in movement a godown survey was carried out which inter alia, asked questions at the receiving points about difference in deliveries and receipts. In this study 38 storage centres were covered. The survey reveals that transport loss is 0.87% of the goods carried. It is highest for train (1.3%), followed by truck (0.52%), barge (.45%), boat (0.32%), cart (.17%) and head load (.01%).

However, loss varies for different kind of foodgrains with the distance of movement. Since LSDs are more numerous than CSDs, movement to LSDs generally involves shorter hauls than in case of CSD. Variations in transport loss can be seen from the Table:IV-13 below:

Table : IV - 13
PERCENTAGE LOSS OF FOODGRAIN BY MODE OF
 TRANSPORT, TYPE OF COMMODITY & GODOWN TYPE

Commodity/Type of Godown	Transit Loss in %						Overall
	Rail	Truck	Barge	Boat	Cart	Head	
1	2	3	4	5	6	7	8
I. <u>LSD</u> :	<u>1.67</u>	<u>0.36</u>	<u>0.36</u>	<u>0.44</u>	-	-	<u>0.51</u>
(i) Paddy :	0.23	0.34	-	0.60	-	-	0.56
(ii) Rice :	1.72	0.46	0.49	0.44	-	-	0.41
(iii) Wheat :	2.33	0.42	0.36	0.41	-	-	0.41
II. <u>CSD</u> :	<u>3.05</u>	<u>0.23</u>	<u>0.76</u>	-	-	-	<u>1.84</u>
(i) Paddy :	0.47	0.12	-	-	-	-	0.30
(ii) Rice :	2.66	2.3	0.76	-	-	-	2.01
(iii)Wheat :	3.20	2.3	0.75	-	-	-	2.36
III. <u>SILO</u> :	<u>0.58</u>	-	-	-	-	-	<u>0.58</u>
(i) Paddy :	-	-	-	-	-	-	-
(ii) Rice :	-	-	-	-	-	-	-
(iii)Wheat :	0.58	-	-	-	-	-	0.58
IV. <u>TPC</u> :	<u>0.60</u>	-	-	-	<u>0.40</u>	<u>0.10</u>	<u>0.56</u>
(i) Paddy :	-	-	-	-	0.15	0.01	0.08
(ii) Rice :	0.56	-	-	-	-	-	0.56
(iii)Wheat :	0.63	-	-	-	0.25	-	0.60
V. <u>Overall</u> :	<u>1.30</u>	<u>0.52</u>	<u>0.41</u>	<u>0.44</u>	<u>0.40</u>	<u>0.01</u>	<u>0.87</u>
(i) Paddy :	0.47	0.22	-	0.60	0.15	0.01	0.31
(ii)Rice :	1.17	0.56	0.45	0.44	-	-	1.00
(iii)Wheat :	1.50	0.59	0.36	0.41	0.25	-	0.99

Source: Survey of Consultant (1985).

Table : IV - 13 shows that loss of rice and wheat is generally higher than that of paddy, except in case of boat transport, Again between wheat and rice the loss of wheat tends to be higher than for rice except in case of transportation by railways, probably due to its urban character and management. Excluding paddy, loss in case of CSDs is generally higher than that in case of LSDs - about 50% higher in case of railway and two to five fold in case of movement by barges and trucks respectively.

Transport loss is not found to systematically vary with the number of consignments received but in general probability of loss declines with the increase in frequency; that, there is no systematic element of loss in individual consignment. This will be evident from Table : IV - 14 placed below:

Table : IV - 14
TRANSPORT LOSS (%) IN DIFFERENT STORAGE CENTRES BY FREQUENCY OF CONSIGNMENT

Frequency of consignment	Transport Loss (%) during Movement to				
	LSD	CSD	SILLO	TPC	Yearly Av.
1	2	3	4	5	6
1 - 12 :	-	-	0.85	-	0.85
13 - 60 :	0.44	0.78	-	0.10	0.61
61 - 120 :	0.45	-	-	-	0.45
121 - 180 :	0.17	2.70	0.30	0.63	0.95
181 - 240 :	0.24	2.16	-	-	0.20
241 - 300 :	0.14	-	-	-	0.14
301 - 365 :	0.14	-	-	-	0.14
366 + :	0.75	-	-	-	0.75
Yearly Average:	0.51	1.84	0.58	0.56	0.87

Source: Survey by Consultant (1985).

It has however been found that transit loss varies considerably from month to month. Monthly variation of transport loss can be seen from the Table : IV - 15 placed below:

Table : IV - 15
MONTHLY TRANSPORT LOSS BY MODE OF TRANSPORT

Months	Transport Loss (%) by Mode of Transport						
	Train	Truck	Barge	Boat	Cart	Head	Overall
1	2	3	4	5	6	7	8
May, 1984	0.64	0.50	0.41	0.16	-	-	0.51
June, 1984	0.61	0.36	0.58	0.36	-	-	0.40
July, 1984	0.78	0.90	0.57	0.49	-	-	0.73
August, 1984	1.39	0.78	0.63	0.45	-	-	0.84
September, 1984	0.70	0.65	0.70	0.37	-	-	0.59
October, 1984	0.63	0.48	0.23	0.27	1.6	-	0.53
November, 1984	1.12	0.73	0.14	0.20	-	0.01	0.71
December, 1984	1.65	0.55	0.47	0.25	-	-	0.76
January, 1985	1.84	0.59	0.29	0.37	-	-	0.89
February, 1985	1.72	0.42	0.33	0.29	0.10	-	0.73
March, 1985	1.25	0.37	0.35	0.42	-	-	0.59
April, 1985	0.88	0.50	0.75	0.23	-	-	0.54
Yearly Average:	1.30	0.52	0.41	0.15	0.17	0.01	0.87

Generally loss appears to be at its peak during November to March, a period of procurement (Aman) and also distribution including Food For Works and again in July and August, a period of lean economic activities.

In the following table a comparative position of the findings under the survey and Bangladesh Project Management Institute (BPMI) study is described.

Table : IV - 16
COMPARISON OF LOSS BY CARRIER

Mode of Transport	Permissible limit of Food Division	A Report of BPMI			Godown Survey '85 (by EUREKA)
		1978-79	1979-80	1980-81	
1	2	3	4	5	6
I. LSD		1.36	1.20	0.68	0.51
(i) Rail	1%	3.07	4.62	2.63	1.67
(ii) Road	.25 to 1%	0.21	0.14	0.08	0.36
(iii) River	0.50%	2.61	1.64	0.44	0.40
II. CSD		NA	1.82	0.66	1.84
(i) Rail	1%	NA	2.50	1.22	3.05
(ii) Road	.25 to 1%	NA	0.13	0.02	0.23
(iii) River	0.50%	NA	4.97	1.00	0.76
III. TPC		0.0	0.04	0.05	0.56
(i) Rail	1%	0.0	0.0	0.0	0.00
(ii) Road	.25 to 1%	0.0	0.04	0.05	0.40
(iii) River	0.50%	0.0	0.0	0.0	0.00
IV. SILO-		0.0	0.0005	0.0004	0.18
(i) Rail	1%	0.0	0.0005	0.0004	0.58
(ii) Road	.25 to 1%	0.0	0.0	0.0	0.00
(iii) River	0.50%	0.0	0.0	0.0	0.00
(iv) Ghat		0.54	0.19	0.11	Merged with river
Total :	1.5%	0.95	0.77	0.35	0.87

From the above table it is seen that transport loss by train has been consistently above the permissible limit for food carried to LSD and CSD whereas this is within the set limit for SILO and TPC. Transport loss in road transport is higher under the Godown Survey compared with that of BPMI; still it is within the permissible limit. Transport loss in river transport has shown downward tendency in case of movement to LSD and CSD under BPMI study; the tendency is found to continue under the present survey also.

4.06.3: Shortage in Godowns/Storage Loss:

Shortage in godown or storage loss has been defined as loss of food-grain occurred in the storage during the reference year May, 84 to April, 85. This is, in fact, the difference in weight of foodgrain despatched for different off-take from the weight recorded in the godown at the time of receipt. Storage loss has been computed as shortage in storage as percentage of quantity received.

Loss Allowance: Food Division has set the following permissible limits to storage loss:

Commodity	Permissible Limit	Period
1. Rice	0.75%	Upto 12 months
	+ .25%	for additional 3 months
2. Wheat	0.75%	Upto 12 months
	+ .25%	for additional 3 months
3. Paddy	1%	Upto 12 months
	+ .25%	for additional 3 months

4.06.3.1: Primary data on storage loss was collected in two stages: first, under the main survey and secondly, under a review survey. The main survey was conducted over 34 godowns: consisting of 2 Silos, 4 GSDs, 26 LSDs and 2 TPCs. Main survey covered receipt and despatches of the reference year and then it was followed by a review survey of 4 godowns which covered information on initial stock, receipt and despatch during the reference year and despatch out of balance quantity during the subsequent periods. Storage loss was computed on the basis of shortage accounted at the end of total despatch. Storage loss has also been measured through weighment of bags of foodgrains in LSD, CSD and Silo on sample basis. A comparative statement of storage loss observed in these operations are given below:

Table : IV - 17
STORAGE LOSS BY COMMODITY AND TYPE OF STORAGE

Commodity	LSD			CSD			SILO
	Main Survey	Review Survey	Sample Weight	Main Survey	Review Survey	Sample Weight	Main Survey
1.	2	3	4	5	6	7	8
1. Paddy	0.55	NA	NA	0.36	NA	NA	0.0
2. Rice	0.58	0.08	0.68	0.72	0.37	0.72	0.0
3. Wheat	0.39	0.19	1.40	0.68	0.45	0.45	0.0
Overall:	0.50	0.15	1.04	0.59	0.41	0.59	0.0

SILO		TPC			RECONCILED				Over- all
Review Survey	Sample Weight	Main Survey	Review Survey	Sample Weight	LSD	CSD	Silo	TPC	
9	10	11	12	13	14	15	16	17	18
NA	NA	0.36	NA	NA	0.55	0.36	0.0	0.36	0.42
0.0	0.0	0.24	NA	NA	0.68	0.72	0.0	0.24	0.55
0.0	0.0	0.25	NA	NA	0.68	0.63	0.0	0.25	0.53
0.0	0.0	0.25			0.63	0.68	0.0	0.28	0.50

(Figures are in percentage)

The above table reveals that overall storage loss is 0.50%. Storage loss is highest in CSD (0.68%) followed by LSD (0.63%) and TPC (0.28%). No storage loss in Silo was observed. In respect of type of foodgrain it is highest for rice (0.55%), followed by wheat (0.53%) and paddy (0.42%). The range of variation of storage loss both by type of storage and grain is 0.01% to 4.8%.

A comparative position of the storage loss observed in the godown survey as compared with official allowance is presented in Table : IV - 18.

Table : IV - 18
COMPARATIVE STATISTICS OF STORAGE LOSS

Foodgrain	Storage Loss in Percentage			Godown Survey by EUREKA (Bang- ladesh) Ltd. 1985
	Permissible limit allowed by Govt.			
	Upto 6 months	Upto 12 months	Additional 3 months	
1	2	3	4	5
Paddy	.75	1	0.25	0.42
Rice	.30	0.70	0.25	0.55
Wheat	0.50	0.70	0.25	0.53
Overall :	0.55	0.75	0.25	0.50

This table shows that storage loss for rice and wheat during 1984-85 has slightly exceeded the permissible limit for 6 months' storage time but for paddy it is within the set limit. As compared with permissible limits for 12 months and above the storage losses observed in godown survey are remarkably smaller.

4.06.3.2 : Causes of Storage Loss:

An attempt has been made to explain storage loss. There are 3 main causes of storage loss, namely, grain quality, godown condition and management standard. The quality issue has been already discussed; we will focus here on the physical facilities of storage i.e. the condition of the godowns, though, it is recognised that all the three factors are interactive in character. Physical characteristics of godown depend on the type of construction, design and age of godowns. All these three are found to have effect on godown loss.

Construction Type: Storage loss varies as obtained from the survey, with the type of construction of godowns. Construction has been divided into two types, pucca and semi-pucca. A Pucca godown has the floor, wall and roof of cement construction while semi-pucca means pucca floor with wall/roof made of other than cement construction. Storage loss for semi-pucca godown (0.59%) is more than the pucca one (0.54%). Detail breakup of storage losses for different types of storage centres are placed in the following table:

Table : IV - 19
PERCENTAGE OF STORAGE LOSS BY GODOWN CONSTRUCTION

Type of Storage	Pucca				Semi-Pucca				Overall			
	Paddy	Rice	Wheat	Total	Paddy	Rice	Wheat	Total	Paddy	Rice	Wheat	Total
1	2	3	4	5	6	7	8	9	10	11	12	13
1. LSD	0.53	0.37	0.36	0.42	0.57	0.79	0.41	0.59	0.55	0.58	0.39	0.51
2. CSD	0.36	0.72	0.72	0.68	-	-	-	-	0.36	0.72	0.68	0.68
3. SILO	NA	NA	0.0	0.0	-	-	-	-			0.00	0.00
4. TPC	0.36	0.24	0.25	0.25	-	-	-	-	0.36	0.24	0.25	0.25
Overall:	0.48	0.66	0.50	0.54	0.57	0.79	0.41	0.59	0.53	0.72	0.46	0.57

Design of Godowns: It was also found that storage loss depends on the type of design of godowns. Storage losses were found higher for Twin Nissan and Calcutta types, while lower for Dhaka with column and FS (Dhaka without column) design of godowns which are comparatively modern. The following table shows the variations of loss among different designs:

Table : IV - 20
PERCENTAGE OF STORAGE LOSS BY GODOWN DESIGN-TYPE

Structure Design	LSD			CSD			SILO		
	Paddy	Rice	Wheat	Paddy	Rice	Wheat	Paddy	Rice	Wheat
1	2	3	4	5	6	7	8	9	10
1. Lahore shed	0.52	0.21	0.67	-	-	-	-	-	-
2. Dhaka with column	0.39	0.33	0.26	0.36	0.60	0.68	-	-	-
3. FS (Dhaka without column)	0.45	0.40	0.31	-	-	-	-	-	-
4. Twin Nissan	0.76	0.76	0.38	-	-	-	-	-	-
5. Calcutta	-	0.16	-	-	3.31	2.32	-	-	-
6. Others	-	-	0.18	-	-	-	-	-	-
Total:	0.55	0.58	0.39	0.36	0.78	0.68	-	-	-

Table : IV - 20 (contd...)

Structure Design	TPC			Overall				
	Paddy	Rice	Wheat	LSD	CSD	Silo	TPC	Total
	11	12	13	14	15	16	17	18
1. Lahore shed	-	-	-	0.47	-	-	-	0.47
2. Dhaka with column	-	-	-	0.33	0.54	-	-	0.44
3. FS (Dhaka without column)	0.36	0.24	0.25	0.74	-	-	0.28	0.51
4. Twin Nissan	-	-	-	0.63	-	-	-	0.63
5. Calcutta	-	-	-	0.16	0.82	-	-	1.49
6. Others	-	-	-	0.18	-	-	-	1.18
Total :	0.36	0.24	0.25	0.63	0.68	2	0.28	2.50

Age of Godown vs. Storage Time: Thirdly storage loss was tried to be explained by the age of godown and storage time. Behaviour of storage loss can be seen from the following 2 x 2 contingency table:

Table : IV - 21

STORAGE LOSS BY STORAGE TIME AND BY AGE OF GODOWN

(a) CSD

(Fig. in %)

Age of Godowns	Storage time	1-2 months	3-4 months	5-6 months	7+ months
		2	3	4	5
1 - 10 years		0.48	NA	NA	0.42
11 - 15 "		0.75	NA	NA	NA
16 - 25 "		0.40	0.46	0.65	0.30
26 + "		NA	-	0.76	NA

(b) LSD

1 - 10 Years	0.30	0.38	0.39	NA
11 - 15 "	0.25	0.29	0.35	0.36
16 - 25 "	0.35	0.46	NA	0.30
26 + "	0.36	0.72	2.33	0.34

(c) TPC

Table : IV - 21 (contd....)

Storage time		1-2 months	3-4 months	5-6 months	7+ months
Age of Godown		2	3	4	5
1 - 10	Years	0.28%	NA	NA	NA
11 - 15	"	NA	NA	NA	NA
16 - 25	"	NA	NA	NA	NA
26 +	"	NA	NA	NA	NA

Note: There is no storage loss in case of Silo.

None of the above panels show any trend in the relationship between storage loss and age of godowns or between storage loss and storage time or between storage loss and interaction of age of godown and storage time except in the extreme case of very old godowns (above 26 years). It is to be emphasized that storage loss is influenced by so many factors, any bivariate relationship will be found difficult to explain the storage loss.

Frequency of Despatch: Fourthly, in CSD storage loss is found to be directly proportional to the frequency of despatches whereas in LSD it behaves irregularly. Percentage variation of storage loss can be seen from the following table:

Table : IV - 22

PERCENTAGE OF STORAGE LOSS DUE TO FREQUENCY OF DESPATCHES

Frequency of consignment	LSD	CSD	SILO	TPC	TOTAL
1	2	3	4	5	6
11 - 12	NA	NA	-	NA	NA
13 - 60	NA	NA	-	NA	NA
61 - 120	0.50	0.56	-	NA	0.56
121 - 180	0.34	NA	-	NA	0.34
181 - 240	0.72	NA	-	NA	0.72
241 - 300	0.36	NA	-	0.28	0.32
301 - 365	0.50	NA	-	NA	0.50
366 +	0.52	0.75	-	NA	0.64
Overall:	0.63	0.68	-	0.28	0.50

For LSD it is highest (0.72%) for frequency group 181-240 and smallest (0.34%) for the group 121-180. In case of CSD it is highest (0.75%) for frequency group 366 + and smallest (0.56%) for 61 to 120. The overall behavior of storage loss is also same.

Seasonality: Finally, storage loss has also a seasonal spread. During the rainy season it is comparatively smaller than in the dry season which might be due to absorption of more moisture by foodgrain during the rainy season. The following table shows the monthly break-up:

Table : IV - 23
SEASONAL BREAK-UP OF STORAGE LOSS (%)

Season/Month	Frequency of Consignment			Total
	1 - 2	3 - 5	6 +	
1	2	3	4	5
<u>A. Rainy Season</u>	2.15	0.43	0.50	0.50
May, 1984	NA	0.39	0.43	0.43
June, 1984	3.58	0.93	0.79	1.05
July, 1984	0.71	0.35	0.47	0.47
August, 1984	NA	0.43	0.81	0.78
September, 1984	NA	NA	0.50	0.50
October, 1984	NA	NA	0.49	0.49
<u>B. Dry Season</u>	0.67	0.97	0.60	0.56
November, 1984	NA	NA	0.78	0.78
December, 1984	NA	1.71	0.55	0.59
January, 1985	NA	NA	0.56	0.56
February, 1985	NA	NA	0.68	0.68
March, 1985	0.89	NA	0.39	0.40
April, 1985	0.45	0.22	0.65	0.44
<u>Yearly :</u>	1.41	0.67	0.59	0.50

A comparative statement of storage loss of the current survey with other study (BPMI) is also presented in the following table:

Table : IV. - 24
STORAGE LOSS BY TYPES OF GODOWN & SOURCES

Type of Godown				Godown Survey, 1985
	1978-79	1979-80	1980-81	EUREKA (Bangladesh)Ltd.
1	2	3	4	5
1. LSD	2.15	4.29	2.10	0.63
2. CSD	0.51	0.45	0.58	0.68
3. SILO	0.0006	0.0	0.003	0.0
4. TPC	0.22	0.54	0.48	0.28
Overall :	0.72	1.32	0.79	0.50

The above table depicts that storage losses of Godown Survey (1985) are lower for LSD, SILO and TPC and higher for CSD. The overall storage loss is also lower than the losses found in BPMI Report.

Storage loss data of Port has been collected from the secondary source and is found to be 2.66%. Including storage loss at port, aggregate storage loss stands at 3.16% which is less than the losses found at the BPMI Report (3.46%) for the year 1980-81.

4.06.4: Other Causes for Shortage:

In this survey the respondents clearly identified the factors causing the storage loss but failed to provide information on the extent of losses by each of these factors. Response rate (%) for each factor is presented in the following table:

Table : IV - 25
COMPARATIVE TABLE SHOWING RESPONSE RATE ON CAUSES OF STORAGE LOSS (IN 1981 and 1985)

(Fig. in Percentage)

Causes	1981		1985		1981		1985		1981		1985	
	2	3	4	5	6	7	8	9	10	11		
1.Rains	NA	7	NA	15	-	-	NA	NA	NA	11		
2.Absence of Drier	14	10	14	8	-	-	NA	NA	14	9		
3.Insect	NA	3	NA	8	-	-	NA	NA	NA	6		

Table IV-25 contd...

Table : IV - 25 (contd....)

Causes	LSD		CSD		SILO		TPC		OVERALL	
	1981	1985	1981	1985	1981	1985	1981	1985	1981	1985
1	2	3	4	5	6	7	8	9	10	11
4. Insuffi- cient fumiga- tion	NA	3	NA	8	-	-	NA	NA	NA	6
5. Fungus	NA	3	NA	8	-	-	NA	NA	NA	6
6. Pilfer- age	29	7	29	15	-	-	NA	NA	29	11
7. Moisture differ- ence	66	24	43	3	-	100	21	NA	55	14
8. Handling	100	NA	NA	-	100	-	NA	NA	100	NA
9. Others	5	7	14	-	-	-	NA	NA	10	4

Source: BPMI Report and Report of EUREKA (Bangladesh) Ltd.

From the above table it is seen that loss due to handling is common. Insect (36%) is another major factor for storage loss, followed by difference of moisture content (14%) and rain (11%).

The causes for storage loss on the basis of subjective indicators of respondents are presented below in percentage terms:

Table : IV - 26
CAUSES FOR STORAGE LOSS BY TYPE OF STORAGE

Causes	(Fig. in %)				
	LSD	CSD	SILO	TPC	Overall
1	2	3	4	5	6
1. By rain	10	38	-	-	20
2. Absence of Drier	-	-	-	-	-
3. Insect	25	27	-	NA	26
4. Insufficient fumigation	10	24	-	-	17
5. Fungus	11	NA	-	-	11
6. Pilferage	19	9	NA	NA	14
7. Difference of Moisture content	48	2	100	-	50
8. Others	NA	NA	-	-	-

Source: Report EUREKA (Bangladesh) Ltd. 1986

The table shows that difference in moisture content (50%) is the major factor of storage loss followed by insect (26%), rain (20%) insufficient fumigation (17%), pilferage (14%) and fungus (11%).

4.07. ECONOMETRIC ANALYSIS:

4.07.1. Loss Function for Transit Loss:

It is assumed that transit loss (Y) depends on the explanatory variables: Mode of transport (x_1), Distance (x_2), Quantity transported (x_3) and Frequency of operation (x_4). The estimating equation for loss function is as follows:

$$Y = 90.28482 - 27.170033 x_1 - 0.13966 x_2 + 0.0062089 x_3 + 0.0692223 x_4$$

$$(t \text{ values}) (0.143) (-.17765) (-.04189) (-.9158) (.0697)$$

$$R^2 = 0.702389$$

$$DW = 1.517$$

$$\text{For } \alpha = .05$$

$$d_l = 1.27$$

$$d_u = 1.65$$

$$\text{and For } \alpha = .01$$

$$d_l = 1.07$$

$$d_u = 1.43$$

The above equation explains that about 70% of transit loss is explained by the explanatory variables.

At the level of significance $\alpha = .01$, d_u is less than DW. From it we can conclude that autocorrelation co-efficient for the error terms is zero. From the fitted equation we can also predict that for unit increase in "Mode of Transport" and "Distance" there will be corresponding decrease of 27.1700333 and 0.13966 units in Transit loss and for an unit increase in "Quantity transported" and "Frequency of operation" there will be corresponding increase of .0062089 and 0.0692223 units in transit loss. At .01 level of significant t value for all co-efficients are insignificant.

4.07.2. Loss Function for Storage Loss:

Y (Storage Loss) = $a_1 + b_1x_1$ (Godown type) + b_2x_2 (operating days) + b_3x_3 (Size) + b_4x_4 (OMS + Dealers Volume) + b_5x_5 (Inspection frequency) + b_6x_6 (Moisture content).

It has been assumed that storage loss in godowns can be explained by the following variables:

- (i) Godown type
- (ii) Number of consignment
- (iii) Size
- (iv) OMS and Dealers volume
- (v) Inspection frequency, and
- (vi) Difference of Moisture Content

$$Y = 24.24364 - 9.87262 x_1 + 0.0062586 x_2 + .0012455 x_3 \\ - .0011637 x_4 - .221016 x_5 + 3.77448 x_6 \\ R^2 = 0.76273$$

The above equation shows that for unit increase of "Godown type" "OMS and dealers volume" and "Inspection frequency" there will be corresponding reduction in storage loss of 9.87262 tons, .00016337 ton and .221016 tons.

This curve also reveals that for unit change in "Number of consignment", "Size" and "Moisture Content" there will be corresponding increase of .00062586 tons, .00112455 tons and 3.77448 tons in storage loss. $R^2 = 0.76273$ indicates that 76.27% of the factors of storage loss is explained by the above explanatory variables.

4.08.1. Measures in Operation:

To reduce ^{loss} of foodgrain a number of measures are taken during loading, unloading and storing.

(a) Measure taken at the time of loading are:

(i) Stitching of open/torn bags: Before loading into traditional mode of transport all the bags are checked and stitching are made on open or torn bags. This saves wastage during transit, loading and unloading.

(ii) Supervision: Loading operation is supervised to check any pilferage or theft.

(iii) Head Load: Loading is done through head load, This minimizes the handling loss.

(b) Measures taken during unloading are:

(i) Draft survey: Before loading into lighter vessel or unloading at outer anchorage draft survey is conducted by ship surveyor.

(ii) Weighing: After unloading from the traditional mode of transport weighing of foodgrains are done by the Inspector, Sub-Inspector or Assistant Sub-Inspector.

(iii) Supervision: To check pilferage supervision of unloading is done by inspector or sub-inspector.

(iv) Bagging and stitching of bags.

(v) Examination of quality of Stock.

(c) Measures taken at the time of storing are:

(i) Dunnage: Stacking of foodgrain is done on dunnage made of wood or bamboo.

- (ii) Stack size: Standard size of a stack will be as per following specification:

Length	24' to 25'
Breadth	15'
and Height	14 bags.
 - (iii) Fumigation: Fumigation and spraying of insecticide to ensure quality control.
 - (iv) Proper ventilation and appropriate design type for godown.
 - (v) Examination of infected foodgrains.
- (d) Quite a large percentage of cases spoiled stock ultimately result in quantity loss. Thus the following measures, for checking and quality control, are in practice:
- (i) Eye Estimation
 - (ii) Moisture test
 - (iii) Dust checking
 - (iv) Teeth cutting
 - (v) Laboratory test
 - (vi) Application of mechanical process
 - (vii) Open market sale
 - (viii) Auction.

4.08.2. Measures Recommended:

Some of the measures recommended for control of storage loss are mentioned below:

- (i) Replacement of unsatisfactory semi-pucca and old godowns by modern one, or upgradation of the same.
- (ii) Rejection of foodgrain having excess moisture

- (iii) Introduction of incentive system to good workers and illustrative punishment to culprits.
- (iv) Regular and timely inspection of procured stock by honest personnel and intensification of pest control operation.
- (v) Strict enforcement of the inventory control.
- (vi) Rationalization of the claim for godown shortage.
- (vii) Introduction of mechanical weighment system.
- (viii) Supply of necessary machinery and tools for facilitating necessary examination of foodgrains.
- (ix) Outside influence and pressure should be stopped.
- (x) Godowns should be free from deteriorated stock of foodgrains which are already infested by insect and be cleaned and properly disinfested before storing any fresh stock.
- (xi) Wooden Dunnage only should be used for stacking
- (xii) Stacking should be done as per standard specification.
- (xiii) Sanitation and arrangement for frequent laboratory test must be ensured.
- (xiv) Proper training for storage management.

4.08.3. Some of the measures recommended for control of storage loss at the port are presented below:

- (i) Port may be equipped with adequate lighterage arrangement with mechanical weighment system.
- (ii) Arrangement for spot examination of foodgrains before unloading from ship.
- (iii) Discrepancy between the manifest quantity and surveyed quantity should be pointed out on the spot.

- (iv) The loaded barges must be guarded by reliable guards on transit status.
- (v) Proper supervision during loading and unloading.
- (vi) Fixation of responsibility for unreasonable shortage and arrangement for capital punishment.

4.08.4. Some of Measures recommended for control of transit loss are presented below:

- (i) Carrying Contractors who are habitually exceeding the allowances limits fixed by the government should be black listed.
- (ii) Illustrative punishment to the persons or institutions causing loss.
- (iii) Strong stitching of the bags at the time of loading.
- (iv) Appointment of skilled labour for loading and unloading.
- (v) Vigilant supervision and administration at the time of loading, unloading and transit.
- (vi) Reliable guard should be ~~presented~~ during transit.
- (vii) All redundant trucks under the Ministry of Food should be replaced by reputed model.
- (viii) Proper arrangement should be made for saving the foodgrains from rains while in transit.

4.09. COMPARATIVE STUDY OF LOSS:

4.09.1. Cross Country:

In order to ensure fair price to farmers, handle situation arising out of crop failure, maintain distribution commitment and stabilize prices, many countries maintain buffer stock in addition to the operational stocks involving normal running of PFDS. In a way public food policy involving these issues characteristics both developing and developed countries entailing one or another kind of subsidy and transfer cost. In respect of cost of operation of

the policy very limited information are available for the developing countries. Among that developing countries India has a large public sector food stock. In 1981 India had annual storage capacity of above 7.7 million tons covered and 1.2 million tons cover and plinth as compared to 1.8 million tons of Bangladesh in covered LSD, CSD, Silo and TPC. Indonesia has a programme of building up of buffer stock of 2.00 million tons - through internal procurement. Philippines maintains, 7.10 million tons as buffer stock in 20 modern storage centres. In India storage loss during 1979/80 was about 1.5% of the quantity sold as against 0.5% (excluding loss at the port) in Bangladesh. Cyclones, floods and longer periods of storage to meet the buffer stock requirements are the main contributors of the storage loss. Storage in cover and plinth does not guarantee protection from insects and rodents. In Bangladesh "difference of moisture content", insects and design type of godowns are the main causes of storage loss. A comparative statement of storage and transit loss of foodgrains in India and Bangladesh is given below:

Table : IV - 27
COMPARATIVE STORAGE LOSS

Year	India			Bangladesh		
	Storage Loss (%)	Damage (%)	Transit Loss (%)	Storage Loss (%)	Loss at Port (%)	Transit Loss (%)
1.	2	3	4	5	6	7
1975/76	0.3	NA	NA	NA	NA	NA
1976/77	0.7	0.45	3.57	NA	NA	NA
1977/78	0.9	0.34	1.29	NA	NA	NA
1978/79	1.0	1.01	1.87	0.72	NA	0.95
1979/80	1.5	0.50	0.98	1.32	NA	0.77
1980/81	NA	NA	NA	0.79	2.66	0.35
1984/85	NA	NA	NA	0.50	2.66	0.87

Source: Food Corporation of India.

From the above table it is observed that both storage and transit losses figures of Bangladesh for 1979/80 and for 1984/85 are smaller than the corresponding figures of India for the year 1979/80.

Food department's recent revision of allowable transit shortage is placed below:

Mode of Transport	Commodity	Transit Shortage (%)
By Truck	Rice/Wheat	0.125
By River	"	0.4
By Bullock Cart	"	0.5
By Sea	"	0.5
By Rail	"	0.5
	Wheat Product	0.375

The transit loss observed in the godown survey conducted by EUREKA (Bangladesh) Ltd. and also the Food Corporation of India are higher than revised allowance limits of the Food Department of Bangladesh.

4.09.2. Cross Section:

In godown survey, the godowns have been classified into two strata:

Stratum - I : Godown accessible through waterway

Stratum - II : Godown accessible through road/rail.

Transit loss for godowns of Stratum-I is about 0.43% and that of Stratum-II is 0.91%. Other factors of transit losses are Rail (1.30%), Truck (0.52%), Barge (0.41%), Boat (0.44%), Cart (0.40%), Head (0.01%) and Overall (0.87%). Transit loss varies for different foodgrains: Paddy (0.31%), Rice (1.00%) and Wheat (0.99%). Transit loss also varies for different types of godowns: LSD (0.51%), CSD (1.84%), Silo (0.58%) and TPC (0.56%). Storage Loss varies with types of godowns, physical characteristics of godowns, the facilities available to godowns, duration of storage, rains, insects, fungus, pilferage, etc. It is also different for different foodgrains. Storage loss for LSD, CSD and TPC are 0.63%, 0.68% and 0.28% respectively. Storage loss for paddy, rice and wheat are 0.42%, 0.53% and 0.53% respectively. Storage loss differs with age of godown and frequency of assignment.

Transit and storage loss at the port are shown together. Loss of food-grain at Chittagong Port (2.50%) which is different from Mongla Port (2.41%). Quality of foodgrains deteriorate in the godowns and in some cases become unfit for human consumption. Foodgrains declared unfit for human consumption are either damaged or sold by auction. Quality deterioration also varies with types of foodgrain, types of storage centre, facilities available, difference of moisture content, insects and quality control efforts, etc.

4.10. SUMMARY:

4.10.1. In this chapter the findings of previous studies have been analysed and compared with the government allowances and the results of the godown survey carried out under the present study. Attempts have also been made to compare them with the experience of the Food Corporation of India. During 1984/85 quantitative loss of foodgrain in Bangladesh has been found to be 3.16% which is about 60% higher than the government allowance. Loss, according to BPMI Report was more than the set limit. In Bangladesh, loss of grain shows a downward tendency over time. Loss of foodgrain in the port is about 5 times of storage loss and 2.4 times of total of storage and transit losses. Besides, there are shortage due to short landing at port points deserves special attention. Excluding port loss of foodgrain recorded by Food Corporation of India (FCI) for 1979/80 was about 20% higher than that mentioned in the BPMI report and 80% higher than the finding under the current godown survey.

4.10.2. Although overall transit loss has always been found to be within the government allowance the loss in Railway was 25% to 50% higher than the permissible limits. For the year 1979-80 the transit loss in Bangladesh was 22% lower than in India, which further narrowed to 10% in 1984/85 according to the godown survey. To reduce transit loss, dependence of railway has to be reduced and truck as a substitute with accountability should be preferred as usual mode of transport, unless Railway would improve their traffic management.

4.10.3. Storage loss in godown exceeded the government allowance only in 1979/80 which was a bad year of harvest but was within the limit during 1978/79, 1980/81 and 1984/85. Storage loss observed by FCI during 1979/80 was higher than that in Bangladesh reported by BPMI for the years 1979/80 and 1980/81 by 15% and 90% respectively and about 3 times higher than the finding of the godown survey for 1984/85.

This may be due to preservation of huge quantity of foodgrain under cover and plinth in India. BPMI report, has recorded storage loss in LSD as 4 to 8 times higher than that of CSD but godown survey recorded storage loss in LSD 8% lower than in CSD. As per godown survey storage loss for rice has exceeded the government allowance whereas it is within the limit for paddy and wheat. It has been observed that difference in moisture content, insect infestation, bad handling and pilferage are the main factors of storage loss.

4.10.4. As deteriorating stock ultimately become unfit for human and animal consumption some part of such stock ultimately becomes quantitative loss. The godown survey shows that the average quality deterioration is 0.61% out of which .11% is due to insect infestation and 0.50% due to difference in moisture content. Existence of foreign material is about 25% and damaged grain 2 times higher than the government allowance. Damaged grain in Bangladesh is 8% higher than that found in Indian. Thus, control of insects, moisture, foreign material and damaged karnels deserves special care to ensure quality of stock and ultimately, to reduce loss.

CHAPTER - V
COST OF OPERATION OF PFDS

5.01. ANALYSIS OF COST OF OPERATION OF PFDS:

In the preceeding two chapters cost of operation of PFDS has been discussed from the point of view of its cost efficiency. Chapter-III dealt with the procurement cost, external and internal, and distribution cost in general while chapter-IV dealt in detail with the cost of handling and storage. The cost of handling and storage covered not only monetary cost i.e. outlays but also losses of grains that occur in the operation of the PFDS. It appears from the present as also the earlier studies that there are considerable diversities among different methods of transport and storage systems as to their cost of operation.

Transportation:

In the year 1984-85 the transportation cost was Tk.13107 lacs for handling 32.6 lac tons of foodgrain. The volume of foodgrain handled by different modes of transport was as follows:

Rail	=	7.47 lac tons
Road	=	14.85 " "
River	=	10.27 " "
Total	=	32.59 lac tons

It is revealed that the freight rate and actual cost varies with the mode of transport. In this study cost of internal freight has been estimated by mode of transport and shown below:

BIWCC	=	Paisa 3 per maund per mile
Road	=	Paisa 8 per maund per mile
Rail	=	Paisa 5 per maund per mile

Cost due to incidental charges are also involved alongwith each mode.

In case of ocean transport one important element in cost efficiency is the pre-condition of some food-aid that necessitates the commodities to be shipped through flag vessels of the donor country, thereby preempting competitive bidding and the difference in freight being borne by the donor country. Here such competing freight is based on the quotation of BSC and the difference is reduced increasing the cost of freight to that extent.

Besides transportation cost, there is also transit loss to reckon. Transit losses are different for different types of transport. Loss due to short landing in sea vessel is about 2.43% whereas in internal transport the loss is to the tune of 0.87%. Internal transit loss also varies with mode of transport, viz. Rail (1.30%), Truck (0.52%), Barge (0.41%), Boat (0.44%), and Cart (0.40%). Total volume of transport loss for 1984-85 was however found to be about 95,000 tons.

Storage loss on the other hand occurs at the godown (0.50%) and at the port (2.66%). Total volume of storage loss for the year 1984-85 came to 1,75,000 tons. Storage losses by types of storage facilities were estimated to be at CSD (0.68%), LSD (0.63%), Silo (0.01%) and TPC (0.28%). It was also different for different types of foodgrains stored, viz. rice-0.72%, paddy-0.53%, and wheat-0.46%. Incidentally storage loss has been found to be high in dry season (0.56%) and low in rainy season (0.50%). Volume of loss in stock however varies due to many factors. The source of data shown here is of godown survey by the consultant.

In this chapter a rigorous attempt has been made to identify factors contributing towards cost of handling and losses. Under the constraint of non-availability of related full set of information the following equations were used for estimating various cost function for identification of the more relevant factors on the basis of 7 years data for the period 1978-79 to 1984-85:

- (a) Average Overhead Cost = f (Volume of business:
Procurement and Distribution)
- (b) Average Storage Cost = f (Volume of business:
Procurement and distribution)
- (c) Average Transport Cost = f (Procurement and Distribution
by Mode of Transport)

5.01.1. Overhead Cost Analysis:

Overhead cost include all fixed cost in respect of establishment, technical, storage, machinery and equipments costs. Overhead cost has been estimated using equation (a) mentioned above. In this equation the impact of volume of local procurement, imports and distribution of PFDS on the overhead cost has been analysed. Estimated equation is Y (Average Overhead Cost) = $a_1 + b_1x_1$ (volume of local procurement) + b_2x_2 (volume of imports) + b_3x_3 (volume of distribution).

Here, average cost = Total Cost \div (volume of local procurement + import + distribution).

The fitted equation is:

$$Y = 512.853 - 7.40352x_1 + 3.2153x_2 - 12.4651x_3$$

(0.2418) (-1.4698) (1.3447) (2.8078)

The figures in the parenthesis are the t values.

$$R^2 = 0.7418$$

$$DW = 2.17$$

Smaller values of "t" mean that the estimated coefficients are not significant except for volume of distribution but it needs also to be emphasized that the estimates were based on 7 years' observations only. D.W. statistics show existence of nonmulti-collinearity between the 3 explanatory variables. The above fitted equation indicates that an increase in the volume of local procurement and in

the volume of distribution under PFDS lead to a decline in overhead cost. Thus for an increase of 1 ton in volume of local procurement and volume of distribution there will be corresponding reduction in overhead cost of Tk. 7.40 and Tk. 12.47 respectively. The effect of import on overhead cost is positive i.e. for every additional ton in food import there will be corresponding increase in overhead cost by Tk.3.22. There are two obvious reasons for this. First, current procurement procedures is based on fixed points under which farmers and traders are required to bring foodgrains to the procurement centres for which a transport bonus is allowed. Such transport bonus is a fixed element of procurement price, not of cost of operations. Secondly, the PFDS had a large network in existence to the extent that the overhead cost is more or less given. Thus an increase in local procurement leads to a decline in overhead cost per ton. This only reflects the historical character of PFDS which mainly developed as a distribution agency. In contrast to the nature of effects of local procurement and distribution, the effect of import on overhead is direct, i.e. an increase in import lead to an increase in overhead cost as every deal has its own characteristics. It is also to note that relative to marginal cost the constraint co-efficient is quite large indicating a large permanent element in the overhead cost.

5.01.2. Transport Cost Analysis:

In this section an attempt has been made to estimate the transport cost function to identify the cheapest mode of transport by estimate using the equation shown below:

$$\begin{aligned}
 Y \quad (\text{Average Transport Cost}) &= a_1 + b_1x_1 \quad (\text{Movement by Rail}) \\
 &+ b_2x_2 \quad (\text{Movement by Road}) \\
 &+ b_3x_3 \quad (\text{Movement by River})
 \end{aligned}$$

Here, Average Transport Cost means Total Transport Cost

(Procurement + Distribution).

In this equation the average transport cost has been estimated with the information on movement by mode of transport.

The fitted equation is:

$$Y = 1052.5183 - 36.31324 x_1 - 16.05978 x_2 - 29.65893 x_3$$

(5.07)
(-1.25)
(-.48)
(-.44)

This equation indicates that for increase of 1 ton in the volume of "Movement by Rail", "Movement by Road" and "Movement by River" transport cost will decrease by Tk.36.31, Tk.16.06 and Tk.29.66 respectively. Smaller "t" values indicate that the regression co-efficients are insignificant. Co-efficient of multiple determination R^2 for the variables has been found to be 0.8327 which indicates that 83.27% of the "Transport Cost" has been explained by the above explanatory variables. Durbin-Watson Statistics (DW) has been found to be 2.02 which is greater than the upper tolerance limit and thus indicates that there is no serial correlation among the independent variables. The negative co-efficients of explanatory variables pushes for an alternate equation. Average transport cost = t (movement by mode of transport).

The equation for Average Transport Cost can be expressed as

$$Y = 2828.8337 - 92.3439 x_1 - 103.024 x_2 - 90.0749 x_3$$

where average cost means (Total Cost) ÷ (Procurement).

Here, Average Cost = Total Cost ÷ (movement by rail + road + river).

The estimated equation is -

$$Y \text{ (Average Transport Cost)} = 1728.5423 - 79.2932 x_1 \text{ (Rail)}$$

$$-13.8037 x_2 \text{ (Road)} - 45.9516 x_3 \text{ (River)}.$$

The situation did not improve. Of course, in this the impact of loss of foodgrain due to different mode of transport has not been taken care of. The equation shows that average cost of transportation falls faster if more food is moved by railways than by river and road and by river than by road.

5.01.3. Efficiency of Transportation:

Transportation of food grains by different modes of transportation entails two types of cost, financial cost and nonfinancial cost. Financial cost is the tariff charged by the carriers and nonfinancial cost is the loss of food grains in transit and movement. Since in handling and carting some loss is very likely to be incurred because of say, breaking of bags, there is an allowance for such loss made in the calculation of incidental cost (chapter III, p 13-16; IV-21). In movement abnormal losses may also be incurred and the risk of such loss is different over different modes of movement. Movement by water, for example, entails risk of bad weather. Food Directorate, therefore, allows variable rates for standard loss to different modes of transportation (Chapter III p 15). Since transportation charges are also different (Chapter V, p 1), choice of the cheapest mode should depend on the minimization of the sum of the financial and nonfinancial. This section deals with this issue. However, there are two binding constraints on such choice. First, there may be such locations of government godowns where options for movement by alternative carriers may not exist, i.e. roads, railways and water ways may not be competing carriers. In such a situation choice is inique. Such limitation to may be geographical and seasonal. Secondly even if the alternative opportunities may exist, one single carrier may not be capable to handle all the volume of food grains waiting for movement. Thus, sudden rush of food impor. may require use of all the three modes even though they may entail different cost. In a competitive situation however, where alternative carriers are available, cost of transportation will be minimum. It is from this need that the total cost of transportation over different modes is considered.

5.01.4. It is estimated that rail is the cheapest mode of transportation in financial terms than the other modes. If one ton of food-grain is withdrawn from roads to railways transportation average cost of transportation will fall by Tk. 65.49 (Tk.79.29 - 13.80) and by Tk.33.34 (Tk.79.29- 45.95) if withdrawn from river transportation. On the other hand the transfer taxes from road to river,

average cost will fall by Tk.32.15 (Tk.45.95 - 13.80). Thus it is cheapest to move foodgrains by railways, given its availability. From financial cost point of view the order of preference is railways, waterways and roads. The actual tariffs however are not in the same order which shows roads transportation as the costliest mode and water (IWTC) as the cheapest mode per md. per mile (Chapter V. p 1). On the other hand, estimation of the transit loss function (Chapter V, p 8) shows that transit loss falls continuously if food movement is shifted from carts to boats/burges, to trucks and to railways. Thus considering the financial and nonfinancial costs railways is the cheapest mode of transportation followed by waterways and roads (excluding short haulage by carts) in that order.

5.01.5. Storage Cost Analysis:

Storage cost has also been estimated and analysed using the following equation:

$$Y \text{ (Average Storage Cost)} = a_1 + b_1x_1 \text{ (Local Procurement)} \\ + b_2x_2 \text{ (Imports)} + b_3x_3 \text{ (Distribution).}$$

Here, Average Storage Cost = Total Storage Cost ÷ Total Procurement.

In this equation, the effect of independent variables "Local Procurement", "Imports" and "Volume of Distribution" on the dependent variable, "Storage Cost", has been estimated.

The estimated equation is thus:

$$Y = 7.22899 - .14572 x_1 + .02357 x_2 - .10506 x_3 \\ (2.00) \quad (0.9933) \quad (.33841) \quad (.81234)$$

Figures within brackets are the values of "t" - statistics

$$R^2 = 0.3239$$

$$DW = 2.84$$

The fitted equation indicates that for an increase of 1 ton of foodgrains in "Local Procurement" and "Volume of Distribution" .

the average storage cost will decrease by paisa 15 and paisa 11 respectively. It also indicates that for every increase of 1 ton in "Imports" average storage cost will increase by 2 paisa. At 5% level of significance the expected value of "t" is 1.533 which is higher than the observed "t" values of regression co-efficient presented above indicating that all the regression co-efficients are insignificant. Co-efficient of multiple determination ($R^2 = 0.3239$) indicates that only 32.39% of variation in storage cost has been explained by the explanatory variables and there are other important explanatory variables. Durbin-Watson statistics ($DW = 2.84$) indicates existence of non-multicollinearity among the independent variables. It is to be recalled here that the overhead cost analysis has the same relation as the storage cost.

5.01.6. Loss Function for Transit Loss:

It is assumed that transit loss (Y) in ton depends on the following explanatory variables: mode of transport (x_1) in terms of weights, distance (x_2) in mile, quantity transported (x_3) in tons and frequency of operation (x_4) in number per year. The estimated equation for loss function is as follows:

$$Y = 90.282482 - 27.170033 x_1 - 0.13966 x_2 + 0.0062089 x_3 + 0.0692223 x_4$$

("t" values) (0.143) (-.17765) (-.04180) (-.9158) (.0697)

In the estimation procedure modes of transports were weighted by the frequency of consignment. In all 34 observations having one from each of the 34 storage centres surveyed were considered. In these storage centres maximum consignments were carried out by railway and thus "railway" mode was given the weight 1. As compared to this weight the following other weights were calculated:

Truck	=	0.923
Barge/Boat	=	0.53846
Cart	=	0.0269

Modes of transports were precoded. For analytical purposes these were assigned relative weights on the basis of the frequency of consignment. The frequency for Rail was 14 assigning the highest weight ' 1.0 '. The frequency for Truck was 13 assigning the weight 0.923. In the same way the weights for Barge/Boat and Cart were estimated. The closer this weight towards 1 the losses will be more and more higher. The analytical findings of the loss function is given below:

$$R^2 = 0.702389$$

$$DW = 1.517$$

$$\underline{\text{For}} = .05$$

$$dl = 1.27$$

$$du = 1.65$$

$$\text{and } \underline{\text{For}} = .01$$

$$dl = 1.07$$

$$du = 1.43$$

The above equation explain that about 70% of transit loss is explained by the explanatory variables.

At the level of significance = .01, du is less than DW. From this we can conclude that autocorrelation co-efficient for the error terms is zero. From the fitted equation we can also predict that for an unit increase in the weight of "mode of transport" and the distance by one mile, transit loss will decrease by 27.1700333 tons and by 0.13966 tons respectively. In the same way for an increase of one ton in "quantity transported" and "frequency of operation" there will be corresponding increase of .0062089 tons and 0.0692223 tons respectively in transit loss. At .01 and .05 level of significance "t" value for all co-efficient are insignificant.

5.01.7. Loss Function for Storage Loss:

The storage loss function has been estimated by using the following equation:

$$Y \text{ (Storage Loss)} = a_1 + b_1x_1 \text{ (Godown type)} + b_2x_2 \text{ (Number of consignment)} + b_3x_3 \text{ (Size)} + b_4x_4 \text{ (OMS + Dealers' lifting Volume)} + b_5x_5 \text{ (Inspection frequency)} + b_6x_6 \text{ (Moisture content)}.$$

Thus it has been assumed that storage loss in godown can be explained by the following variables:

- (i) Godown type : Weighted average of the combination of material of construction of wall, floor, roof and door.
- (ii) Number of consignment: Number of consignment handled by each godown per month.
- (iii) Size : Capacity in metric tons.
- (iv) OMS and Dealers volume: per month in metric tons.
- (v) Inspection frequency, per year in number, and
- (vi) Moisture Content in percentage.

Observations of all the godowns located in the sample storage centres were pooled together in this survey. In this equation godown types were assigned relative values on the consideration of construction material of the floor, roof, wall and door. The weights for construction materials assigned is as follows:

Cement/Iron	=	0.25
C.I.Sheet/Wood	=	0.10
Mud	=	0.05

For any godown the weights for floor, wall, roof and door are added together to derive the weight of the godown. The closer these weights towards 1 the losses will be the less. The highest weight for any godown can be 1. Thus, the loss equation can be expressed as follows:

$$Y = 24.24364 - 9.87262 x_1 + 0.0062586 x_2 + .0012455 x_3 - .0001637 x_4 \\ - 221016 x_5 + 3.77448 x_6 \\ R^2 = 0.76273$$

Since x_2 , x_3 and x_4 do not appear to have large co-efficient their effects in respect of loss function may not be conspicuous.

Therefore the above equation shows that for unit increase of "Godown type", "OMS and dealers' lifting volume" and "Inspection frequency" there will be corresponding reduction in storage loss of 9.87262 tons, .0001637 tons and .221016 tons. In principle, the nearer the weights towards 1 the loss should be less. Thus it is clear from the fitted equation that out of the six factors, "godown type" and "moisture content" are the two most important factors affecting storage loss. In ideal godown type storage loss can be reduced by 10 tons per godown while reduction of moisture content can reduce storage loss by 3 tons per godown. Next to these factors is the "inspection frequency" which can also cut back storage loss.

5.01.8. Management of Stock:

The above estimation have important significance on stock management. Management of stock of foodgrains is under the care of Directorate General of Food and covers a very wide range of activities from warehousing, loading, unloading, transport, stock turnover, stock segregation, grain inspection, fumigation, management information system (MIS), and training and development of the concerned personnel. Both quantitative loss and qualitative deterioration occurs to stored foodgrains. Overall storage loss in godowns has been found to be 0.50%. This varies with the type of storage viz. CSD (0.68%), LSD (0.63%) and TPC (0.28%). There was no incident of storage loss in Silo. In addition to storage loss in the godown there are major incident of loss at the ports (2.66%). At the transit stage also quantity loss (0.82%) as well as quality deterioration occurs. Pilferage, difference in moisture content, mishandling, insufficient fumigation, fungus infestation, absence

of drier, insect pest attack and rains have been found to be the main reasons for loss of food at godowns. Management of spoiled stock and its disposal is another serious concern in this matter since such stock may have spread effect unless it is quickly separated. Spoiled stock is generally sold out by auction, disposed off through OMS, destroyed or partly retained. Government have conducted several studies to find ways and means to improve the system of management of stock so that both the qualitative and quantitative loss of food-grains remain within tolerance limit. These studies along with some other major studies have been undertaken in respect of the following points:

- (a) Inventory turnover and delivery rules
- (b) Inspection System
- (c) Quality Control Mechanism
- (d) Godown condition
- (e) Ancillary facilities
- (f) Watch and Ward facilities.

Finally, recommendations on the basis of analytical findings of those studies have been discussed in the following subsections.

5.01.9. Inventory Turnover and Delivery Rules:

In the study conducted by BPMI the system of inventory turnover and delivery rules of PFDS existed in 1982 was narrated. The reports of "FAO's Food Security Project", "Feasibility Study for Setting up of Food Corporation in Bangladesh" and World Bank's document touched slightly on this point regarding the situation which prevailed at their reference time. There is however no remarkable change in the system since 1982. The storage centres send information on stock of foodgrains to four directorate and Monitoring Cell daily. Deliveries of foodgrains made in either "First Come First Out" or "Principle specified by IC&T" basis are true but there are exceptions. In exceptional cases deliveries are made through delivery orders (DO's) signed by the Director, Movement and Storage. The impact of OMS and dealers lifting volumes have been estimated to be negative and negligible in this study.

5.01.10. Inspection System:

The FAO's report on "Technical Support Development for the Public Storage Sector in Bangladesh" describes the practice of inspection that prevailed in 1984. The BPMI report and the feasibility study also have touched upon the inspection system like some other previous studies. Some remarkable irregularities are found to prevail in the godowns. In the present study however the impact of inspection frequency on the storage loss has been found to be negative and remarkable.

5.01.11. Quality Control Mechanism:

The quality control mechanism has been examined in details by the FAO's studies. In the BPMI study and "A feasibility study of the quality control in foodgrain" by P.H.Giles and D.W.Hall subjective recommendations were made on the quality control mechanism. In this study the impact of "Moisture Content" on both the qualitative and quantitative losses have been found to be negative.

5.01.12. Physical Condition:

The BPMI and the FAO's study have examined impact of physical condition of storage centres on the quality deterioration and quantity loss of foodgrains in subjective way. In this study the impact of "Physical condition" of godowns on storage loss has been estimated to be negative. The study also showed that 55.9% of the godowns have proper in-built ventilation facilities.

5.01.13. Ancillary Facilities:

In the BPMI study the existing ancillary facilities available to different godowns were also examined. The FAO's study also touched upon the available facilities. In the current study it has been observed that 7.7% of LSDs and 50% of TPC do not have fumigation facility and only 32.4% of the godowns have drying/humidity control facility. The impact of the size of godown on the storage loss has been found to be positive which means that storage loss increases with the size of godown except for Silos.

5.01.14. Watch and Ward Facilities:

In the BPMI, FAO and also the current study the existence of guard shed was examined. The current study found that 71% of all the godowns have Watch and Ward facilities. Incidentally all the CSDs have this facility but even then the loss is high, while 61.5% of the LSDs have guard shed but loss is comparatively lower than CSDs. It may however be mentioned here that possibly the guard rather than guard shed are responsible for loss of foodgrain.

5.01.15. Recommendations:

Depending on the overall analyses of storage loss the following areas need immediate attention:

- (1) Godowns of poor physical conditions should be replaced by modern ones. It may be recalled that an ideal godown can cut back storage loss by about 10 tons. Therefore, rehabilitation of old godowns is of high priority. The survey result shows that in consideration of wall, floor, roof and doors and ancillary facilities only 8.8% of the godowns are in perfect form, while 22.4% of the godowns have moisture control and drying facilities.
- (2) Laboratory test facilities, moisture meter and other modern moisture control and drying facilities must be made available to all storage centres.
- (3) The existing inspection system is not effective. For effective control and inspection system the facilities should be modernized and expanded upto upazila level. The inspection system should also be strictly monitored by supervisory level personnel.

5.02. SUMMARY:

Chapter-III dealt with the procurement and distribution cost in general and Chapter-IV detailed the loss of foodgrain in handling, transit and storage. The current chapter-V made statistical analysis of cost of operation of PFDS. For identification of the relevant

f. tors the following cost and loss functions were estimated:

(a) Average Overhead Cost = f (volume of procurement and distribution)

(b) Average Storage Cost = f (volume of procurement and distribution)

(c) Average Transport Cost = f (movement by rail, road and river)

(d) Transit Loss = f (mode of transport, distance, quantity transported and frequency of operation).

(e) Storage Loss = f (Godown type, number of consignment, size of godown, OMS and dealers volume, inspection frequency and moisture content).

The cost data has been compiled from the budget book of the Ministry of Finance (GOB). Sophisticated statistical tools like R^2 (co-efficient of determination), t (Hotelling's test statistic) and DW (Durbin Watson) Statistics were calculated for diagnosis of the factors of association, dependence and goodness of fits of the equations.

This chapter also dealt with the existing procedures and practices of management of stock.

Cost of operation incurs directly as overhead cost, transport cost and storage cost and indirectly due to storage loss, transit loss and handling loss. In this analysis handling loss has been merged with storage loss and transit loss. For overhead, transport and storage cost analysis basic data in complete form could hardly be procured for 7 years. So any limitations, if any, might be due to use of small set of data. Loss functions were estimated on the basis of the data of whole godown survey by the consultant. There might also have some limitations because of quality of data which suffers to some extent by wrong response, non-response and non-availability of adequate information in the godown.

Management of stock has been analysed on the following points:

- (a) Inventory turnover and delivery rules,
- (b) Inspection system,
- (c) Quality control mechanism,
- (d) Godown condition,
- (e) Ancillary facilities, and
- (f) Watch and Ward facilities.

CHAPTER - VI
ECONOMIC SUBSIDY

6.01. CONCEPT OF ECONOMIC SUBSIDY:

In Chapters II and III we were concerned with the quantification of budget subsidy; Chapter II dealt with the cash subsidy as a difference between the actual or imputed cost of food on one hand and the actual or the imputed sale proceeds on the other. Some food aids have imputed values and so also some uses of food since imputed values of food and reflect the value of food in the home markets of donors rather than international prices, in Chapter III imputed values were corrected to reflect international prices. To a certain extent cash imports, because of special terms to be entered into to circumvent financial strain may also deviate from international prices, so corrections were made in this respect also. Further, some food aid stipulates shipment by donors flag ship in which case freight happens to be higher than international freight charges. All these have been discussed in Chapter III. It is found that such adjustments caused substantial difference between cash subsidy and cost adjusted subsidy. Such adjustments however subsume free trade situation since all imports prices are adjusted to world prices. However, valuation of food aid at international prices raises the basic question whether such prices are relevant from donor's or recipient country's point of view or not. The implication of the use of international price in food subsidy calculation is that both donor and the recipient have option to sell food in the world market in a constructive sense for subsidy in true economic sense is the difference between the actual sale price and the price at which food could be sold i.e. the opportunity cost. If this definition is used, valuation of food aid at international price fuses food aid into trade in so-far as valuation is concerned. Since food aid is not free trade, use of international price in the calculation of economic subsidy on food has no logical basis. The point becomes clear when the position of food aid recipient who has no option for resale of food so received in the world market is recognized; for her that opportunity does not simply exist. As such world price is not the opportunity cost of food distributed through PFDS. Cut off from the

world market the economic subsidy has to be evaluated wholly on the basis of domestic market opportunities for only practicable alternative to sell through, say the ration system is to sell the open market.

6.02. RESOURCE COST VS. ECONOMIC VALUE OF FOOD:

From the above concept follows an important distinction between resources cost and economic value. Resources cost is the cost of production and procurement through distribution and is derived through valuation of factors of production, foods and services associated with production, procurement and distribution of food-grain. Economic value of food is on the other hand the value of foodgrain to the consumers, the price they will be ready to pay rather than to forego its consumption.

It is not necessary that the two are same or should be always same less so in case of a merit want like food where social value of food is high but the poor people can hardly afford it to the desired extent. A second distinction to make is the difference between resource cost and opportunity cost as the former is often viewed ~~expst~~ as historic cost. That some amount of resource has been used to produce a certain commodity or service has no relevance to opportunity cost. The opportunity cost of using a commodity (or a resource) in a certain way is the value of that commodity in the best alternative use foregone. Thus the opportunity cost for food distributed through the ration system, for example, is the market value at which such food could be sold otherwise. Since food is a merit want a restrictive definition of opportunity cost will be is the price which a ration food recipient would have paid for such food rather than forego it. As such capacity is different for different consumer groups, market price has no unique virtue for a merit want. Hence no attempt would have been meaningful had subsidy been estimated on the basis of market price in the same as world price has no relevance.

6.03. PRICE AND INCOME ELASTICITIES:

Recognition of the importance of food as a merit requires understanding the consumer behaviour in relation to price and income situation for a consumer's intake of food is dependent on his income and price. A change of income changes consumption of food as it changes the budget line, the magnitude of change in food consumption depending on the extent of change in price or income and the price/income elasticity. Subsidized food, it is to note, affects consumption in two ways as is well known, namely, through substitution effect and income effect, therefore a reduction in subsidy through increase in ration price will affect food consumption in both the ways. Given a change in ration price, the extent of change in food consumption will depend on substitution and income effect. Therefore, in pursuing a subsidy reduction policy, it is important to have clear understanding how an increase in ration price is going to affect the various consumer groups. As a corollary it is also to measure the consumer surplus that accrues to a consumer group due to sale of food at reduced price.

6.04. ACCESSIBILITY OF HOUSEHOLDS:

6.04.1. PFDS, it is to recall, has many channels for distribution of food. They consist of statutory rationing in 5 areas, modified rationing, priority groups, food-for-works, vulnerable group feeding, open market operation and free sales and lastly, relief. They may be grouped into two classes, depending on price consideration, into monetized channels and non-monetized channels. Because of the variation in pricing mechanism, any subsidy that PFDS bears and therefore benefit there of are differentially distributed among the recipients of food through the different channels of PFDS. This chapter primarily looks into this distributive aspect of PFDS and its impact on nutrition. The main objective is to arrive at an estimate of subsidy from the point of economic definition of subsidy vis-a-vis the earlier estimates which concerned with budget subsidy and its rationalization from efficiency of operation and market opportunities from purchasers' point of view.

6.04.2. Keeping these two objectives in view, namely, distribution of subsidy benefit by channels and income groups of households and estimation of economic subsidy, a household survey was carried out to a limited extent. In all 2019 households were surveyed in SR and 20 MR areas and on the basis of data so collected the PFDS- is assessed here from the points of the two objectives mentioned above. Dhaka City and Khulna City were surveyed as part of SR areas whereas four rural villages and one thana headquarter village from each division were surveyed as part of SR area.

Samples were drawn proportionately from Posh area, Mid-income area and low income area. Distribution of sample households are given below:

<u>Type of area</u>	<u>Number of household drawn from</u>			
	<u>Posh Area</u>	<u>Mid-Income</u>	<u>Low-Income</u>	<u>Total</u>
<u>SR Area</u>				
Dhaka City	27	641	473	1141
Khulna City	52	1 160	125	337
<u>MR Area</u>				
Chittagong Divn.	89	49	17	154
Dhaka Divn.	72	39	15	126
Khulna Divn.	57	33	10	100
Rajshahi Divn.	91	50	20	161

6.04.3. Distribution of PFDS' Food by Income Groups:

Based on data collected through the household survey income-wise distribution of PFDS by channels is presented in Table : VI - 1.

Table : VI - 1
ACCESS TO PFDS BY INCOME GROUPS

<u>Income Group</u> <u>(monthly)Tk.</u>	<u>Channels</u>								<u>No</u> <u>access</u>	<u>Total</u> <u>Nos.</u>
	<u>SR</u>	<u>EP</u>	<u>OP</u>	<u>LEI</u>	<u>MR</u>	<u>VGf</u>	<u>FWP</u>	<u>9</u>		
<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>	<u>7</u>	<u>8</u>	<u>9</u>	<u>10</u>	
000-499	-	2 (3.1)	-	1 (1.6)	33 (51.6)	2 (3.1)	3 (4.7)	23 (35.9)	64 (100)	
500-1499	167 (16.5)	5 (.5)	1 (.1)	13 (1.3)	111 (11.0)	2 (.2)	78 (7.7)	634 (62.7)	1011 (100)	

Table:VI-1 contd....P/5

Table : VI-1 (contd...)

1	2	3	4	5	6	7	8	9	10
1500 -3999	313 (40.9)	2 (.3)	4 (.5)	3 (.4)	83 (10.8)	-	9 (1.2)	351 (45.9)	765 (100)
4000-5999	40 (4.3)	3 (3.2)	2 (2.2)	-	25 (26.9)	-	-	23 (24.7)	93 (100)
6000-9999	25 (44.6)	-	5 (8.9)	-	5 (8.9)	-	-	4 (37.5)	56 (100)
10000-19999	6 (30.0)	-	-	-	1 (5.0)	-	-	13 (65.0)	20 (100)
20000 +	6 (60.0)	-	-	-	1 (10.0)	-	-	3 (30.0)	10 (100)
Total :	557 (27.6)	12 (.6)	12 (.6)	17 (.8)	259 (12.8)	4 (.2)	90 (4.5)	1068 (52.9)	2019 (100)

Note: Figures in parenthesis are row percentages.

The above table shows that (i) in the sample area 52.9% of the households do not have any access to PFDS, (ii) over half of the population sample falling in the income range of 0-1499 taka had only limited access to PFDS and 70% of them received no food under PFDS, (iii) in contrast, proportion of households earning more than Tk.1500 a month receiving food under PFDS was 75%, (iv) density of household receiving food under PFDS is the highest in the middle income groups between Tk.1500 and Tk.9999 a month - the proportion of such households receiving food being 58%, (v) in the highest income group the access to PFDS is also high, and (vi) though the access to PFDS significantly varies among the various income groups, it is to be also recognised that households receiving food under PFDS are largely concentrated in the income groups between Tk.500 and Tk.3999; out of the 1158 households (60% of total sample), receiving food 704 households or 60% of recipient households were in this income groups. Thus, PFDS shows a definite bias in favour of higher income classes. Out of 577 households receiving food under SR, for example, 480 households (83%) were in these groups. The table also shows that SR is the most dominant channel of distribution of PFDS food; it accounted for over 50% of households receiving food, followed by MR (23%); therefore, subsidy on food is mainly accounted by SR and MR, depending on pricing of food distributed through different channels.

6.04.4. The households covered by the sample survey were also pooled into two groups - urban and rural in order to identify their share in the benefit of food subsidy. Urban and rural break-up of PFDS are shown in Table : VI - 2.

Table : VI - 2

ACCESS TO PFDS IN URBAN AND RURAL AREAS BY INCOME GROUPS

Access to PFDS Income Group(mm)	(I) Household Access to PFDS - Urban							No access	Total
	SR	EP	OP	LEI	MR	VGf			
1	2	3	4	5	6	7	8	9	
000-499	-	2 (9.5)	-	1 (4.8)	-	-	18 (85.7)	21 (100)	
500-1499	167 (21.5)	5 (.6)	-	13 (1.7)	-	-	591 (76.2)	776 (100)	
1500-3999	313 (56.2)	1 (.2)	-	3 (.5)	-	-	240 (43.1)	557 (100)	
4000-5999	40 (65.6)	-	-	-	-	-	21 (34.4)	61 (100)	
6000-9999	25 (71.0)	-	-	-	-	-	10 (29)	35 (100)	
10000-19999	6 (32.0)	-	-	-	-	-	13 (68)	19 (100)	
20000 +	6 (67.0)	-	-	-	-	-	3 (33)	9 (100)	
Total :	557 (37.7)	8 (.5)	-	17 (1.2)	-	-	896 (60.6)	1478 (100)	

(II) Household Access to PFDS - Rural								
SR	EP	OP	LEI	MR	VGf	F/P	No access	Total
1	2	3	4	5	6	7	8	9
-	-	-	-	33 (76.7)	2 (4.7)	3 (7.0)	5 (11.6)	43 (100)
-	-	-	-	111 (47.4)	2 (.9)	78 (33.3)	43 (18.4)	234 (100)
-	1 (.5)	4 (1.9)	-	83 (39.9)	-	9 (4.3)	111 (53.4)	208 (100)
-	4 (12.11)	2 (6.1)	-	25 (25.7)	-	-	2 (6.1)	33 (100)
-	-	5 (23.8)	-	5 (23.8)	-	-	11 (52.4)	21 (100)
-	-	-	-	1 (100)	-	-	-	1 (100)
-	-	-	-	1 (100)	-	-	-	1 (100)
-	5 (.9)	11 (2)	-	259 (47.9)	4 (.7)	90 (16.6)	172 (31.8)	541 (100)

In the urban area (i) 39.4% have access to PFDS and 60.6% have "no access to PFDS", (ii) 85.7% of the households in the lowest income group, Tk.000-499, have no access to PFDS and (iii) medium income households of income group Tk.4000-5999 and 6000-9999 have higher access to PFDS - 65.6% and 71% respectively. Main channel of access to PFDS in urban areas is SR; 95% of the urban households having access to PFDS were accounted by SR. In the sample urban areas no MR, VGF and OP card holders were found.

In rural areas (i) 31.8% have no access to PFDS, (ii) highest percentage (53.4%) of the households who have "no access to PFDS" falls in the income group Tk.1500-3999 and lowest percentage (6.1%) in the income group Tk.4000-5999. In the rural areas MR accounted for about 92% of the households having access to PFDS. VGF covered only 0.7% of all rural households and less than 2% of households having access to PFDS. The two priority groups covered only 3.4% of households receiving food under PFDS. It is found that though MR is intended for poor households in the rural areas only 13% of the recipient households fell in the lowest income group (Tk.0-499); however, they accounted for 8% of the rural households. It appears that there is significant denial (15 to 70%) of PFDS' food to the poorest households; this could however due to lack of purchasing power to afford food under MR. If it were so, it will also mean very limited coverage of VGF as the number of households (5) denied of PFDS' benefit was 2.5 times as large as the number covered by the VGF programme. 16.6% of the sample households have access to FWP. Households of income group 500-1499 are highest beneficiary (33.3%). MR intended for poor families, was more directed towards the families in the income range between Tk.500 to Tk.1499 a month; three-fourths of the households enjoying MR fall in this income range. One therefore, finds a close correspondence between MR and SR from the point of households income groups. In case of SR this group accounted for 88% of households having access to this channel of PFDS. This confirms the view that PFDS serves mainly the middle class households in both urban and rural areas.

6.05. QUANTITY RECEIVED BY HOUSEHOLDS:

6.05.1. While the above section looks at the accessibility of households, in this section a closer look is taken at PFDS from the point of quantity of food received by households of different income levels. As SR and MR are the dominant sources of food for urban and rural households respectively under PFDS it may be recalled (Chapter II) that of the total food distributed under PFDS in 1984/85, 9.51% was accounted by SR and another 15.8% by MR, while PFDS as a whole accounted for about 30% of the national food budget. Even at this low level of PFDS' operation it could still have differential impact on nutrition and welfare of households in different income groups; therefore the household survey also collected data on food consumption by different income groups and its sources. There are 3 sources a household may have to meet its food consumption need, namely, family farms, market and PFDS. Table : VI - 3 below shows the source-wise consumption of food by different income groups, both at national level and urban-rural level.

Table : VI - 3
MONTHLY PER HOUSEHOLD CONSUMPTION OF RICE AND
WHEAT BY SOURCE OF SUPPLY AND BY INCOME GROUP

Source of Supply Income Group	(a) National (Qty. in Maund)							
	Rice				Wheat			
	Product	Market	Ration	Total	Product	Market	Ration	Total
1	2	3	4	5	6	7	8	9
000-499	0.09 (0.6)	0.76 (80.9)	0.09 (9.6)	0.94 (100)	0.03 (5.7)	0.34 (64.2)	0.16 (30.2)	0.53 (100)
500-1499	0.16 (12.4)	1.10 (85.3)	0.03 (2.3)	1.29 (100)	0.09 (13.4)	0.36 (73.5)	0.04 (8.2)	0.49 (100)
1500-3999	0.29 (21.2)	1.04 (75.9)	0.04 (2.9)	1.37 (100)	0.03 (8.1)	0.26 (70.3)	0.08 (21.6)	0.37 (100)
4000-5999	0.26 (17.9)	1.06 (73.1)	0.13 (9.0)	1.45 (100)	0.06 (16.7)	0.17 (47.2)	0.13 (36.1)	0.36 (100)
6000-9999	0.24 (17.5)	1.08 (78.8)	0.05 (3.7)	1.37 (100)	0.05 (13.9)	0.18 (50.0)	0.13 (36.1)	0.36 (100)
10000-19999	0.46 (31.7)	0.88 (60.7)	0.11 (7.6)	1.45 (100)	-	0.21 (58.3)	0.15 (41.7)	0.36 (100)
20000 +	0.32 (24.2)	0.89 (67.4)	0.11 (8.3)	1.32 (100)	-	0.21 (63.6)	0.12 (36.4)	0.33 (100)
Total :	0.26 (19.8)	0.97 (74.0)	0.08 (8.1)	1.31 (100)	0.05 (11.9)	0.25 (59.5)	0.12 (28.6)	0.42 (100)

Table : VI - 3 contd..

Source of Supply Income group	TOTAL			
	Product 10	Market 11	Ration 12	Total 13
000 - 499	0.12 (8.2)	1.10 (74.8)	0.25 (17.0)	1.47 (100)
500 --1499	0.25 (14.0)	1.46 (82.0)	0.07 (3.9)	1.78 (100)
1500-3999	0.32 (18.4)	1.30 (74.2)	0.12 (6.9)	1.74 (100)
4000-5999	0.32 (17.7)	1.23 (68.8)	0.26 (14.3)	1.81 (100)
6000-9999	0.29 (16.8)	1.26 (72.8)	0.18 (10.4)	1.73 (100)
10000-19999	0.46 (25.4)	1.09 (60.2)	0.26 (14.4)	1.81 (100)
20000 +	0.32 (19.4)	1.10 (66.7)	0.20 (13.9)	1.73 (100)
Total :	0.31 (17.9)	1.22 (70.5)	0.20 (11.6)	1.75 (100)

Note: Figures within brackets are the percentages.

At the national level only 6.1% of the consumption of rice is met from PFDS; 19.8% from production and 74.0% from market. In case of wheat 28.6% is met from PFDS; 11.0% from production and 59.5% from market. As expected, the population sample that is most dependent on PFDS for food is the poorest group (Tk.0-499), but here also 9.6% of consumption of rice is accounted by PFDS. However, since rice accounts for 13% only of PFDS food, the dependence of poor families is neglected in wheat, where 30% of wheat consumption is supplied by PFDS. Population of income group 500-1499 consume least percentage of rice (2.3%) from PFDS and those of income group 000-499 and 4000-5999 consume highest percentage of 9.6% and 9.0% respectively. In case of wheat the same income group 500-1499 consume least (8.2%) from PFDS and the income group 10000-19999 most (41.7%) from PFDS. When rice and wheat pooled together it shows that 11.6% are met from PFDS, 70.5% from market and 17.9% from own production. Population of income group (500-1499) is the least (3.9%) beneficiary and income group 4000-5999 and 10000-19999 are the highest (14.4%) beneficiaries of PFDS.

Table : VI - 3

MONTHLY PER HOUSEHOLD CONSUMPTION OF RICE AND
WHEAT BY SOURCE OF SUPPLY AND BY INCOME GROUP(b) Urban Area

(Qty. in Maund)

Source of Supply Income Group	Rice				Wheat			
	Pro-duct	Market	Ration	Total	Pro-duct	Market	Ration	Total
1	2	3	4	5	6	7	8	9
000-499	-	0.49 (71.1)	0.19 (27.9)	0.68 (100)	-	0.05 (13.2)	0.33 (86.8)	0.38 (100)
500-1499	-	1.18 (95.9)	0.05 (4.1)	1.23 (100)	-	0.42 (84.0)	0.08 (16.0)	0.50 (100)
1500-3999	-	1.01 (92.7)	0.08 (7.3)	1.09 (100)	-	0.20 (55.6)	0.16 (44.4)	0.36 (100)
4000-5999	-	1.09 (80.7)	0.26 (19.3)	1.35 (100)	-	0.07 (21.9)	0.25 (78.1)	0.32 (100)
6000-9999	-	1.15 (92.7)	0.09 (7.3)	1.24 (100)	-	0.11 (28.9)	0.27 (71.1)	0.58 (100)
10000-19999	-	1.07 (82.9)	0.22 (17.1)	1.29 (100)	-	0.12 (28.6)	0.30 (71.4)	0.42 (100)
20000 +	-	1.15 (83.3)	0.23 (16.7)	1.38 (100)	-	0.17 (40.5)	0.25 (59.5)	0.42 (100)

Note: Figures within bracket are the percentages.

Source of Supply Income group	TOTAL			
	Product	Market	Ration	Total
	10	11	12	13
000-499	-	0.54 (50.9)	0.52 (49.1)	1.06 (100)
500-1499	-	1.60 (92.5)	0.13 (7.5)	1.73 (100)
1500-3999	-	1.21 (83.4)	0.24 (16.6)	1.45 (100)
4000-5999	-	1.16 (69.5)	0.51 (30.5)	1.67 (100)
6000-9999	-	1.26 (77.8)	0.36 (22.2)	1.62 (100)
10000-19999	-	1.19 (69.6)	0.52 (30.4)	1.71 (100)
20000 +	-	1.32 (73.3)	0.48 (26.7)	1.80 (100)
Total :	-	1.18 (75.2)	0.39 (24.8)	1.57 (100)

In urban areas PFDS has a greater share of food consumption, 13.6% of rice and 59.0% of wheat consumption being met from PFDS. It means that urban people receive highest proportion of wheat for consumption from PFDS. In urban area also population of low income groups Tk.500-1499 (slum dweller) enjoys less support from PFDS in respect of both rice and wheat. Population in income group of Tk.4000-5999 (middle class) are the highest beneficiaries of PFDS. It is also observed that 30.5% of the overall requirement are met from ration and 69.5% from market. Urban people generally do not consume rice and wheat from own product. In urban area income group 500-1999 is the lowest (7.5%) beneficiary and of 4000-5999 and 10000-19999 are the highest (30.3%) beneficiaries of PFDS.

Table : VI - 3

MONTHLY PER HOUSEHOLD CONSUMPTION OF RICE AND WHEAT BY SOURCE OF SUPPLY AND BY INCOME GROUP

(c) Rural Area

(Qty. in Maund)

Source of Supply Income group	Rice				Wheat			
	Pro-duct	Market	Ration	Total	Pro-duct	Market	Ration	Total
1	2	3	4	5	6	7	8	9
000-499	0.18 (15.0)	1.02 (85.0)	-	1.20 (100)	0.06 (8.6)	0.64 (91.4)	-	0.70 (100)
500-1499	0.31 (23.3)	1.02 (76.7)	-	1.33 (100)	0.19 (38.8)	0.29 (59.2)	0.01 (2.0)	0.49 (100)
1500-3999	0.55 (33.1)	1.03 (62.0)	0.08 (4.8)	1.66 (100)	0.05 (17.9)	0.31 (86.1)	-	0.36 (100)
4000-5999	0.52 (33.5)	1.03 (66.5)	-	1.55 (100)	0.12 (30.0)	0.26 (65.0)	0.02 (5.0)	0.40 (100)
6000-9999	0.44 (29.7)	0.96 (64.9)	0.08 (5.4)	1.48 (100)	0.10 (27.8)	0.26 (72.2)	-	0.36 (100)
10000-19999	0.93 (57.4)	0.69 (42.6)	-	1.62 (100)	-	0.27 (90)	0.03 (10)	0.30 (100)
20000 +	0.65 (50.4)	0.64 (49.6)	-	1.29 (100)	-	0.25 (100)	-	0.25 (100)
Total :	0.51 (35.4)	0.91 (63.2)	0.02 (1.4)	1.44 (100)	0.11 (24.4)	0.33 (73.3)	0.01 (2.2)	0.45 (100)

Note: Figures within brackets are the percentages.

Table : VI-3 contd...

Source of Supply Income Group	TOTAL			
	Product	Market	Ration	Total
1	10	11	12	13
000-499	0.24 (12.1)	1.66 (87.4)	-	1.90 (100)
500-1499	0.50 (27.5)	1.31 (72.0)	0.01 (0.5)	1.82 (100)
1500-3999	0.60 (29.7)	1.34 (66.3)	0.08 (4.0)	2.02 (100)
4000-5999	0.64 (32.8)	1.29 (66.2)	0.02 (1.0)	1.95 (100)
6000-9999	0.54 (29.3)	1.22 (66.3)	0.08 (4.3)	1.84 (100)
10000-19999	0.95 (48.4)	0.96 (50.0)	0.03 (1.6)	1.92 (100)
20000 +	0.65 (42.2)	0.89 (57.8)	-	1.54 (100)
Total :	0.62 (32.8)	1.24 (69.6)	0.03 (1.6)	1.89 (100)

Note: Figures within brackets are the percentages.

Only 1.6% of rural requirement is met from PFDS. Sample population of rural area purchase 65.6% of their consumption requirement from market and 32.8% from own product.

6.05.2. Monthly per household consumption of rice and wheat by source of supply and by broad socio-economic classes is shown in

Table : VI - 4 below:

Table : VI - 4

**MONTHLY PER HOUSEHOLD CONSUMPTION OF RICE AND WHEAT BY
SOURCES OF SUPPLY AND BY BROAD SOCIO-ECONOMIC CLASSES**

Source of Supply Socio-Economic Class		(Quantity in Maund)											
		Rice			Wheat				Rice and Wheat				
1	2	3	4	5	6	7	8	9	10	11	12	13	
I. Dhaka SR Area													
Posh Area	-	1.02 (95)	1.05 (5)	1.07 (100)	-	.12 (31)	.27 (69)	.39 (100)	-	1.14 (78.1)	0.32 (21.9)	1.46 (100)	
Mid-Income	.02 (2)	.96 (95)	.05 (5)	1.03 (100)	-	.16 (14)	.23 (59)	.39 (100)	0.02 (1.4)	1.12 (78.9)	0.28 (19.7)	1.42 (100)	
Low-Income	-	1.09 (98)	.02 (2)	1.11 (100)	-	.28 (93)	.02 (7)	.30 (100)	-	1.37 (97.2)	.04 (2.8)	1.41 (100)	
II. Khulna SR Area													
Posh Area	-	.96 (78)	.27 (22)	1.23 (100)	-	.15 (39)	.23 (61)	.38 (100)	-	1.11 (68.9)	.30 (31.1)	1.61 (100)	
Mid-Income	-	.96 (93)	.07 (7)	1.03 (100)	-	.22 (52)	.20 (48)	.42 (100)	-	1.18 (81.4)	.27 (18.6)	1.45 (100)	
Low-Income	-	1.18 (98)	.03 (2)	1.21 (100)	-	.37 (90)	.04 (10)	.41 (100)	-	1.55 (95.7)	.07 (4.3)	1.62 (100)	
III. Thana H/Q													
Posh Area	.39 (29)	.94 (70)	.01 (1)	1.34 (100)	.11 (34)	.19 (59)	.02 (6)	.32 (100)	.50 (30.1)	1.15 (38.1)	.03 (1.8)	1.66 (100)	
Mid-Income	.20 (15)	1.14 (84)	.01 (1)	1.35 (100)	.05 (19)	.22 (81)	-	.27 (100)	.25 (15.4)	1.36 (84.0)	.01 (.6)	1.62 (100)	
Low-Income	.07 (6)	1.20 (94)	-	1.27 (100)	-	.19 (100)	-	.19 (100)	0.07 (4.8)	1.39 (95.2)	-	1.46 (100)	
IV. Rural Area													
Posh Area	1.05 (63)	.01 (37)	-	1.66 (100)	.04 (12)	.30 (88)	-	.34 (100)	1.09 (54.5)	.91 (45.5)	-	2.00 (100)	
Mid-Income	.63 (37)	1.06 (63)	-	1.69 (100)	.03 (14)	.18 (86)	-	.21 (100)	0.66 (34.7)	1.24 (65.3)	-	1.90 (100)	
Low-Income	.14 (11)	1.17 (89)	-	1.31 (100)	.01 (3)	.30 (97)	-	.31 (100)	0.15 (9.3)	1.47 (90.7)	-	1.62 (100)	
V. Overall: Posh Area													
Mid-Income	0.21 (17)	1.03 (81)	.03 (2)	1.27 (100)	.04 (3)	.19 (63)	.07 (23)	.30 (100)	0.40 (24.7)	1.07 (66.0)	0.15 (9.3)	1.62 (100)	
Low-Income	.05 (4)	1.16 (95)	.01 (1)	1.22 (100)	.01 (3)	.20 (61)	.11 (35)	.33 (100)	0.23 (14.4)	1.23 (76.9)	0.14 (8.7)	1.60 (100)	
						.28 (90)	.02 (6)	.31 (100)	.06 (3.9)	1.44 (94.1)	.03 (2.0)	1.53 (100)	

The table shows greater access of posh and middle income areas to PFDS. In Dhaka SR area low income people receive only 2% of the rice consumed from ration as against 5% for Posh area and mid-income area people. In respect of wheat posh area people receive highest percentage (69%) and the low income people lowest percentage (7%) from ration. When rice and wheat pulled together it shows that slum dwellers receive only 2.8% of their demand from ration as against 19.7% by mid-income people and 21.9% by posh area people. 97.2% of the demand of poor people are met from market.

In Khulna SR area also the consumption behaviour is same as Dhaka SR area, with greater share of Posh area in PFDS' food.

Thana Headquarters and rural population receive negligible percentage of rice and wheat from PFDS. In general, Posh area people consume more rice supplied from PFDS as against least by the poor. In case of wheat, the mid-income people eat more (33%) and low income people the least.

6.05.3. Economic behaviour of sample population can be seen from Table : VI - 5 placed below:

Table : VI - 5
ECONOMIC BEHAVIOUR BY BROAD SOCIO-
ECONOMIC CLASS AND BY SOURCE OF SUPPLY

Source of Supply	Per household consumption of rice				Per household consumption of wheat			
	Production	Market	Ration	Total	Production	Market	Ration	Total
1	2	3	4	5	6	7	8	9
Posh Area	.359 (300)	.884 (352)	.083 (270)	1.326 (308)	.035 (160)	.188 (180)	.074 (175)	.297 (172)
Mid-Income Area	0.210 (280)	1.029 (320)	.032 (270)	1.271 (290)	.018 (150)	.199 (160)	.106 (175)	.323 (165)
Low-Income Area	.052 (260)	1.158 (280)	.012 (270)	1.222 (270)	0.01 (150)	.284 (150)	.016 (175)	.308 (160)
Overall	0.30 (280)	1.03 (318)	0.05 (270)	1.38 (290)	0.02 (154)	0.22 (163)	0.09 (175)	0.33 (165)

Footnote: Figures within brackets are the prices per maund.

The above table shows that Posh area people pay more for unit price of rice as compared to Mid-income people who also pay more as compared to low income people. Per household consumption of rice is highest in Mid-Income household and lowest in low income household whereas for wheat it is highest for Posh Area people and lowest for low income people. High and Medium income people pay more for unit price of wheat as compared to low income people. This may probably be due to preference of rich towards quality grain and the poor towards comparative advantage of prices.

6.05.4. Difference of consumption behaviour of different occupational households can be seen from the following table:

<u>Source of income</u>	<u>Monthly consumption in Maund</u>	
	<u>Rice</u>	<u>Wheat</u>
Salaried	1.01	0.18
Farming	0.69	0.10
Business	0.85	0.15
Industry	0.22	0.06
Rented	0.27	0.09
Other	0.01	0.44
Average	0.68	0.16

Source: Survey results by the Consultant.

6.05.5. As per Household Expenditure Survey of Bangladesh Bureau of Statistics per household availability of rice is 1.81 maunds and wheat is 0.35 maunds as against 1.36 maunds and 0.33 maunds respectively observed in the above survey.

6.05.6. Impact of PFDS on nutritional status can be seen from Table : VI - 6 placed below:

Table : VI - 6

IMPACT OF PFDS ON NUTRITIONAL STATUS BY INCOME GROUP

(Figures within brackets are the percentage and outside are the household)

Income Group	Access to PFDS						No Access to PFDS					
	Adult			Children			Adult			Children		
	Good	Av.	Poor	Good	Av.	Poor	Good	Av.	Poor	Good	Av.	Poor
1	2	3	4	5	6	7	8	9	10	11	12	13
000-499	9 (23)	20 (51)	10 (26)	18 (44)	17 (42)	6 (15)	1 (6)	10 (59)	6 (35)	-	9 (75)	3 (25)
500-1499	29 (15)	147 (77)	14 (7)	29 (16)	136 (75)	16 (9)	53 (10)	416 (81)	42 (8)	32 (6)	410 (84)	48 (10)
1500-3999	95 (28)	229 (68)	13 (4)	77 (24)	235 (72)	15 (5)	72 (18)	318 (79)	13 (3)	51 (14)	301 (81)	19 (5)
4000-5999	49 (40)	70 (56)	5 (4)	37 (68)	80 (1)	1 (32)	28 (64)	56 (4)	4 (4)	23 (26)	59 (65)	8 (9)
6000-9999	33 (29)	76 (67)	4 (4)	29 (28)	67 (64)	8 (8)	23 (36)	39 (62)	1 (2)	20 (36)	34 (61)	2 (4)
10000-19999	25 (44)	27 (47)	5 (7)	23 (44)	26 (50)	3 (6)	13 (31)	29 (69)	-	8 (30)	18 (67)	1 (4)
20000 +	17 (59)	10 (35)	2 (7)	13 (46)	14 (50)	1 (4)	7 (78)	2 (22)	-	10 (77)	3 (23)	-
Total :	257 (29)	579 (65)	53 (6)	226 (26)	575 (68)	50 (6)	197 (17)	870 (77)	66 (6)	144 (14)	834 (79)	81 (8)

In assessing the nutritional aspect for the beneficiaries of the PFDS an attempt was made to find out the linkage, if any, between the recipients of foodgrains on ration (under any category) and their general nutritional aspect. It is, however, a difficult problem to identify the nutritional aspect only on visual experience, for the people with poor health may also be due to worm infestation or any other wasting diseases. During the survey on-the-spot identification was made in this respect based mainly on general appearance of the person concerned. These were categorised under three broad classification - good health, average health and poor health. In doing so the available members of the particular household were summoned during the survey and a gross idea was formed thus, by the investigators.

The above table shows that among adults who have access to PFDS have better health as compared to who do not have. This is also true for children. More adults and children who do not have access to PFDS have "average health" than who do have access to PFDS. Impact of PFDS is more adverse to children who have no access to PFDS.

6.05.7. The impact of PFDS on nutritional status of SR area and rural area people can be seen from the Table : VI - 7 below:

Table : VI - 7

IMPACT OF PFDS ON NUTRITIONAL STATUS
BY BROAD SOCIO - ECONOMIC CLASS

(Figures, within brackets are the percentage of household)

Socio-Economic Class	Access to PFDS						No Access to PFDS					
	Adult			Children			Adult			Children		
	Good	Av.	Poor	Good	Av.	Poor	Good	Av.	Poor	Good	Av.	Poor
1	2	3	4	5	6	7	8	9	10	11	12	13
<u>Dhaka SR</u>												
Posh Area	16 (59)	8 (30)	-	15 (56)	8 (30)	1 (4)	3 (15)	-	-	2 (7)	1 (4)	-
Mid-Income	143 (22)	241 (38)	17 (3)	121 (19)	240 (37)	8 (1)	77 (12)	157 (24)	6 (1)	61 (10)	151 (24)	6 (1)
Low-Income	4 (1)	49 (10)	1 (2)	5 (1)	21 (4)	4 (1)	53 (1)	341 (73)	25 (5)	23 (51)	323 (68)	47 (10)
<u>Khulna SR</u>												
Posh Area	13 (25)	20 (39)	1 (2)	13 (25)	20 (39)	-	6 (12)	12 (23)	-	3 (6)	16 (31)	-
Mid-Income	13 (8)	72 (45)	2 (1)	12 (8)	64 (40)	3 (2)	19 (12)	49 (31)	5 (3)	20 (13)	54 (43)	5 (3)
Low-Income	10 (8)	25 (20)	3 (2)	-	18 (14)	2 (2)	2 (2)	65 (52)	20 (16)	4 (3)	92 (74)	9 (7)
<u>Thana H/Q</u>												
Posh Area	6 (30)	7 (35)	-	5 (25)	7 (35)	-	4 (20)	3 (15)	-	2 (10)	6 (30)	-
Mid-Income	10 (25)	19 (48)	-	13 (33)	10 (25)	1 (3)	6 (15)	5 (13)	-	4 (10)	9 (23)	3 (8)
Low-Income	6 (10)	17 (28)	4 (7)	3 (5)	24 (40)	3 (5)	8 (13)	22 (57)	3 (5)	5 (8)	19 (32)	6 (10)

Table : VI -7 contd....

Table : VI - 7 (contd..)
 IMPACT OF PFDS ON NUTRITIONAL STATUS
 BY BROAD SOCIO - ECONOMIC CLASS

(Figures within brackets are the percentage of household)

Socio-Economic Class	Access to PFDS						No Access to PFDS					
	Adult			Children			Adult			Children		
	Good	Av.	Poor	Good	Av.	Poor	Good	Av.	Poor	Good	Av.	Poor
1	2	3	4	5	6	7	8	9	10	11	12	13
<u>Rural Area</u>												
Posh Area	7 (17)	17 (41)	-	6 (14)	17 (41)	1 (2)	4 (10)	14 (33)	-	4 (10)	14 (33)	-
Mid-Income	15 (12)	44 (34)	5 (4)	15 (11)	45 (34)	4 (3)	10 (8)	49 (37)	8 (6)	10 (8)	54 (41)	3 (2)
Low-Income	18 (7)	91 (36)	18 (7)	91 (8)	88 (35)	18 (7)	9 (4)	107 (43)	8 (30)	9 (4)	95 (38)	16 (6)
<u>Sample Area</u>												
Posh Area	42 (30)	52 (37)	1 (1)	39 (28)	52 (37)	2 (1)	17 (12)	29 (21)	-	11 (8)	37 (26)	-
Mid-Income	187 (19)	376 (39)	24 (2)	161 (17)	359 (37)	16 (2)	112 (12)	260 (27)	19 (2)	95 (10)	268 (28)	17 (2)
Low-Income	38 (4)	182 (20)	26 (3)	27 (2)	151 (17)	27 (2)	74 (8)	535 (59)	56 (6)	41 (5)	529 (58)	78 (9)

The above tables shows that in Posh and Mid-income areas both the adults and children who have access to PFDS have better health as compared to those who do not have access to PFDS. In low income group the situation is reverse. In SR area both the adults and children of Posh sub-area have better health. In Dhaka SR area adults and children of mid-income sub-area behave in the same way but in Khulna SR area the performance is reverse. For low income sub-area adults and children who have "no access to PFDS" have better health than who have access to PFDS but in Khulna SR area it is true for children only. In rural areas both the adults and children who have access to PFDS better nutritional status than those who do not have access to PFDS.

6.05.8. Current status of ration entitlement and lifting can be seen from Table : VI - 8 placed below:

Table : VI - 8
RATION ENTITLEMENT AND LIFTING BY CHANNELS
FOR BROAD SOCIO - ECONOMIC CLASSES

(Figures within brackets are the percentage)

Channels	# Weeks			Rice (Qty. in md.)		
	Ent.	Lifted	% less lifting	Ent.	Lifted	% less lifting
1	2	3	4	5	6	7
SR	2256	1780	21	42.77	19.55	54
LEI	72	68	6	17.87	0.89	95
EP	20	20	0	0.63	.37	41
OP	16	12	25	2.7	.03	89
MR	24	14	42	2.37	0.75	68
VGf	20	16	20	3.92	2.26	42

Wheat (Qty. in md.)			Reason				
Ent.	Lifted	% Less Lifting	No price difference	Bad quality	Long queue	Want of money	Others
8	9	10	11	12	13	14	15
131.25	00.03	24	155 (27)	264 (46)	8 (1)	3 (.5)	6 (1)
4.01	3.18	21	5 (33)	13 (87)	-	-	-
1.19	0.31	74	-	-	-	-	-
3.89	1.16	70	1	-	-	-	-
88.11	2.02	98	37 (27)	50 (36)	6 (4)	41 (29)	1 (.6)
*	-	-	2 (40)	1 (20)	-	-	-

The above table shows that in SR area card holders do not lift the ration in 21% weeks. In terms of week percentage of less lifting is highest in MR area (42%) and lowest in LEI. EP card holders lift weekly ration in 100% cases which is probably due to higher price

differentials. The main common reason for less lifting in SR (46%), MR (36%) and LEI (87%) areas is bad quality of ration commodities. Another important reason is "no price difference". The reason "want of money" is predominant in MR area only. In case of VGF and OP area the main reason for less lifting is "no price difference". In case of SR, LEI, OP and VGF less lifting is dominant for rice and in case of EP and MR it is dominant for wheat. In SR and LEI area card holders lift maximum wheat probably because of easy availability of good quality even though the ration price is higher than market price in some areas.

6.05.9. Impact of Rationing on the Public Sector - Subsidy & Compensation:

Chapter II and III discussed distribution of subsidy by channels of food distribution and urban and rural areas. In this section distribution of subsidy by public and private sectors is discussed. Since supply of subsidized food to public sector employees constitutes a compensation in kind for services rendered, it has obvious implication for public sector compensation policy; that is, withdrawal of subsidized food will need to be compensated by enhancement of cash salary of the public sector employees. In determining cash compensation few theoretical issues need to be posed even if the amount of food subsidy going to the public sector employees is known. While the subsidy estimate may be based on full cost to the government in maintaining the PFDS, its implications for public sector compensation policy may be different. First, required compensation may be different from cash subsidy for, as the public sector employees will be required to buy their food from the markets, price they will be required to pay may be different from the full-cost price of PFDS. Market price may be higher or lower at the time of withdrawal of food subsidy. Secondly, with the withdrawal of food subsidy PFDS may be required to sell food from its stock in order to avoid deterioration in competition with the markets; in such a case, if, market price is lower than the full cost of public sector's food, the question of subsidy will reappear as one of trading loss; as a result the overall cash position of the government may not improve. What will be actual position will depend on the relative level of

market price and full-cost price of PFDS. Therefore, in this section the compensation is estimated on the basis of both full-cost and market prices, while a higher compensation at market prices will imply increased cost to government for compensation of public sector employees, the reverse may not be true; that is, a lower market price will mean just trading loss. However, since a part of food subsidy also accrues to the private sector, withdrawal of subsidy may lead to the improvement of government budget position, since there is no immediate implication for compensation to private sector, except probably for the very poor classes of the society, provided the ration price is less than the market price. The third issue which is theoretically more involved is whether compensation should be fully allowed by enhancement of cash salary of the public sector employees. The question here is the standard economic question of price-compensated variation of income. It has two facets: whether compensation to public sector employees should be made as they face different market prices so that (a) their consumption of food remains unchanged or (b) their welfare remains unaffected. The issues here are those of income effect and substitution effect of change in price of food for the public sector employees. These issues involve estimation of income elasticity and pure substitution elasticity which has been discussed in details later in Sec. 6.06 of this Chapter. Finally, it must be recognized in considering compensation that a public sector employee may have also family members earning income from other than public sector employment or may have more than one member dependent on public sector employment.

6.05.10. Estimation of food subsidy going into public sector has been derived on the basis of channels supplying food to the Sector. It is to recall that the various channels have been earlier classified into two broad classes as (i) monetized channels and (ii) non-monetized channels. The latter group consisting of FWP, VGF and Relief is addressed to people other than public sector employees while the first group consists of channels covering either fully or partly public sector employees. On the basis of such destination of food supplied under PFDS, the classification of all the channels is shown below:

Table : VI - 9
DESTINATION OF FOOD BY CHANNELS
TO PUBLIC & PRIVATE SECTORS

Channels	Wholly Public	Wholly Private	Public & Private
1	2	3	4
(A) Monetized			
1. SR :	X	X	/
2. MR :	X	/	X
3. EP :	/	X	X
4. OP :	/	X	X
5. LEI :	X	X	/
6. OMS :	X	/	X
(B) Non-Monetized			
7. FWP :	X	/	X
8. VGF :	X	/	X
9. Relief:	X	/	X

On the basis of destination of food under PFDS the estimation of subsidy of food going to the public sector relates to the first 5 channels of the monetized group. From the above classification it appears that the channels, EP and OP, are entirely servicing the public sector while MR and OMS the private sector. The channels which address both the public and private sectors are SR and LEI and thus require apportionment of food subsidy going through these two channels between the public and private sectors. The exercise is discussed below.

6.05.11. Distribution of Subsidy under SR:

In 1984/85, an amount of 264 thousand tons of food was distributed through the SR in a total of 1648 thousand tons distributed through all the 6 monetized channels and an amount of Tk.28.28 crores as actual subsidy (cash) on account of SR in a total subsidy of

Tk.210.56 crore for the monetized channels (vide Table II - 14, p. II-29); thus approximately 14% of the subsidy was incurred under the SR system. The number of participants (card holders) in this system are 33,22,950, distributed in both the public and private sectors. How many of these cards are held by public sector employees are difficult to estimate in any direct way as these cards have been issued over such a long time that their identification on the basis of application is no longer possible nor is realistic because the nature of household might change over time; so the estimate was based on a questionnaire to households for which a sampling survey of households in both urban and rural areas was carried out. The questionnaire covered nature of employment and source of income of households. From this survey the proportion of households dependent on public sector employment was estimated as follows:

Table : VI - 10
PERCENTAGE OF PUBLIC SECTOR CARD-HOLDING HOUSEHOLDS

SR Areas	Percentage of Card Holders		
	Government	Semi-Govt./Autonomous	Total
1	2	3	4
1. Dhaka :	21.16%	3.0%	24.16%
2. Others :	24.29%	21.13%	45.42%

The above number may be compared to the results derived from the municipal survey (unpublished) of BBS under the Agricultural Census of 1984. According to this Survey the proportion of households dependent on government service appears to be 29.35% in all municipal areas of the country and 23.10% in the 4 metropolitan areas of Dhaka-Narayanganj, Chittagong, Khulna and Rajshahi. Few observations may be made on these two sets of data. First, the households survey shows a lower concentration of official card holders in Dhaka than in other SR areas. Its reason is obvious for Dhaka has large proportion of private households who had access to SR while in some new SR areas such as Khulna the system was restricted to public employees after independence. Secondly, on the same ground that Dhaka has a large number of private households the proportion of public sector employees as found under the municipal survey in 4

metropolitan areas lies in between the lower value of Dhaka and higher value for other SR areas as found in the Household Survey.

6.05.12. Using the Household Survey results as the proportion of card holders and the total cards in all SR areas the number of SR card holding families in the public sector has been derived as follows:

	<u>Families</u>	<u>Cards</u>
1. Government	1,48,738	8,82,933
2. Semi-Govt./ Autonomous Bodies	74,007	4,14,439
	<u>2,22,745</u>	<u>12,47,372</u>

* assuming 5.6 members per family.

That is, 34% of the cards are held by households dependent on the public sector for their employment. The geographical distribution of SR cards in the 5 SR areas is as follows:

Table : VI .. 11

GEOGRAPHICAL DISTRIBUTION OF SR CARDS

Areas	Nos.
1	2
1. (a) Dhaka	20,12,896
(b) Narayanganj	2,52,473
2. Chittagong	4,70,401
3. Khulna	4,53,709
4. Rajshahi	1,50,481
5. Rangamati	32,930
	<u>33,72,950</u>

6.05.13. Total Public Sector Subsidy:

On the basis of card held by the families dependent on public sector for their employment, 34% of the actual subsidy for SR or Tk. 10.46 crores are attributed to the public sector for SR. But this is only a small part of the total subsidy enjoyed by the public sector

employees and institutions as a whole. As mentioned earlier, the whole of subsidy under EP and OP is incurred in running public sector establishments including hospitals and jails. However there is a receipt of Tk.17.75 crores from EP category under Revenue Budget Head No. 34-Defence Receipts on account of food, as discussed elaborately under Section 2.01,4 (Chapter-II). This means net subsidy to EP is Tk.46.64 crore. With this adjustment public sector's subsidy falls. In addition, it is estimated that about two-thirds (63.4%) of subsidies on account of L.E. channel are due to public sector enterprises. LEI card holding private enterprises had 1,48,426 employees including transferred jute mills against public sector's employment of 2,06,585 accordingly LEI cards were distributed between the private and public sectors. The share of public sector in the total of monetized channel subsidy for 1984/85 is shown below:

Table : VI - 12
SHARE OF PUBLIC SECTOR'S SUBSIDY

(Taka in Crore)			
Channels (Monetized)	Total Subsidy	Share of Public Sector	Percentage
1	2	3	4
1. SR :	28.28	10.46	34%
2. EP :	64.39	64.39	100%
3. OP :	41.65	41.65	100%
4. LEI :	5.38	3.41	63.4%
	<u>139.70</u>	<u>119.91</u>	<u>85.8%</u>
5. MR :	49.52	-	-
6. OMS :	11.60	-	-
7. F.M.* :	9.74	-	-
Total :	210.56	119.91	57.0%

* F.M. means flour mills; there is only one flour mill in the public sector; hence its share is considered negligible.

It follows that out of the total subsidy of Tk.210.56 crores incurred in 1984/85, Tk.119.91 or 57.0% was incurred for the public sector. Since this subsidy was either incurred in running some government establishment (e.g. hospitals/jails) or as payment in kind for public sector employees, any withdrawal of such subsidy under food budget will correspondingly lead to an increase of the cost of operation of the government departments.

6.05.14. Extent of Compensation:

The extent of compensation to employees and increased cost of establishments will depend on the alternative, opportunity cost of meeting their food demand. This may or may not be equal to the amount of food subsidy. To clarify the point, an example is shown. If full-cost⁽¹⁾ of PFDS is, say, Tk.300/md. and ration price is Tk.250, subsidy is Tk. 50/md.; but as soon as subsidy is withdrawn employees will have a choice to buy food from government dealers at full cost i.e. Tk.300/md. or buy from the open market. If open market price is, say, Tk.280/md. then in order to meet his food need an employee will have to be compensated by Tk.30/md. the difference between the ration price and market price, not by the difference between the ration price and PFDS full-cost, which is Tk.50/md. If however the market price is Tk.320/md., an employee will have a cheaper alternative to meet his food demand from the government dealers and the compensation should be Tk.50/md. The qualitative difference between the open market and PFDS is not material, since the employee had been buying food from the government dealer. Thus the actual compensation to employees will depend on the market opportunities. It must be reemphasized here that true (economic) subsidy is the difference between market price and the PFDS price.

6.05.15. In the following table the two estimates of subsidy, one on actual cost of PFDS and the other on market price are shown for the public sector.

Table : VI - 13
PUBLIC SECTOR'S FOOD SUBSIDY (1984/85)

Channels	Quantity of Food (000 ton)	(Tk. in Crores)	
		Budget Subsidy (av.)	Subsidy at av. market price
1. SR	: 98 (63)	10.46	9.63
2. EP	: 117 (73)	64.39	46.91
3. OP	: 390 (290)	41.65	5.34
4. LEI	: 40 (40)	3.41	0.25

Note: (1) Figures in parentheses are for wheat. (2) Budget subsidy includes incidentals. (3) Retail market price of rice is Tk.8519 /ton and wheat Tk.4822 /ton in SR and EP based on urban areas and for OP Tk.7501 and 4126 respectively based on rural prices. (4) Since there is a recovery of 17.75 crores under channel EP from the beneficiaries arising from higher average prices charged, the actual subsidy both budget (64.39 crores) and at market price subsidy (46.91 crores) will be lower by the same amount (i.e. 17.75 crores).

Thus, the effective subsidy at market prices is substantially less than the budget subsidy - Tk.62.13 crores against Tk.119.91 crores or about 52%. In other words if public sector employees are compensated in cash for loss of subsidized food there will be net saving of Tk.57.78 crores in budgetary resources. It is noticed that main source of saving is OP, where, because of its diffused character there is better opportunities to buy food cheaper directly from the market. It is also to note that there practically no saving on account of EP as here urban market prices have been taken into consideration for comparison with ration prices, but here probably saving potential may be exploited if purchases by users from local markets are allowed.

6.06. ECONOMIC ANALYSIS:

6.06.1. Price and Income Elasticities:

In this section an analysis of consumer behaviour with respect to prices of food and income is covered. The analysis uses econometric method in estimating price and income elasticities and substitution and income effects of price changes. The estimates are based on the household expenditure survey carried out under the present study. Households have been classified into 3 groups, namely, (1) low income households having income from Tk.300 to 1500 a month; (2) medium income households with income between Tk.1500 to 3000; and (3) high income households with income more than Tk.3000 a month. The equation used for the estimation of price and income elasticities is:

$$\log Y = a + b_1 \log x_1 + b_2 \log x_2$$

where, Y = quantity of food consumed in md./month

x_1 = price of food per md.

x_2 = monthly household income in taka

b_1 = Price elasticity

b_2 = Income elasticity

Because of the double log transformation b_1 and b_2 are the price and income elasticities respectively. Both elasticities have been estimated for rice and wheat separately. The estimated equations for the 3 groups for rice and wheat are given below:

(1) Long Income Households:

(a) For rice : $\text{Log } Y = 0.81185 - 0.99376 x_1 + 0.60587 x_2$
 (t values) (0.5518) (-1.5640) (3.090)

(b) For Wheat : $\text{Log } Y = 1.41518 - .08701 x_1 - 0.47136 x_2$
 (t values) (2.4799) (-3.1506) (2.4799)

(2) Medium Income Households:

(a) For Rice : $\text{log } Y = 1.62913 - 0.71071 x_1 + 0.12235 x_2$
 (t values) (1.0204) (-1.4231) (.3722)

(b) For Wheat : $\text{log } Y = .12008 - 0.01208 x_1 - 0.06658 x_2$
 (t values) (.0579) (-.0997) (-.1087)

(3) High Income Households:

(a) For Rice : $\text{log } Y = 1.13783 - 0.73617 x_1 + 0.285424 x_2$
 (t values) (.6664) (-.8830) (.5022)

(b) For Wheat : $\text{log } Y = .05308 - 0.01267 x_1 - 0.01432 x_2$
 (t values) (.0729) (-.3026) (-.0717)

Income Groups	Income elasticity (b_2)		Price elasticity (b_1)	
	Rice	Wheat	Rice	Wheat
1. Low Income	.6059	-.4714	-.9938	-.0870
2. Medium Income:	.1224	-.0666	-.7107	-.0181
3. High Income	.2854	-.0143	-.7362	-.0127

6.06.2. One characteristics outcome of the above estimation is that income elasticity of wheat for all the three groups turn out to be negative, i.e., an increase in income leads to a decline in consumption of wheat. This clearly shows the preference of Bangladeshi households to rice. Given the cultural tradition and test of Bangladeshis this is in no way a starting revelation but it has very significant implication for the management of PFDS since the larger part of food distributed through PFDS consists of wheat rather than rice. So if food price is raised including that of wheat a reduced real income will affect wheat consumption differently from rice consumption. It is to note that income elasticity of rice is positive i.e. a reduction in income will lead to reduction in rice consumption. It is also to notice that income elasticity of wheat is relatively much large in case of low income households than it is with medium and large income households; this means that an increase in issue prices under PFDS will have greater affect on the 1st group than on the other two groups in respect of rice and wheat consumption. Generally it follows that an increase in price of food will lead to higher consumption of wheat and reduced consumption of rice.

6.06.3. Income and Substitution Effects:

How a price increase will affect consumption of wheat and rice requires a further analysis of consumer behaviour in terms of substitution and income effect since income elasticities for rice and wheat have opposite sign. Knowledge of such effect is important if the nutrition level of the various income groups is to be protected. So in addition to the estimation of sample price and income elasticities of demand for food pure substitution elasticity has also to be estimated. For this estimation the following standard equation has been used:

$$E_{ij} = e_{ij} - E_i K_i$$

where, E_{ij} = Price elasticity of demands,

e_{ij} = Pure substitution elasticity

E_i = Income elasticity

K_i = Budget share of Commodity -i in the total expenditure in all commodities.

To estimate pure substitution elasticity from the above equation the only element to be determined is the budget share as the other two elasticities have already been estimated. Share of food budget of rice and wheat for the 3 groups are:

<u>Income Groups</u>	<u>Rice</u>	<u>Wheat</u>
(1) Low Income	40.17%	5.57%
(2) Medium Income	28.98%	2.52%
(3) High Income	18.17%	1.88%

Inserting these values to their corresponding equations we get the pure substitution elasticities for the 3 groups as follows:

	<u>Estimate e_{ij}</u>	
	<u>Rice</u>	<u>Wheat</u>
(1) Low Income	-.7504	-.1133
(2) Medium Income	-.6752	-.0138
(3) High Income	-.6843	-.0130

The estimated substitution elasticities show that the issue price policy will have different impact on the consumption of food cereals by the 3 groups, particularly in case of wheat. Because of the nutrition effect of any change in consumption it is important to examine the pure substitution elasticity closely with a little bit of serious concern. It may be recalled that in case of low income households price elasticity of rice is -0.99378, close to about -1; that is a 10% increase in rice price will lead to about a 10% decline in rice consumption, but the substitution elasticity being -.7504 only (7.5%), only a quarter of the decline is accounted by income effect, being relatively poorer now than before the increase in rice price. With reduced income poor families will shift to wheat consumption even if the relative prices of wheat and rice remain same. It follows from the income effect that a 10% increase in rice price implies about 8% decline in income. The resulting switch from rice to wheat will lead to a 3.8% (.4714 x 8%) increase in wheat consumption. Taking the substitution effect of 10% price

increase in rice on its consumption and its income effect on consumption of wheat it appears that consumption of food cereal will decline among the low income households as the cross-elasticity of substitution for rice to wheat appears to be quite high - a 10% increase in rice price appears to lead to 17% increase in wheat for compensating variation. A 10% increase the rice price will require reduction in rice consumption by 7.5% even if the poor households are to stay out in their welfare, but that will require a 17% increase in wheat consumption given their preferences; but actual increase is estimated to be 2.8% only no compensating income variation is adopted for the poor families with increase in ration prices.

6.06.4. But the above conclusion is based on the assumption that only issue price of rice is raised. In real situation however issue prices of rice and wheat are raised. If along with rice price wheat price is also raised low income households will be under double squeeze. A 10% increase in wheat price will also reduce consumption of wheat though only marginally, by about 2%. Hence it follows an nondiscriminatory price policy will hurt the low income households quite significantly, taking simultaneous increase in rice and wheat prices. It is to be noted that for the estimate of price and income elasticities t values for income elasticities are quite large for the low income groups.

6.06.5. Since for the other two groups income elasticity of wheat is relatively low (t values also low) the effect of an increase in rice will be less pronounced than with the poor families. It is also to note that the price elasticity for these two groups is also relatively lower. Therefore, general increase in price will affect the low income households more than the other two groups.

6.06.6. In absence of compensating income transfer (e.g. VGF) an increase in price will reduce for consumption. In other words, the new price will not clear the market at a given supply level and consequently such price is not the price that is relevant for

calculation of economic subsidy. As such opportunity cost (real economic subsidy) of PFDS, given the level of its operation, is lower than international price of food implies.

6.06.7. Economic Compensation for the Public Sector:

As there exist two effects of sale of food through PFDS at subsidized rates to public sector employees, subsidy being looked on as a payment in kind to them unlike transfer of income to the poorer sections in private sector, there arises the question how much the public sector employees are to receive as compensation if subsidized food is withdrawn from PFDS or subsidy is eliminated. In this context it may be recalled that in para 6.05.15 an estimate of subsidy was made on the basis of opportunity cost of PFDS i.e. based on the difference between market prices and PFDS' prices. One way to determine compensation to the public sector employees as already estimated in the above para will be to use this economic concept of subsidy, but that overlooks the distinction between income effect and substitution effect as such estimate implies that after price increase to the level of market price a consumer will continue to consume (purchase) same quantity of cereals as before if his income is raised by the extent of price difference times the quantity he is consuming. The existence of income effect and substitution effect means that with such income compensation individual consumption of food will change depending on the new level of income and relative prices of commodities. It is, therefore, emphasized that since subsidized food supply to the public sector is considered as compensation in kind to its employees rather than as a tool of ensuring a normative level of consumption, compensation in economic sense is the loss of income that will follow from the increase in PFDS' prices.

Estimated income elasticity for each of the 3 income groups has been shown in para 6.06.2. It shows substantial variation in income elasticity between the groups and between rice and wheat. It is significantly larger for the lower income group than for the larger income group. Further it is negative in case of wheat while it is

positive in case of rice showing a strong preference for rice; this complicates the issue for as subsidy in kind is replaced by money income a consumer moves from wheat consumption to rice. The question of budget subsidy has therefore to be considered both from the point of income groups for income effect and substitution between rice and wheat simultaneously. Since the current subsidy is distributed rice and wheat and unit subsidy is different, first issue to determine the extent of requirement for price increase in both rice and wheat,

In 1984/85 actual cost of sales for rice was Tk.8840/- /ton (Table: VI-14) against the pooled sales price^{of}/Tk.6605; thus the unit subsidy was 25.3%. In case of wheat the cost was Tk.4540 /ton and the sales price was Tk.4251 giving the unit subsidy of 6.37% through distribution and procurement cost (incidentals being distributed on rice and wheat on an average basis). These mean that to eliminate subsidy, price of wheat will have to be raised higher than that of rice. Though this reflects the overall position there are significant variations between the various channels of PFDS. Since the concern is compensation to public sector employees only 4 channels are relevant, namely, SR, EP, OP and LEI. Unit subsidy for each of these 4 channels is shown below in terms of both (a) official costs, and (b) market prices for rice and wheat:

Table : VI - 14
UNIT SUBSIDY BY CHANNEL IN THE PUBLIC SECTOR(1984/85)

Channels	Rice (per ton)					Wheat (per ton)				
	Av. Cost	Market price	Sales price	Subsidy Rate in %		Av. cost	Market price	Sales price	Subsidy Rate in %	
				(a)	(b)				(a)	(b)
1. SR :	8840	8519	6605	25.3	22.5	4540	4822	4251	6.37	11.8
			(7209)	18.5	(15.4)			(4492)	(1.06)	16.8
2. EP :	8840	7501	1560	82.4	79.2	4540	4126	1281	71.8	68.7
3. OP :	8840	7501	6605	25.3	11.9	4540	4126	4251	6.37	-
			(7209)	(18.5)	(3.9)			(4492)	(1.06)	
4. LEI:	8840	7501	-	-	-	4540	4126	(4778)	-	-

Note: (i) Sales price is shown at average price during the year:

(ii) Figures in parenthesis is the latest price under PFDS.

The table shows that efforts to reduce subsidy will largely affect the EP group as this is also the group that accounts for about half of the subsidy (vide Table : VI - 13). From the point of compensation to the public sector there are 3 distinct groups namely, SR and OP where that unit rate of subsidy was more or less same for rice under both the options (PFDS & market), EP where the rate is high and LEI. The unit rate of subsidy in relation to the market price shows the extent of compensation to each of these 3 groups of public sector employees, since market price is lower than PFDS' cost price .

The income effect of an increase in price from lower PFDS' distribution price to market price can be estimated from the price and pure substitution elasticities estimated before by using the following equation:

$$dQ/Q = (e-s) \cdot dp/p$$

Where e =price elasticity and s = pure substitution elasticity, p and Q being the original price and quantity bought at that price; dQ & dp are changes in quantity and price.

$$\therefore dQ = - (e - s) (dp/p) \cdot Q$$

That is, after an increase in price food purchase will decline by dQ as a result of income effect. Therefore consumer (public sector employees) will have to be compensated by an increase in income so that he can increase his consumption by dQ . The amount of additional income (dY) is

$$dY = dQ (p+dp) = - (e-s) (dp/p) \cdot Q (p+dp)$$

Since the elasticities are different for the 3 income groups, the amount of compensation will be also different. If market price of rice is used as the opportunity cost of PFDS for SR areas rather than selling rice at subsidized rates to public sector employees the compensation formula for each of the 3 groups will be as follows:

(i) Income group between Tk.300 to Tk.1500 /p.m. :
 $dy = Tk.8519 \times .038 \times Q$

(ii) Income group between Tk.1500 to Tk.3000 /p.m.:
 $dy = Tk.8519 \times .006 \times Q$

(iii) Income group between Tk.3000 and above
 $dy = Tk.8519 \times .008 \times Q$

The estimate the total compensation for the public sector on the basis of above formula wheat are still to be known is the distribution of employees by income groups and the quantity of rice consumed. As the former information is not available an alternative method is to use weighted elasticities of the 3 groups. The weights used are the sample size of each groups and the proportion of budget spent on food for each group. The composite weight for income and budget share is as follows:

		<u>Rice</u>	<u>Wheat</u>
(i)	Low Income	: .0176	0.25
(ii)	Medium Income	: .4051	0.2742
(iii)	High Income	: .5773	0.4758
		<hr/>	<hr/>
		1.00	1.00
		<hr/>	<hr/>

Thus the weighted sum of price and substitution elasticity is:
 $(.2434 \times .0176) + (.0355 \times .4051) + (.0519 \times .5773) = 0.0486$

The quantity of SR rice for the public sector was about 30 thousand tons. Therefore, the amount of compensation is estimated at Tk.19.13 lakh only.

Corresponding procedure for wheat yields the weighted elasticity of $-.0054$ and on the basis of a market price of wheat at Tk.4822 /ton the amount of compensation comes to Tk.1.61 lakhs for 68 thousand tons of wheat absorbed by the public sector through the SR channel.

The total compensation for the public sector for food received through the channels mentioned earlier is shown below:

Compensation to Public Sector for Income effect (Reference Year 1984/85)

<u>Channels</u>	<u>Weighted elasticity</u>	<u>Market price/ton</u>	<u>% change in price</u>	<u>Quantity (000 tons)</u>	<u>Compensation (Tk. in Lakh)</u>
1. SR:Rice	.0486	Tk.8519	15.4	30	19.13
Wheat	-.0054	" 4822	6.8	68	-
				98	19.13
2. EP:Rice	.0486	" 8519	79.2	44	144.28
Wheat	-.0054	" 4822	68.7	73	-
				117	144.28
3. OP:Rice	.0486	" 7501	3.9	100	14.22
Wheat	-.0054	" 4126	-	290	-
				390	14.22
4. LEI:Rice	.0486	" -	-	-	-
Wheat	-.0054	" 4822	-	40	-
				40	-
Total :				645	177.63

It is to note that 81% of compensation will be on account of EP.

In deciding on compensation for the public sector employees two points need to be mentioned. First, there is no subsidy in economic sense for distribution of food such as through the OP channel or very little of it as under the LE channel. Most of subsidy arises in case of SR and EP, mainly the latter (vide Table VI - 13). Secondly, there is a clear distinction between SR food recipients and others, particularly EP. While SR recipients are households, others consist partly of households and partly of establishments such as OP which includes hospitals and jails also beside households. EP also exhibits this dual character involving in significant part establishments. Because of this duality it might be desirable to treat the subsidy of EP as a part of cost of particular establishment; similarly, for hospitals and jails requiring adjustments between food budget and departmental budgets.

6.06.8. Subsidy and Production:

There is a logical extension of the subsidy issue to the question whether subsidized food inhibits domestic production of food. In assessing this problem it needs to be recognized that subsidized food sales constitutes only one side of the picture of PFDS for it is also engaged in domestic procurement of food at incentive prices under the official food policy. As PFDS is addressing two issues of production and consumption simultaneously, conflict of the two is apparent. But a number of factors are to be taken into consideration for a rational view. First, production and distribution problems are two distinct problems and they need to be addressed simultaneously in view of existence of poverty on a wide scale, the latter implying that even if production problem may have its engineering solution (i.e. HYV technology), distribution problem ensues from lack of income and employment which may not have quick solution. Say's Law does not respond adequately to these problems. Within this broad limitation it is also to recognise that there are both seasonal and geographical diversities in food supplies and prices which require intervention by PFDS through both the levers of procurement and distribution not coextensively, geographically and seasonally. In fact, seasonal and geographical variations are reasons for frustration of Say's Law in the food sector. Public food

offtake during the two lean quarters, Sept.- Nov. and Feb.-April accounted for 60% of the total offtake in 1983/84 and 56% in 1980/81. About 11 districts - 4 in Khulna, 2 in Dhaka, 2 in Rajshahi and 3 in Chittagong are categorised as deficit districts (WB Memorandum, 1986, Vol. II, p.70) Against this the overall situation is also food deficit which needs to be addressed through import. This theoretical underpinning of the current food policy is further strengthened by the fact that food production remains a subsistence economy to a large extent such that surplus food market is very limited; in other words, public food distribution may have, if any, very little effect on production. The rate of growth of food during the last ten years tends to prove this view. A further point to stress is that the level of food distribution through PFDS fluctuates with the level of domestic output; the reverse relationship is necessarily weak. Lastly to emphasize, the spirit of PFDS is price stabilization between the harvest and lean period as reflected in greater emphasis of the food policy on OMS in recent years. If so viewed the apparent conflict between production and consumption evaporates.

The scope for conflict has also declined in recent years because of the change in the composition of PFDS, shifting in favour of non-monetized channels. Share of the non-monetized channels increased from 20.7% in 1979/80 to 35.6% in 1984/85. Further, the policy to use the food aid counterpart fund for financing development projects in the agriculture sector has also helped promote food output and compensate for whatever adverse effect distribution of subsidized food may have.

6.06.9. Recommendations:

In this context of differential impacts of price policy it is to recall that except for VGF and Food For Works Programme and to a certain extent the MR, the other channels are not household income dependent. SR system caters to the need of all the three groups. Therefore any general price policy aiming at reduction of food subsidy will be undesirable from the point of maintaining the

nutrition level of the low income households. To address this ..
intergroup problem PFDS will need to be restructured lest a general
policy enhance the malnutrition. An urban VGF programme may resolve
the problem only partially given the socio-cultural inhibition
of households.

6.07. NUTRITION ISSUE:

6.07.1. Malnutrition is a serious problem in Bangladesh. According to World Bank's documents less than 5% of the population consume ,
adequate quantity and quality food. In addition to unequal distri-
bution of food in one family to other calorie intake has been
consistently decreasing since 1962-66. Poor health, blindness,
goiter, lathyrism etc. are linked with malnutrition. At present
number of steps are in practice to minimise malnutrition. Rationing
system was originally introduced to provide cheap food to the poor
but in reality in provide more subsidized food to higher income
groups. Food For Works Programme generate employment and payment at
lean agricultural season so that foodgrain reaches the landless
rural poor. The vulnerable group feeding programme aims to provide
food to the high-risk group. In spite of these efforts approximately
2,50,000 children die from malnutrition every year and many suffer
from blindness, lathyrism, etc. This survey has made limited inves-
tigation to assess the impact of PFDS on different socio-economic
groups.

6.07.2 Nutritional Status by Income Group:

Table : VI - 6 shows this survey's observation in respect of the
impact of PFDS to different income groups.

In the poor income group whose income is within Tk.300-1500/- only
43.5% have access to PFDS. In this group 44.2% of children and
43.4% of the adults have access to PFDS. In mid-income group
(Tk.1501-3000) 46.8% of the children and 45.5% of the adults have
access to PFDS and among high income group 61.6% of adults and
59.9% of children have access to PFDS. This shows that rich

people are the highest beneficiaries of PFDS. The percentage distribution of Table : VI - 6 also shows that percentage of "good health" is more to both the adult and children who have access to PFDS. In mid-income and high income group percentage of good health have fluctuated. Adults and children who have no access to PFDS mostly reported to have average health.

6.07.3. Rural - Urban Dichotomy:

Urban people enjoy different facilities as compared to rural. In respect of PFDS urban people gets commodities at subsidized rate through SR, OP, EP and in some cases LEI where the rural people gets benefits from MR, FFW and Vulnerable group feeding programme. Urban - Rural break up and the impact of PFDS on nutritional status can be assessed from Table : VI - 7. In Dhaka SR area 55% of adults who have access to PFDS have good health as compared 44.9% who do not have the corresponding figures for Khulna, Thana H/Q and Rural areas are (57.1%, 36.5%), (55%, 45%) and (63.5%, 36.5%) respectively. In case of children the percentage of beneficiaries in Dhaka, Khulna, Thana H/Q and rural areas are (62.1%, 37.9%), (48.1%, 51.9%), (63.6%, 33.3%) and (84.1%, 15.9%) respectively. This shows that both adults and children who have access to PFDS have better nutritional status than those who do not have.

Average nutritional status of both adults and children have been observed to be among more mid-income people in Dhaka SR area as compared to Rural areas where people access to PFDS. In case of Posh area and low income area the situation is reverse. Among beneficiaries poor nutritional status is lower among urban children as to compared rural but the situation is reverse to these who access to PFDS.

6.08. SUMMARY:

Chapter-II dealt with cash (budget) subsidy and Chapter-III that of adjusted budget subsidy, adjustments needed for distortions in prices and costs. The current chapter mainly deal with Economic

Subsidy. In this chapter the concept of Economic Subsidy, and Economic value of food and their relation with resource cost based on price and income elasticities have been discussed. The accessibility and impact of PFDS on nutritional status of households as observed by the "Household Survey" conducted for this study has also been analysed and presented in this chapter. Econometric analysis of household expenditure survey data has been carried out in this section to estimate income and substitution effects. Economic behaviour of different socio-economic classes given income, consumption and prices, has been determined for 3 broad socio-economic classes.

Changes in price or income affect food consumption depending on the extent of changes in price or income and the price/income elasticities; therefore, as subsidized food affects consumption through substitution effect and income effect, so also a reduction in subsidy through increase in ration price will affect food consumption in both ways.

Subsidy in true economic sense is the opportunity cost which is the difference between the actual sale price and the price at which food could be sold. International price for calculation of economic subsidy though suggested by some, has no logical basis as the world price is not the opportunity cost of food distributed through PFDS since there is no option to sell food on the world market while receiving food aids. Thus, economic subsidy has to be evaluated wholly on the basis of domestic market opportunities for only practical alternative to ration system is to sell through open market. Economic subsidy in contrast to budget subsidy in the public sector has been shown in Table : VI - 13. It is about half that of budget subsidy.

The household survey shows that 57.4% of the sample area population do not have any access to PFDS and about 70% of the households whose income is less than Tk.1500/- per month have no access to PFDS. Among mid-income people whose income range from Tk.1500-3000/- per month 45% have no access to PFDS and among rich people 24% do not

(or did not) like to have access to PFDS. At national level largest beneficiaries of PFDS are the high and medium income people but not the low income people. The same scenario exist in urban areas but in rural area the mid-income people are the least benefited group under PFDS. At national level only 6.1% of food are received from PFDS, 19.8% come from own production and the remaining 74% from the market. Detailed break-up by commodities and by income groups has been presented in Table : VI - 3 through Table : VI - 5.

Malnutrition is a serious national problem and only 5% of the population consume adequate quantity and quality food. Among different income groups unequal distribution of food has been increasing over time but calorie intake has been decreasing consistantly. This survey shows that among adult and children of high and mid-income people who have better access to PFDS have better health as compared with those of low income people. Details of nutritional aspects has been presented in Table : VI - 6 and V - 7.

The economic analysis shows that income elasticities of wheat for all the three socio-economic groups are negative which clearly indicates the preference of traditional Bangladeshi households for rice over wheat. Therefore, food price is raised or reduced real income will affect wheat consumption differently from rice consumption. Income elasticity of rice is positive i.e. an increase in income will lead to increase in rice consumption. The income and substitution affects has been detailed at page VI - 29 and 30.

Using the concepts of income effect and substitution effect compensation for the public sector employees to be needed in case of food subsidy is eliminated has been estimated to be in the order of Tk. 8 crore. Most of it is on account of food distributed through EP. Since EP and OP are partly supporting establishments along with households it has been suggested to adjust food subsidy on these accounts through the departmental budgets.

Recommendation of this chapter is that any price policy aiming at reduction of food subsidy will be undesirable from the point of maintaining nutrition level of the poor. Rather the PFDS should be restructured so that the poor class gets maximum benefit from it.

CHAPTER - VII
RECOMMENDATIONS

7.0. GENERAL OBSERVATIONS:

Foodgrain in Bangladesh is the dominant and essential item of consumption. Since the country is still deficit in foodgrain production, its supply and price have to be stabilized to the advantage of both consumers and producers. It is, however, not out of controversy whether interest of the consumers or producers have to be protected. Any food policy in Bangladesh may run into contradiction with regard to welfare of certain groups of people. However, since the middle of 1970s PFDS has moved away from its old role as a ration system to increasingly support the production system. The present study concerns its role in food distribution with the focus on food subsidy. Today public foodgrain distribution system (PFDS) claims a significantly large segment of financial resources of the government, about 30% of annual revenue budget of the country. Assuming normalacy, the size of the PFDS turnover runs into 1.5 to 2.0 million tons of food annually. The size goes up in a year of bad crop.

Under such an unstable situation, formulation of foodgrain price with or without subsidy is an extremely difficult task. However, foodgrain pricing, in other words, the subsidy in public foodgrain distribution has been viewed from different socio-economic angles. The study concentrated on the estimation of budget subsidy adjustment of subsidy on efficiency consideration and economic subsidy on the basis of opportunity cost. Budget subsidy concerns with the budgetary practices of the government given the conditions affecting its operation. Food is received by PFDS under various terms and condition of food aid actual cost of food may be different from that reflected in the budget. Problem is compounded by the level of efficiency of the public agencies. Therefore, subsidy reflected in the budget may not be the true subsidy. Costs and prices adjusted for the distortions may not also reveal the economic subsidy. Economic subsidy has been defined as the difference in price between

PFDS and markets, since markets constitute the alternative opportunity for both PFDS and consumers for sales and purchases of foodgrains. Chapter I and II dealt with the history of PFDS and budget subsidy. Chapter III, IV and V dealt with efficiencies and adjustments in budget subsidies. Chapter VI dealt with economic subsidies and the impact of any withdrawal of subsidy on consumption and nutrition. One particular point in it was the estimation of compensation to public sector employees in case food subsidy is withdrawn.

Information for Chapter I and II were collected from published and unpublished documents of the government and international agencies. In preparing Chapter III, IV, V and VI in addition to using secondary data two sets of surveys were carried out - one of food godowns and the other households both in urban and rural areas. Household information on income and consumption have been used for analysis of consumers behaviour in terms of income effect and substitution effect. Analysis of the problems led to a numbers of findings about the budget practices, foodgrain handling and storage, distribution of benefit of food subsidy among different socio-economic groups and likely effect of elimination of food subsidy and to a set of recommendations. In the following sections recommendations are pooled together to ensure focus on consistency and feasibility within the current socio-economic conditions.

7.01. SUBSIDY & PRICE ADJUSTMENTS:

(i) Subsidy & Welfare

The unit and total subsidy on Public Foodgrain Distribution may be reduced in phases. It is, however, to mention here that complete elimination of subsidy without looking to the different recipient classes' interest is neither desirable nor feasible because of social (e.g. food to hospitals) and nutritional considerations.

(ii) Subsidy & Cost of Operation:

The government is procuring foodgrain (both from domestic and external source) at prices upon which

certain incidental charges are added. Such handling and incidental costs leave scope of reduction such that subsidy could be minimized. Rly. transportation is much cheaper than other modes and where such opportunity exists, it should be used.

(iii) Godown Losses:

Godown losses are also found to vary significantly with the age, structure and facilities of godowns. So old godowns should be rehabilitated with improvement of structures having better facilities.

(iv) Shelf Life:

In calculating the prices of stored grain the godown rental should be calculated and added to the economic price of foodgrains. Since the godown life of all grains handled through PFDS are not the same, maximum shelf life of the grain (may be, 3 months for wheat, 4 months for rice and 6 months for paddy) should be ensured.

(v) Concepts of Subsidy:

Subsidy for imported and local grain should be calculated through appropriate adjustments in cost for inefficiencies. Adjusted subsidy should be clearly arrived at by valuation of grain at international price - preferably average of say 3 such exporting countries' price and actual cost of procurement in case of domestic procurement with adjustments for incidentals and handling costs.

(vi) Subsidy Calculation:

In calculating subsidy distribution of food through non-monetized channels, namely, FWP, VGF and Relief should be charged at full cost so that each subsidy for account of monetized channels is correctly accounted for.

(vii) Subsidy Adjustment:

Public sector's share in subsidy is only about 57 percent of the total on cash basis and on opportunity cost basis, it is just as half of that on cash basis. The main element of public sector's food subsidy is on account of EP.

On opportunity cost basis the total compensation for the public sector comes to be about Tk. 8 crores the main component of which is EP. Since EP as well as OP cover both households and establishments, it is recommended that food subsidy be adjusted through departmental budgets.

7.02. RESTRUCTURING PFDS:

(i) New Approach:

The existing PFDS may be restructured and changed/mixed with welfare consideration particularly the maintenance of nutrition level and in that case the present rationing approach should be replaced by "TARGET GROUP" approach. In case of such departure - from the traditional PFDS to a new approach - there may be two operational spheres of PFDS i.e. urban and rural: (a) in the urban area supply should be maintained with a price very close to market price and (b) in rural areas arrangements should be made to supply at prices with a wider difference between OMS and the prevailing market price, in order to ensure access for the target groups.

(ii) Refixing the channels of Distribution:

Subsidy elimination/reduction should not be equally viewed for all existing channels of PFDS, as the economic status of all recipients are not necessarily the same. VGF, FFW, GR and even some MR recipients should be treated as target groups in order to ensure nutrition level. Given the economic status and purchasing power of these consumers, the level of subsidy for MR may be determined.

(iii) Priority Areas:

From the available records it appears that the largest share of PFDS (about 30%) goes to "PRIORITY" groups i.e. the armed forces, police, BDR, Mills, etc. and that too with high subsidy. In case of households

(ii) Enhancement of Budgetary Control Mechanism:

In a trading budget, as in the context of food trading by the state, indication of opening and closing stocks of foodgrains with their valuation would enhance the element of budgetary control. This should also apply to the non-foodgrain items of food.

(iii) Separation from Revenue Budget:

In the interest of budget stability, it is worth considering whether the operation of the food budget should be separated from the revenue budget making it totally dependant on bank borrowing except for one final adjustment for budget subsidy as is the practice in some South East Asian countries having comparable public procurement and distribution of foodgrain programmes. The advantage of such a mechanism would be that it might free the revenue budget from pressure caused by seasonal natural calamities. It will also improve budgetary control.

(iv) Uniform Rate of Issue Price:

From budgetary/accounting point of view a uniform rate of issue price for EP/SR/MR/OP channels appear to be more equitable. It would also reduce the inequity of the existing system.

(v) Reduction of Operational Expenses:

The possibilities of cost reduction for bank charges and stock losses under operational expenses, as indicated in the text (Chapter-IV) should be given a serious thought.

7.04. TRANSFER OF RESOURCES:

If the present level of subsidies is withdrawn from almost all the channels, there may be a generation of additional resource which can be transferred to development budget. Grains obtained from the donor agencies and the same procured from the domestic market should have separate account to identify level of resources generation.

falling under these groups there is no justification for giving the subsidized food as the compensation for subsidized food is found to be small.

(iv) Abolition of SR Channel:

From the study it could be revealed that the lowest income group people (Tk. 500/- to 1500/- per month) in SR area have the lowest access to PFDS (21.5%) as against the highest access to the same (68%) by the income groups between Tk. 4000/- to Tk. 10,000/- per month. This fact is an indication that it does not serve one of the main objectives of PFDS to the extent of maintaining nutrition level and general welfare of the target group.

Furthermore, it is found that the fixed income group (salaried) consume more rice (1.01 md. per month/household) than any other groups. Under the prevailing situation the market price is not so high^{than} the ration price (rice). Less lifting of rice by the card holders is also found to be 54% in SR and as high as 95% in LEI channels (as per the study). On the other hand it is found that the amount needed for compensation of public sector employee is quite small.

Based on these facts it would not be undesirable to abolish the SR channel altogether from the PFDS.

7.03. RESTRUCTURING THE BUDGET:

(i) Development of a new Approach:

A budget is both a plan and an instrument of control. It loses its effectiveness unless performance is evaluated in relation to the plan objectives and criteria with utmost promptitude. It is essential to have a dependable system of finding the historic costs for the purpose. It cannot be said therefore that such a system exists as of now (vide Table -II-19). The urgency of developing and installing one could not be too strongly emphasized.

Money thus saved may be allocated in development programmes exclusively on agricultural production, nutrition & child welfare, rural infrastructure, etc. This new step, suggested, is likely to give better and more visible welfare service to the target group.

7.05. STORAGE:

(i) Uniform Weighing & Bagging System:

Since turnovers are continuous and segregation of one consignment is not practically possible from the other, the actual loss has never been estimated. To streamline the situation, to some extent, uniform weighing and bagging system should be introduced throughout the country so that physical verification becomes easier.

(ii) Accounting of Storage Loss:

From our estimate it is found that about Tk.40 to 50 crores are annually adjusted in the PFDS for handling, storage, etc. for the stock of 1.5 to 2.0 million tons foodgrain. It may not be out of scope to mention here that, in the subsidy calculation this sizable amount should be charged against operation cost and there are enough scope to reduce it.

(iii) Management Efficiency:

In order to increase the efficiency of the management of stock and thus to reducing stock loss the measures recommended are described below, in brief:

- (a) The godowns of poor physical condition should be replaced by modern ones or properly rehabilitated in no time.
- (b) The existing inspection, laboratory test, moisture and pest/rodent control system should be made more scientific and effective.
- (c) The existing stock loss should be reduced to below 1.0 (one) percent beyond which the same should be accounted as management inefficiency and thus should not come in any way in the valuation exercise.

7.06. TRANSPORT:

(i) Preference of Transport Mode:

Every year a sizable quantity of foodgrain is lost during transit including short landing at the sea ports. Although overall transit loss has always been found to be within the government allowance limit the loss in Railway was found to be 25 to 50 percent higher than the permissible limits.

To reduce transit loss, therefore, dependance on Railway has to be reduced and truck as a substitute with accountability should be preferred as usual mode of transport, unless Railway would improve their traffic/commercial management.

(ii) Control of Loss at Port:

Control of loss at port point deserves special attention, since loss of foodgrain is, reportedly, about 5 times of storage loss and 2.4 times of total storage and transit losses combined together. .

APPENDIX - A

Statement of Tentative Transit & Godown Loss percentage of CSDs for 1980-81

Sl. No.	Name of the C.S.Ds	RICE				PADDY				WHEAT			
		Transit Loss		Godown loss		Transit Loss		Godown Loss		Transit Loss		Godown Loss	
		Quantity	%	Quantity	%	Quantity	%	Quantity	%	Quantity	%	Quantity	%
1	2	3	4	5	6	7	8	9	10	11	12	13	14
1.	Halishahar	835.013	1.33	641.956	0.85	109.668	4.06	12.952	0.73	227.398	0.25	331.206	0.53
2.	Dewanhat	30.720	0.18	361.441	1.30	12.579	1.43	5.263	0.68	180.105	0.32	224.300	0.59
3.	Chandpur	0.635	0.49	46.622	0.77	7.540	0.45	5.972	0.71	51.736	0.28	83.501	0.57
4.	Tejgaon												
5.	Dhaka												
6.	Narayanganj	49.795	0.29	78.985	0.43	1287.495	5.05	97.387	0.64	404.853	0.95	223.070	0.55
7.	Mymensingh	112.691	1.45	26.502	0.41	478.910	2.04	152.669	1.22	457.820	1.96	68.252	0.42
8.	Khulna	-	-	337.589	2.06	107.204	2.14	10.937	0.82	904.853	1.64	1612.169	3.25
9.	M-Pasha	420.754	1.59	551.250	1.27	1794.588	8.33	67.973	0.70	4707.652	6.13	285.031	0.40
10.	Barisal	24.412	0.89	68.309	2.72	23.255	0.48	216.163	6.09	1621.538	9.55	52.818	0.72
11.	Muladuli	53.751	0.98	19.709	0.68	220.492	1.04	356.215	2.44	405.226	1.91	70.773	0.48
12.	Santahar	1.792	0.06	5.711	0.42	77.118	0.68	124.375	1.19	441.470	2.96	24.636	0.56

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Statement of Tentative Transit & Godown Loss percentage of CSDs for 1981-82

(Figures in M/Ton)

Sl. No.	Name of the CSDs	RICE				PADDY				WHEAT			
		Transit Loss		Godown Loss		Transit Loss		Godown Loss		Transit Loss		Godown Loss	
		Quantity	%	Quantity	%	Quantity	%	Quantity	%	Quantity	%	Quantity	%
1	2	3	4	5	6	7	8	9	10	11	12	13	14
1.	Halishahar	398.582	1.78	1039.940	1.82	321.538	10.94	65.435	1.25	109.854	0.19	989.810	1.96
2.	Dewanhat	73.721	0.21	289.810	0.91	249.910	4.85	14.968	0.29	108.436	0.24	762.859	1.35
3.	Chandpur	250.504	2.82	29.680	0.63	148.339	5.13	28.44	0.81	299.776	1.77	209.705	0.98
4.	Tejgaon	5057.521	4.90	435.722	0.53	223.591	2.00	27.921	0.23	4296.010	4.61	363.867	0.36
5.	Dhaka	297.163	0.96	124.897	0.43	-	-	-	-	210.190	0.33	211.385	0.34
6.	Narayanganj	647.555	3.16	66.928	0.61	916.947	13.80	544.494	4.31	-	-	134.057	0.78
7.	Mymensingh	42.441	0.46	38.634	0.51	721.351	3.15	309.444	0.88	756.626	4.40	77.230	0.38
8.	Khulna	147.592	1.94	361.180	3.27	1.180	3.16	137.253	3.97	195.707	0.31	656.849	0.99
9.	M-Pasha	602.837	1.78	506.458	1.09	336.879	9.93	292.758	2.08	1381.672	2.51	185.293	0.36
10.	Barisal	127.510	1.87	72.751	2.10	11.833	0.48	258.343	4.76	751.698	6.14	518.440	2.71
11.	Muladuli	44.867	1.07	26.876	0.49	59.798	0.40	196.043	0.83	43.001	2.46	49.421	0.60
12.	Santahar	136.767	1.97	25.270	0.44	37.850	0.44	151.997	0.86	642.703	7.89	103.471	0.60

0-11A

STATEMENT OF TENTATIVE TRANSIT & GODOWN LOSS PERCENTAGE OF CSDs FOR 1982-83

Sl. No.	Name of the CSDs	(Figures in M/Tons.)											
		RICE				PADDY				WHEAT			
		Transit Loss Quantity	Loss %	Godown Loss Quantity	Loss %	Transit Loss Quantity	Loss %	Godown Loss Quantity	Loss %	Transit Loss Quantity	Loss %	Godown Loss Quantity	Loss %
1	2	3	4	5	6	7	8	9	10	11	12	13	14
1.	Halishahar	89.698	0.21	309.518	0.55	-	-	-	-	185.144	0.21	725.383	0.66
2.	Dewanhat	58.455	0.26	209.220	0.48	-	-	-	-	114.334	0.22	279.619	0.47
3.	Chandpur	-	-	58.231	0.52	-	-	1.00	0.05	71.818	0.49	77.118	0.42
4.	Tejgaon	1890.705	3.80	391.601	0.49	-	-	0.150	1.02	7801.456	6.00	420.830	0.37
5.	Dhaka	147.592	0.79	102.277	0.46	-	-	-	-	308.100	0.46	178.985	0.27
6.	Narayanganj	173.871	2.04	191.639	1.09	6.122	0.50	180.291	6.98	179.507	0.43	102.986	0.26
7.	Mymensingh	118.477	0.75	42.404	0.31	176.334	1.22	75.849	0.72	1119.186	3.50	79.171	0.27
8.	Khulna	28.891	0.24	322.359	1.68	-	-	0.300	21.62	129.078	0.23	358.193	0.63
9.	M-Pasha	115.342	0.27	154.797	0.37	2.911	1.25	-	-	594.550	0.35	190.444	0.11
10.	Barisal	74.319	1.01	30.758	0.95	26.801	0.66	41.918	1.45	393.318	2.00	30.179	0.57
11.	Muladuli	167.263	2.22	25.718	0.74	-	-	0.336	3.20	688.092	2.97	35.536	0.35
12.	Santahar	116.274	1.48	15.752	0.38	9.071	1.00	0.261	0.04	742.814	3.80	47.405	0.38

11-11

Statement of Tentative Transit & Godown Loss Percentage of CSDs for 1983-84

Sl. No.	Name of the CSDs	(Figures in M/Tons)											
		RICE				PADDY				WHEAT			
		Transit Loss Quantity	Transit Loss %	Godown Loss Quantity	Godown Loss %	Transit Loss Quantity	Transit Loss %	Godown Loss Quantity	Godown Loss %	Transit Loss Quantity	Transit Loss %	Godown Loss Quantity	Godown Loss %
1	2	3	4	5	6	7	8	9	10	11	12	13	14
1.	Halishahar	281.902	0.71	252.742	0.53	-	-	0.229	3.01	225.644	0.23	448.545	0.64
2.	Dewanhat	91.000	0.29	220.000	0.58	34.000	2.26	6.000	0.41	222.000	0.25	233.000	0.36
3.	Chandpur	7.499	0.16	27.892	0.43	-	-	0.201	0.62	70.041	0.20	90.373	0.36
4.	Tejgaon	2592.000	3.80	381.202	0.52	242.913	11.00	1.748	0.10	9627.000	6.16	596.306	0.42
5.	Dhaka	157.113	0.48	140.719	0.42	-	-	0.016	0.90	401.152	0.42	275.045	0.31
6.	Narayanganj	195.449	1.89	63.250	0.51	113.781	6.46	8.080	0.46	277.186	0.50	174.774	0.37
7.	Mymensingh	159.952	2.13	58.526	0.46	288.885	3.90	73.313	0.96	1425.190	2.32	116.581	0.25
8.	Khulna	50.171	0.50	47.443	0.47	-	-	1.355	71.32	130.985	0.28	154.559	0.37
9.	M-Pasha	420.894	3.23	108.588	0.54	54.244	0.19	25.325	0.86	577.410	0.43	314.427	0.24
10.	Barisal	5.541	0.27	198.626	1.94	10.192	0.48	49.111	1.57	105.187	0.68	107.874	0.53
11.	Muladuli	-	-	58.928	0.78	13.171	0.67	39.291	2.06	295.661	1.13	176.392	0.53
12.	Santahar	45.072	0.34	110.857	0.58	6.651	0.27	19.405	0.73	727.510	3.05	123.253	0.51

11-12

Statement of Tentative & Godown Loss Percentage of CSDs for 1984-85

Sl. No.	Name of the CSDs	(Figures in M/Ton)											
		RICE				PADDY				WHEAT			
		Transit Loss Quantity	Loss %	Godown Loss Quantity	Loss %	Transit Loss Quantity	Loss %	Godown Loss Quantity	Loss %	Transit Loss Quantity	Loss %	Godown Loss Quantity	Loss %
3	4	5	6	7	8	9	10	11	12	13	14		
1.	Halishahar	280.089	0.27	337.296	0.91	-	-	-	-	104.285	0.24	332.284	0.47
2.	Dewanhat	120.000	0.24	241.000	0.83	-	-	-	-	74.000	0.23	264.000	0.47
3.	Chandpur	15.169	0.23	27.003	0.91	-	-	-	-	44.731	0.22	103.474	0.42
4.	Tejgaon	5120.000	5.86	246.786	0.43	2.819	20.00	1.104	0.54	2928.000	2.00	672.536	0.44
5.	Dhaka	-	-	153.309	0.21	-	-	-	-	-	-	331.712	0.34
6.	Narayanganj	204.625	0.66	131.679	0.59	-	-	0.118	14.96	362.340	0.55	294.052	0.43
7.	Mymensingh	774.348	2.74	39.684	0.31	19.606	2.74	4.726	0.68	560.601	1.19	186.313	0.34
8.	Khulna	91.527	0.24	41.987	0.35	-	-	-	-	174.148	0.25	212.019	0.28
9.	M-Pasha	359.015	0.77	62.491	0.20	-	-	2.722	1.25	1181.997	0.74	155.318	0.10
10.	Barisal	83.818	1.37	17.015	4.02	0.898	0.36	6.405	3.94	328.827	1.41	50.687	0.30
11.	Muladuli	407.567	7.15	3.386	0.35	-	-	4.806	2.27	576.994	5.35	26.039	0.31
12.	Santahar	347.387	2.27	18.282	0.41	-	-	-	-	1216.688	3.81	82.173	0.32

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Statement of Tentative Transit & Godown Loss Percentage of CSDs for 1985-86

Sl. No.	Name of the CSDs	(Figure in M/Ton)											
		RICE				PADDY				WHEAT			
		Transit Loss		Godown Loss		Transit Loss		Godown Loss		Transit Loss		Godown Loss	
Quantity	%	Quantity	%	Quantity	%	Quantity	%	Quantity	%	Quantity	%		
1	2	3	4	5	6	7	8	9	10	11	12	13	14
1.	Halishahar	324.985	1.63	509.876	0.77	0.997	0.96	-	-	43.538	0.12	201.561	0.57
2.	Dewanhat	170.000	2.95	179.000	0.77	-	-	-	-	34.000	0.12	182.000	0.65
3.	Chandpur	9.578	0.14	19.625	0.48	-	-	0.253	0.37	7.122	0.12	35.205	0.36
4.	Tejgaon	2226.904	9.00	469.881	1.04	0.046	0.10	0.418	0.45	516.165	0.51	204.034	0.29
5.	Dhaka	22.210	0.45	47.905	0.71	-	-	-	-	151.260	0.34	76.965	0.18
6.	Narayanganj	272.847	6.17	85.678	1.96	-	-	2.617	26.16	111.361	0.32	103.071	0.32
7.	Mymensingh	7.712	0.28	110.424	0.69	73.585	4.58	3.883	0.58	304.148	1.36	82.232	0.30
8.	Khulna	67.157	3.70	95.340	0.85	-	-	-	-	65.073	0.12	58.330	0.18
9.	M-Pasha	251.278	1.40	304.575	1.31	-	-	-	-	568.609	0.58	131.984	0.34
10.	Barisal	47.453	2.00	20.877	0.53	-	-	1.467	1.54	188.701	1.49	77.724	0.51
11.	Muladuli	280.483	1.65	3.451	0.38	-	-	0.848	0.36	135.302	1.56	30.515	0.35
12.	Santahar	969.958	4.14	69.391	0.35	113.943	0.62	15.839	0.36	69.887	0.95	45.407	0.37

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