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Damage and Productivity Loss in Industries During the 1998 Flood

Abu Md. Azizul Huq, Md. Imtiaz Hossain, A.K.M. Sadrul Islam, Md. Arif Hasan Mamun, Mosfequr Rahman and Md. Obaidul Gani
Department of Mechanical Engineering
Bangladesh University of Engineering and Technology, Dhaka-1000, Bangladesh

Abstract

This paper presents estimates of damage and loss in productivity in engineering and manufacturing industries during the 1998 flood. Data on loss and damage were collected for public and private sector industries. Some data were collected directly from the industries and some from Ministry of Industries, FBCCI, DCCI and different corporations. The study shows that industries located in and around Dhaka division suffered most during the flood. In the private sector, maximum loss occurred in leather industry, while among the public sector industries, jute sector suffered the maximum loss.

INTRODUCTION

The 1998 flood continued from July to September. The flood affected large areas of 13angladesh and caused damage not only to agriculture, housing, and livestock but also to public and private sector industries in the form of damage to buildings, raw materials, plant and machinery, etc. In addition, production in many types of industries such as steel industries, sugar and food industries, jute mills, textile mills and cottage industries were adversely affected due to disruption of work during the flood. Some industries incurred losses due to breakdown of transportation infrastructure due to flood. Production was also affected during post-flood rehabilitation work, which again affected the economy of the industries. The present study aimed at collection and analysis of data of all types of losses that occurred during the flood in different manufacturing and engineering industries in different parts of the country.

The major objectives of this study are: (1) to assess damage in manufacturing and engineering industries in public and private sectors; (2) to assess productivity loss in manufacturing and engineering industries; (3) to compare damage and loss in productivity in different manufacturing and engineering industries; and (4) to compare division-wise loss in different industries.

METHODOLOGY

The methodology involved collection of flood data, identification of industries for the purpose of data collection, and collection of data on damage and loss in productivity both for private sector and public sector industries. Due to limitation of time and the resources, the research team visited few industries for collection of data and major portion of the data were collected from secondary sources. Figure 1 shows different data collection sources. Table 1 shows the secondary sources of data collection.

All types of industries where technology is used to improve, service and manufacture different types of engineering parts and materials have been classified as engineering industries. Public sector engineering industries include dockyard and shipyard of Bangladesh Steel and Engineering Corporation, Directorate of Dredger of BWDB (Narayanganj), Bangladesh Inland Water Transport Authority and Corporation, etc. Private sector engineering industries include automobile servicing, light engineering industries, electronics service industry, machine parts manufacturing, industrial fittings manufacturing, metal and works, etc.

All types of product manufacturing industries are grouped in to this category. Manufacturing industries are classified into different types of industries, such as chemical industry, food industry, garments industry, jute industry, plastic industry, textile industry, small and cottage industry, pharmaceutical industry, leather industry. In the public sector, BCIC (Bangladesh Chemical Industries Corporation), BJMC (Bangladesh Jute Mills Corporation), BTMC (Bangladesh Textile Mills Corporation) represents chemical, jute and textile industries, respectively. But the major portion of Garments, Jute and Textile industries are in the private sector.

For the purpose of data collection, a questionnaire was prepared for obtaining detailed description of flood damage and productivity loss suffered by different industries. The research team visited a number of industries and filled the questionnaire. In some cases, the questionnaire was filled by the respective industries. In engineering industries, additional data were also collected. Different Corporations and Associations also supplied data to the research team.

The data on damage have been presented according to different fields to

which damages were incurred, such as structural damage in building walls, damages in land, plant and machinery, raw materials, finished goods and others. For manufacturing industries, a fall in production performance from the average rate during the flood was considered as productivity loss. It level of average rate was set by the respective industries. For engineering and service industries, the operation loss was considered as productivity loss.

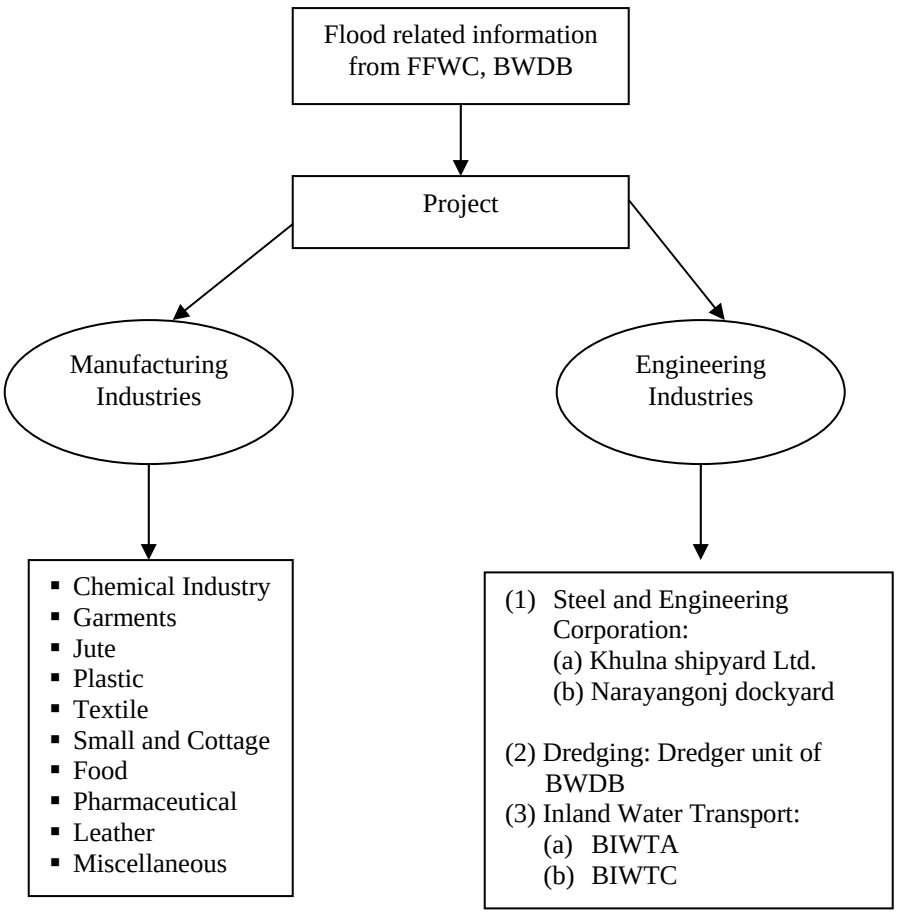

Figure 1: Diagrammatic representation of different data collecting sources

DAMAGE AND PRODUCTIVITY LOSS IN ENGINEERING INDUSTRIES

Public Sector Engineering Industry

Bangladesh Steel and Engineering Corporation

Table 2 shows damage in Khulna Shipyard Ltd. during the 1998 flood. The table shows that the highest loss in revenue is due to discontinuation of production and sale. Plant and machineries accounted for the second highest loss. Table 3 shows damage in Dockyard and Engineering Works Ltd. It shows that maximum loss occurred in revenue followed by that in land.

Bangladesh Water Development Board (Dredging)

Table 4 and 5 show damage and production loss, respectively, in Directorate of Dredger of Bangladesh Water Development Board (BWDB) at Narayanganj. Table 6 shows approximate production /revenue loss due to flood in Directorate of Dredger of BWDB at Narayanganj.

Inland Water Transport

The amount of damage in different divisions of Bangladesh Inland Water Transport Authority (BIWTA) was evaluated (Huq et al., 1999). It was found that highest damage was incurred in Narayanganj division followed by that in Dhaka division. Damages in Barisal and Khulna were also high. Aricha and Chandpur suffered damage worth about Tk. 100 lac. Damage in Patuakhali, Sirajganj and Mawa were comparatively lower.

Damage suffered by different field units of BIWTA was also evaluated (Huq et al., 1999). It was found that the dredge unit suffered the maximum amount of loss amounting over Tk. 900 lac. Conservancy also suffered heavy damage, exceeding Tk. 600 lac. Hydrography and launch stations incurred comparatively lower damages, less than Tk. 200 lac. In the field of structure and equipment of BIWTA, machinery and equipment suffered the maximum damage, amounting to about Tk. 80 lac. Structural damage in Narayanganj was around Tk. 60 lac. and in Khulna about Tk. 34 lac. The amount of loss in Dhaka division was higher.

DAMAGE AND PRODUCTIVITY LOSS IN MANUEACTURING INDUSTRIES

Public Sector Chemical Industries

Loss incurred due to the 1998 flood by the Zia Fertilizer Factory, North Bengal Paper Mills and Sylhet Pulp and Paper Mills were evaluated. Loss suffered by the Sylhet Paper and Pulp Mills was very high, close to Tk. 120 lac. In comparison, the other two industries suffered negligible loss. This is primarily because Sylhet was highly affected by the flood.

Table 1: Secondary sources of data collection

Sl. No.	Name of Sources
1	Ministry of Industries
2	Bangladesh Steel and Engineering Corporation
3	Bangladesh Sugar and Food Industries Corporation
4	Bangladesh Small and Cottage Industries Corporation
5	Bangladesh Textile Mills Corporation
6	Bangladesh Jute Mills Corporation
7	Federation of Bangladesh Chamber of Commerce and Industries
8	Dhaka Chamber of Commerce and Industry
9	Narayangonj Chamber of Commerce and Industry
10	Bangladesh Textile Mills Association
11	Bangladesh Specialized Textile Mills and Power loom Industries Association
12	Bangladesh Jute Mills Association
13	Bangladesh Jute Spinners Association
14	Bangladesh Jute Association

Table 2: Damage in Khulna Shipyard Ltd. during 1998 flood

Sl. No.	Field of Damage	Financial Estimate (Lac Taka)
1	**Land**	
	(a) Land: Silt deposition on slipway	5.00
	(b) Co-way wall: Collapse of co-way wall due to strong current	20.0
2	**Building and Factories**	
	Factories, administrative and residential buildings have been submerged and damaged	20.0
3	**Plant and Machineries**	
	Damage of machineries due to inundation	30.0
4	**Raw Materials**	0.00
5	**Loss in Revenue**	
	Due to discontinuation of production and sale	100.0
	Total	**175.0**

Source: MIS, Bangladesh Steel and Engineering Corporation

Table 3: Damage in dockyard and engineering works ltd.

Sl. No.	Field of Damage	Financial Estimate (Lac Taka)
1	**Land**	
	Ineffectiveness of slipway due to inundation and siltation	50.00
2	**Building and Factories**	
	Damage of roads	5.00
3	**Plant and Machineries**	
	Damage of machineries and electric motor	5.00
	Damage of electric line	26.5
4	**Raw Materials**	0.00
5	**Loss in Revenue**	
	Due to discontinuation of production and sale	62.5
	Total	**149.0**

Source: MIS, Bangladesh Steel and Engineering Corporation

Table 4: Damage in Directorate of Dredger of BWDB at Narayanganj during 1998 flood (structural damage)

Sl. No.	Field of Damage	Financial Estimate (Lac Taka)
1	Road near dockyard	0.50
2	Road of barrack	2.00
3	Road from riverside to main gate	7.00
4	Storage house	2.00
5	Security road with break soling	10.0
6	Boundary wall	0.50
7	Road between two workshops	2.00
8	Sewerage line	2.50
9	School building	0.90
10	Bachelor barrack	0.70
	Total	**28.10**

Table 5: Production loss of Directorate of Dredger of BWDB, Narayangonj (Repair and Production Division)

Sl. No.	Month of Production	Actual Production (Lac Taka)	Average Production (Lac Taka)	Loss of Production (Lac Taka)
1	July, 1998	10.37	12.00	1.63
2	August, 1998	7.97	12.00	4.03
3	September, 1998	5.42	12.00	6.58
4	May, 1998	12.93	12.00	--
5	June, 1998	12.85	12.00	--
			Total	**12.24**

Source: Respective divisions of Director of Dredger, BWDB, Narayangonj

Private Sector Chemical Industries

Loss suffered by the private sector chemical industries on different accounts (e.g., land, building raw materials, plant and machinery, production loss, etc.) was evaluated. It was found that majority of loss was due to production loss (about Tk. 800 lac). This was followed by loss in plant and machinery (about Tk. 250 lac), finished goods (over Tk. 200 lac) and raw materials (about Tk. 100 lac) and buildings (about Tk. 100 lac). Loss attributed to land was minimum.

Ready Made Garments and Knitwear Industries

Loss suffered by the garments and knitwear industries on different accounts (e.g., land, building raw materials, plant and machinery, production loss, etc.) was also evaluated. Loss due to production stoppage was the highest for this sector and amounted to about Tk. 9000 lac. For many industries, land, building, plant and machinery were under water during the flood, causing loss in production for prolonged periods of time.

Hosiery Industries

For hosiery industries flood damage of equipment was small. Damage in circular knitting machine was slightly higher. Flood damage in dying and processing was the maximum, amounting to about Tk. 1500 lac.

Public Sector Jute Industries

Public sector jute industries suffered mostly due to disruption in export of finished products. During the 1998 flood very few finished goods could be exported to foreign countries that caused a large amount of loss in this industry. Flood damage and productivity loss in public sector jute industries located in

different zones (Adamjee, Chittagong, Dhaka and Khulna) were also evaluated. Among these zones, Dhaka suffered the most loss, about Tk. 160 crore, followed by Adamjee (about 100 crore) and Khulna (about 40 crore). This is because maximum jute mills are located in Dhaka zone. Jute mills in Chittagong remained unaffected.

Table 6: Production loss/revenue loss (approximate values) due to flood

Name and type of Dredge	Name of Project/Position During Flood	Days of Dredging Stoppage	Loss of Dredging Hours	Loss of Production (cu. m.)	Loss of Revenue (Lac Taka)
S.D.Testa-18”	M/s Siddique Textile, Kanchpur	75	450	9000	6.75
S.D.Kasalong-18”	210 MW, TPS, Siddirgonj, Narayangonj	75	450	9000	6.75
S.D.Kumar-18”	Kirtinasha River Dredging, Sariatpur	45	270	54000	40.5
S.D.Dudkumar-18”	Basundhara Papar Mills	70	420	84000	63
S.D.Dhaleswari-18”	Akij Cement Factory, Chatak, Sunamgonj	80	480	96000	72
S.D.Bangshi-12”	Bancharampur Degree College yard filling work	45	270	10800	8.1
S.D.Karnafully-12”	Dumudda Channel Dredging, Sariatpur	60	360	14400	10.8
S.D.Surma-12”	BSIC Industrial Area, sariatpur	60	360	14400	10.8
S.D.Dharla-12”	Sinha Textile Ltd., Kanchpur, Narayangonj	75	450	18000	13.5
				Total	**232.2**
Loss of revenue due to idle hour of the attending plants (30%)					69.66
				Grand Total	**301.86**

Private Sector Jute Industries

Evaluation of damage and productivity loss in private sector jute industries showed that production loss and loss of raw materials (primarily jute) were very high, amounting to about Tk. 2500 lac. Since jute is biodegradable, large amount of jute rotted during the flood, which resulted in high loss in production.

Plastic Industry

Analysis of flood damage and productivity loss in private sector plastic industries showed that production loss accounted for majority of loss, which stood at about Tk. 450 lac. In plastic industries plant and machinery are very expensive, so minor damage in plant and machinery resulted in relatively high loss.

Public and Private Sector Textile Industries

Analysis of flood damage and productivity loss in public sector textile industries showed that production loss accounted for the highest loss, amounting to about Tk. 400 lac.

Loss suffered by the private sector chemical industries on different accounts (e.g., land, building, plant and machinery, raw material, production loss, etc.) was evaluated. It was found that loss of production accounted for the maximum loss (around Tk. 8500 lac) in this sector; on the other hand, loss due to damage of land was minimum.

Bangladesh Small and Cottage Industries Corporation

Flood damage and production loss in small and cottage industries within BSCIC industries estates were evaluated. The maximum flood damage occurred in equipment (around Tk. 850 lac) because the equipments were under water during the prolonged flood of 1998. Discontinuity of production also accounted for significant loss. This was due to unavailability of workers (whose houses became inundated during flood) and inundation of equipment. All these caused loss of production (amounting to about Tk. 400 lac). The damage of raw material and building were around Tk.200 lac and Tk. 300 lac, respectively.

Division wise flood damage and productivity loss in the small and cottage industries were also evaluated. It was found that Dhaka division suffered the maximum amount of loss in this sector (around Tk. 1800 lac). This was followed by Chittagong (close to Tk. 400 lac), Rajshahi (over Tk. 200 lac), Khulna, and Barisal. Sylhet division basically remained unaffected. The maximum flood damage occurred in Dhaka division primarily because of the large number of small and cottage industries in this division.

Public Sector Food and Sugar Industries

In public sector food and sugar industries, there was no damage or production loss, as the flood period did not coincide with the sugar production season. But due to flood and water logging, sugar cane plantation within mill areas was severely affected.

Private Sector Food Industries

In private sector food industries, the major loss was due to loss of production and damage of raw materials. Production loss was estimated at Tk. 9000 lac and raw materials over Tk. 3000 lac. Minor losses were also caused by damages in buildings, plant and machinery, finished goods, etc.

Pharmaceuticals Industry

Damage and productivity loss in private sector pharmaceutical industries due to the 1998 flood were evaluated. It was found that the maximum loss occurred in the area of finished goods of these industries amounting to about Tk. 2500 lac. Loss in raw materials was about Tk. 700 lac, and that in plant and machinery was close to Tk. 500 lac. Land and buildings of these industries were not very much affected by the flood.

Leather Industry

Analysis of flood damage and productivity loss in private sector leather industries showed that the only loss suffered by these industries was due to disruption in production during the flood. It was found that losses due to damages in land, building, finished goods, plant and machinery, etc. were negligible.

ANALYSIS OF FLOOD DAMAGE IN INDUSTRIAL SECTORS

Damage Loss

Analysis of damage in private sector industries showed that loss suffered by the textile industries was the maximum (around Tk. 8500 lac). This was followed by food industries (over Tk. 7500 lac) and engineering industries (about Tk. 7000 lac). Most of the textile, food and engineering industries are located in the suburb area of flood affected districts, most of which were affected by the prolonged flood of 19998. So the loss in the textile, food and engineering industries were higher. Other industries suffering significant damages include (in descending order of damage loss) jute, pharmaceuticals, garments, leather, chemical, and plastic industries.

Productivity Loss

Productivity loss in private sector industries was also evaluated. It was found that in terms of productivity loss, leather sector suffered the most and the loss amounted to about Tk. 22000 lac. This was followed by textile and food industry (around Tk. 1000 lac). Engineering and garment industries also suffered significant productivity loss. Productivity loss suffered by jute and pharmaceuticals industry was moderate.

Damage loss and loss in productivity in private sector industries on different accounts were evaluated. It was found that loss suffered due to loss of production was the maximum (around Tk. 65000 lac). This analysis indicates prolonged production disruption due to prolonged flood of 1998 causes maximum production loss. The damage loss on account of raw materials, plant and machinery and finished goods were more or less similar (around Tk. 5000 lac). The damage loss due to building and land was relatively small.

Public Sector Industry

In the public sector, jute industry incurred the maximum amount of loss. Loss in engineering industry was lower, around Tk. 5000 crore. Textile industries incurred comparatively lower loss, of the order of Tk. 2000 crore. Loss in chemical industries was low.

Private Sector Industry

In private sector, leather industry incurred maximum amount of loss. It was followed by food, textile, engineering and garment industries. Loss in pharmaceutical, miscellaneous and chemical industries were lower. Loss in jute and plastic industry was comparatively very low.

CONCLUSIONS AND RECOMMENDATIONS

From the analysis and discussion the following conclusions can be made: (1) Maximum loss in engineering and manufacturing industries during the 1998 flood has been incurred in and around Dhaka division; (2) Productivity loss was higher than damage loss for all types of manufacturing industries; (3) Among private sector industries, maximum loss was suffered by the leather sector; (4) Among public sector industries maximum loss was suffered by the jute sector, (5) For industries within BSCIC estates, maximum loss was incurred in the field of machinery and equipment for industries located in and around Dhaka division.

From the above analysis the following recommendation can be made: (1) In Dhaka division major industrial zone is Narayangonj and Tongi. Narayangonj can be protected from flood by construction of dam like the DND dam; (2) Industrial units should be located at proper elevation (above flood level). Entrepreneurs should be conscious in this regard to avoid massive loss during future events of flood; (3) To assure continuation of production during any disaster like flood following measures could be taken: (i) continuous supply and preservation of raw materials, (ii) Proper storage, distribution and export of finished goods (iii) proper transportation of worker to the industry; (4) Owners may motivate the worker by constricting worker's staff quarter inside the industry

above flood level or by giving extra payment for transportation; (5) Every industry should take proper measure for protection against flood; (6) Proper measures should be taken for transportation of finished goods, raw materials, etc. during flood.

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