

BASIC DESIGN STUDY
ON
FOODGRAIN STORAGE CONSTRUCTION PROJECT
IN
THE PEOPLE'S REPUBLIC OF BANGLADESH

JULY, 1982

Japan International Cooperation Agency



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P R E F A C E

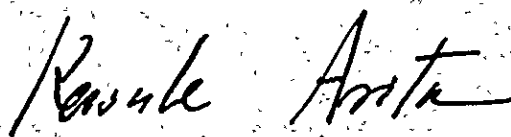
In response to the request of the Government of the People's Republic of Bangladesh, the Government of Japan decided to conduct a study on the Basic Design for Foodgrain Storage Construction Project and entrusted the survey to the Japan International Cooperation Agency (JICA). The JICA sent to Bangladesh a survey team headed by Mr. Yukio Ishiwata, Deputy Director, Purchase Division, Operation Department, Food Agency from April 8 to 24, 1982.

The team had discussions with the officials concerned of the Government of Bangladesh and conducted a field survey (in Dacca, Mymensingh, Chittagong and Pabna). After the team returned to Japan, further studies were made and the present report has been prepared.

I hope that this report will serve for the development of the Project and contribute to the promotion of friendly relations between our two countries.

I wish to express my deep appreciation to the officials concerned of the Government of the People's Republic of Bangladesh for their close cooperation extended to the team.

July, 1982



Keisuke Arita

Japan International Cooperation Agency
(JICA)

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BANGLADESH

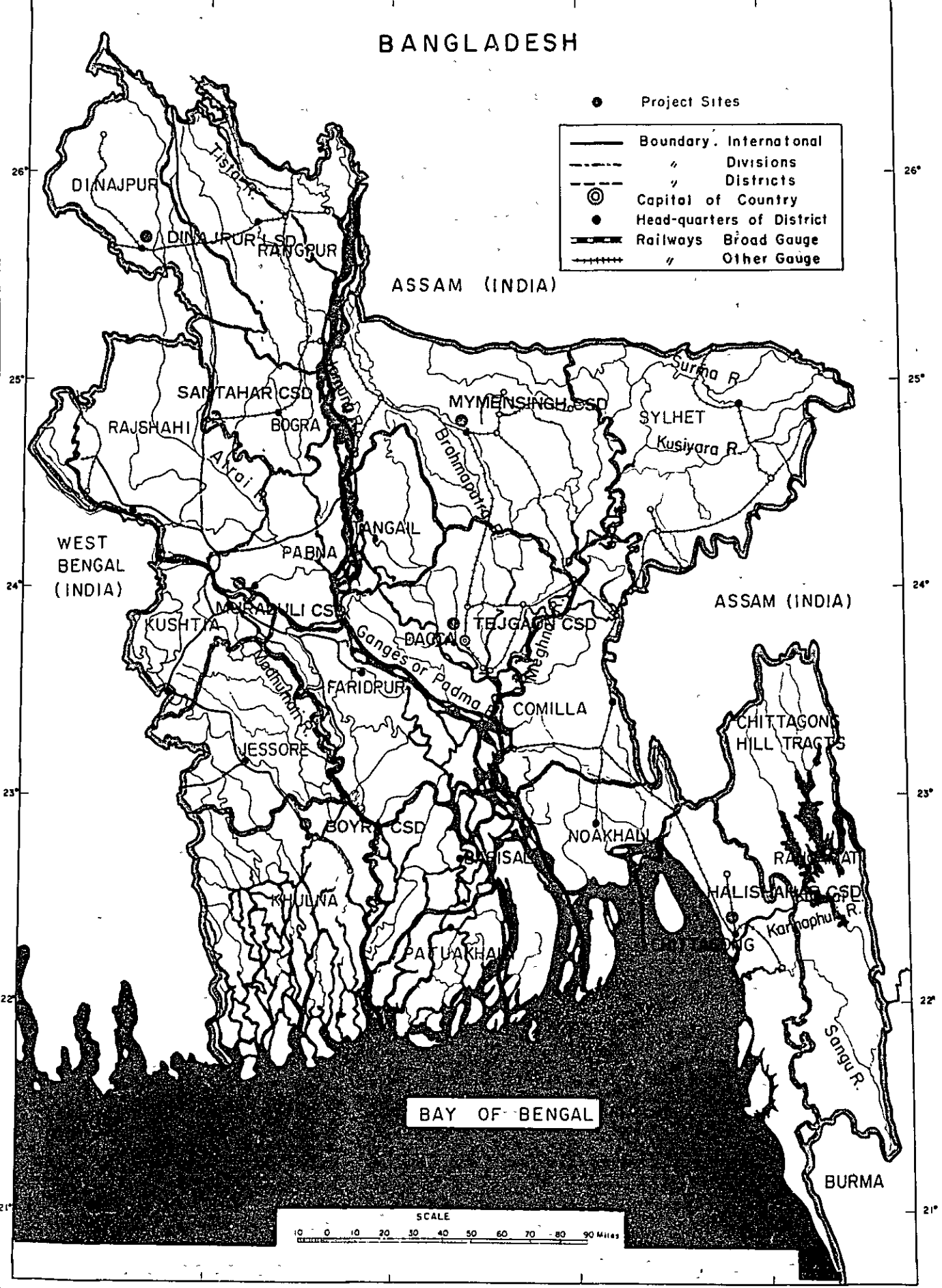
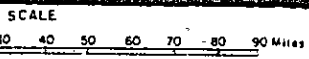
●	Project Sites
—	Boundary, International
- - -	Divisions
- · - · -	Districts
⊙	Capitol of Country
●	Head-quarters of District
—+—+—+—	Railways Broad Gauge
—+—+—+—	Other Gauge

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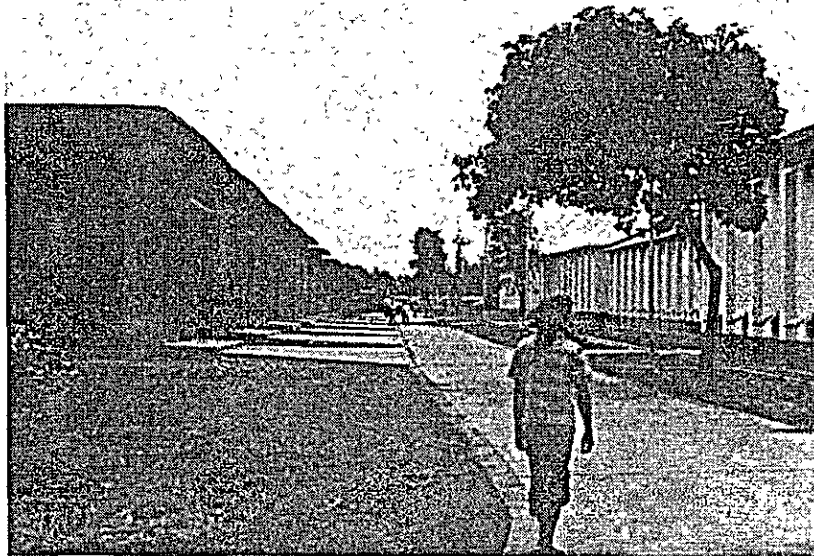
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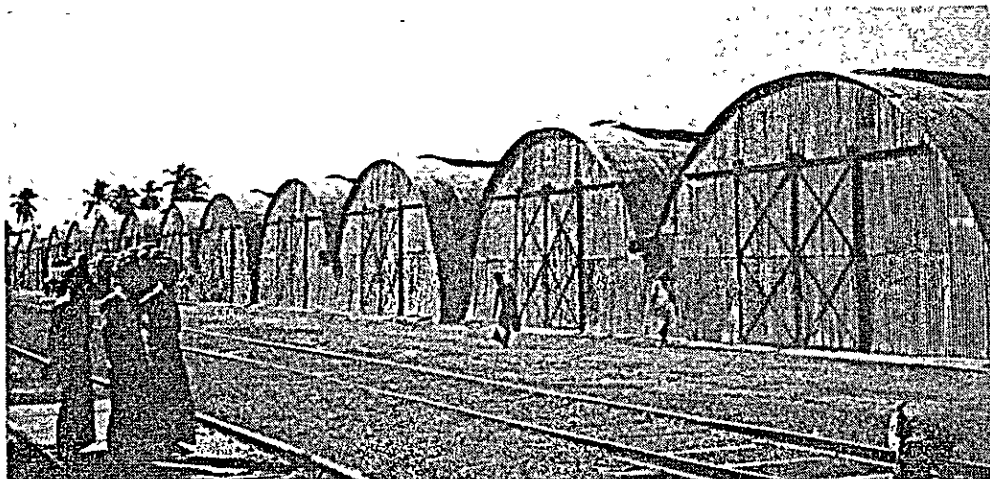
MYMENSINGH CSD (Mymensingh District)

Left: Foodgrain storages Right: Salt storages
Left vacant site: Available for new construction



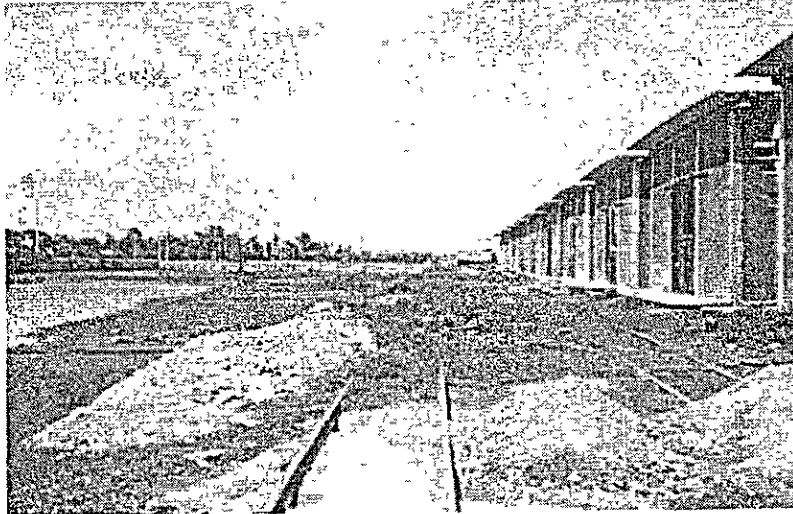
TEJGAON CSD (Dacca District)

Left: Twin Nissen type storages



BOYRA CSD (Khulna District)

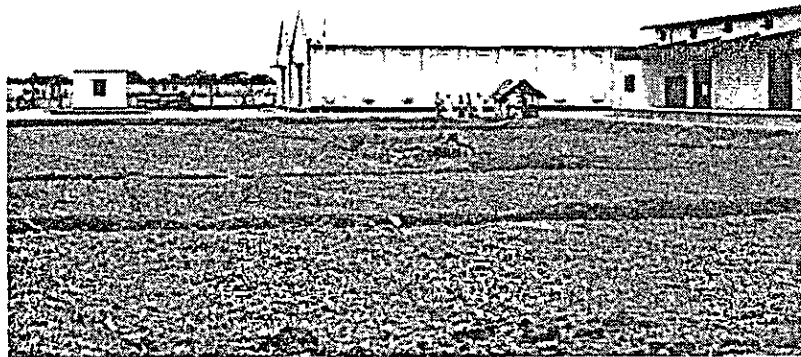
Twin Nissen type storages



SANTAHAR CSD (Bogra District)

Right: Existing Dacca storages

Left vacant site: Available for new construction



HALISHAHAR CSD (Chittagong District)

Right: Calcutta type storages

Left vacant site: Available for new construction



MULADULI CSD (Pabna District)

Right: Dacca type storages

S U M M A R Y

The Government of Bangladesh requested the Government of Japan for a grant assistance for construction of foodgrain storages to accelerate the Foodgrain Storage Programme worked out by her Government. In response to this request, the Government of Japan undertook to conduct a basic design study by a survey team dispatched by Japan International Cooperation Agency (JICA) with great emphasis laid particularly on techno-economic justifiability of this project and on its study for finding out ways and means to solve the intrinsic difficulties inherent to this project. This report contains a summary of the study results.

The Government of Bangladesh has established a food rationing system to ensure steady food supply to the people. However, due to a low rice productivity, the country has not yet attained self-sufficiency in food products and, therefore, depending entirely upon food import to meet the deficient portion between the domestic production and consumption of rice. Under this unbalanced food situation, Central Storage Depots (CSDs), which are scattering over the country at 12 places, perform an important role in procuring and storing domestic food products, storing imported food, distribution and rationing to the people. Apart from the CSDs, there are a great number of Local Supply Depots (LSDs) and silos spreading in the whole country, functioning as food storage facilities. The total food storage capacity amounts to 1,429,850 tons. Out of the total, 406,350-ton capacity is accommodated with the CSDs (based on the estimation as of end December, 1981). However, according to the Second Five-Year Plan (1980/81 - 1984/85), the total population in the country has been estimated to be increased upto 102 million by the 1984/85 fiscal year (end June, 1985) and 2,504,000 tons are required to meet the food storage requirements in this connection. In order to cope with this food deficiency, the Government of Bangladesh has worked out the Additional Foodgrain Storage Programme. In the past, some technical and financial assistance was provided to the Government of Bangladesh not only by the Government of Japan but by such international organizations as International Development Association (IDA), Asian Development Bank (ADB), European

Community (EC), and others. In some year, the foodgrain storages constructed with the financial support of these organizations occupied over 50 % of the annual total number of foodgrain storages in the whole country; out of which 50 foodgrain storages in total were constructed in three phases by the financial assistance from the Government of Japan during 1977 - 1981. By the end of 1982/83 fiscal year (end June, 1983), storage capacity increase has been estimated at 1,859,000 tons which is inclusive of those by external fund support, but this figure still shows storage capacity shortage. Therefore, this deficit capacity has to be met with an extra increase of 645,000 tons within the two years of 1983/84 and 1984/85. The request made by the Government of Bangladesh is subject to this extra capacity increase through the financial assistance to be provided by the Government of Japan.

On the understanding of the background as described in the above, the justifiability of this project as requested by the Government of Bangladesh was evaluated and reflected in designing this project. The total number of storages proposed under this project is 35 units with a total capacity of 35,000 tons. The CSD-wise capacities are shown below.

Mymensingh CSD	4 storages (4,000 tons)
Tejgaon CSD	6 storages (6,000 tons)
Boyra CSD	10 storages (10,000 tons)
Santahar CSD	6 storages (6,000 tons)
Halishahar CSD	4 storages (4,000 tons)
Muladuli CSD	5 storages (5,000 tons)

As for the location and site conditions for construction of foodgrain storages, the Tejgaon and Boyra CSDs have gained geographically in importance from the distribution aspects such as foodgrain production, consumption and transportation and where the existing storages are being used very actively. However, since there is no vacant land for new storage construction in the CSD premises, and some of the existing storages are becoming decrepit and not suitable for storing foodgrains, a part of these old storages have to be demolished to utilize as the

land for construction of new storages. It is also recognized that the Mymensingh CSD is very important from the distribution viewpoint of food as above mentioned and that the existing storages are being used actively. In the Mymensingh CSD premise, the land for construction has almost been prepared, but some obstacles on the land have to be removed. The Santahar CSD and Haliashahar CSD are also recognized to be important from the distribution viewpoint of food as above mentioned and to have storages in active use. In the Santahar CSD, however, some development efforts are needed partially for the land preparation. While the Muladuli CSD is found not geographically important on the distribution aspect. The existing storages in the CSD are not being used actively and therefore it is not recognized that foodgrain storage construction is necessary within the shortest possible time. Also, a part of land for the construction in the Muladuli CSD is a lowland, where preparatory work is required.

Since the Government of Bangladesh has had a policy for adopting the design of the Dacca type storage prepared by PWD (Public Works Department) as a standard for foodgrain storages to be built under foreign aid since 1982 and the size of Dacca type storage is recognized appropriate from the study of current storing situation of foodgrains, then Dacca type would be adoptable as a design standard for this project. However, it is determined to follow the specifications of storing capability as adopted by the foodgrain storages constructed under the Japanese aid in the past if the storing capability of foodgrains would be deemed poor. Also the construction cost is tried to be minimized as much as possible in consideration of local policies in respect of the structure, construction method and construction materials.

As for the concrete scale, there are two types of foodgrain storage in Bangladesh; 500 tons and 1,000 tons, the 1,000-ton capacity storage is adopted in this design since it is economical in the construction cost and has a higher flexibility for storing control. With respect to the size, structure and specification, the foodgrain storages proposed under this project have been so designed as to have a floor area of 720 m² (width 24 m, length 30 m), a ceiling height of 5.791 m, and of reinforced concrete with brick wall. Also, in

consideration of convenience for entering the foodgrain storages from roads or railways, the storages are designed in two different types: gable-side-entering (Type A) and ridge-side-entering (Type B). All foodgrain storages in the Tejgaon CSD are designed with Type B and the rest with Type A. The total construction cost for this project has been estimated at ¥2,765,400,000; out of which the estimated rough amount of ¥2,284,700,000 would be provided as a financial assistance by the Government of Japan. The construction work for this project would take full 15 months to complete.

The Ministry of Food as an executing agency is responsible for operation, maintenance and management of the completed foodgrain storages. The employment of experienced management staff, the procurement of materials for maintaining storage building and electrification are essential for seeking some solution to the problems on the implementation of this project. The annual expenses for these requirements have been estimated at about 4.1 million Yen. Because of such particularities in the utilization conditions of the foodgrain storages as heavy articles to be stored and frequent movements of the contents, damages to these storages can be more accelerated than those to any buildings in other use. It would be deemed most important to repair before these damages become apparent and, for this purpose, painting and repairing works have to be done every four or five years at the latest. In the event that all works required for maintenance and management of the completed foodgrain storages are done in the same year, the annual expenses necessary for all 35 storages would account for about 10.5 million Yen.

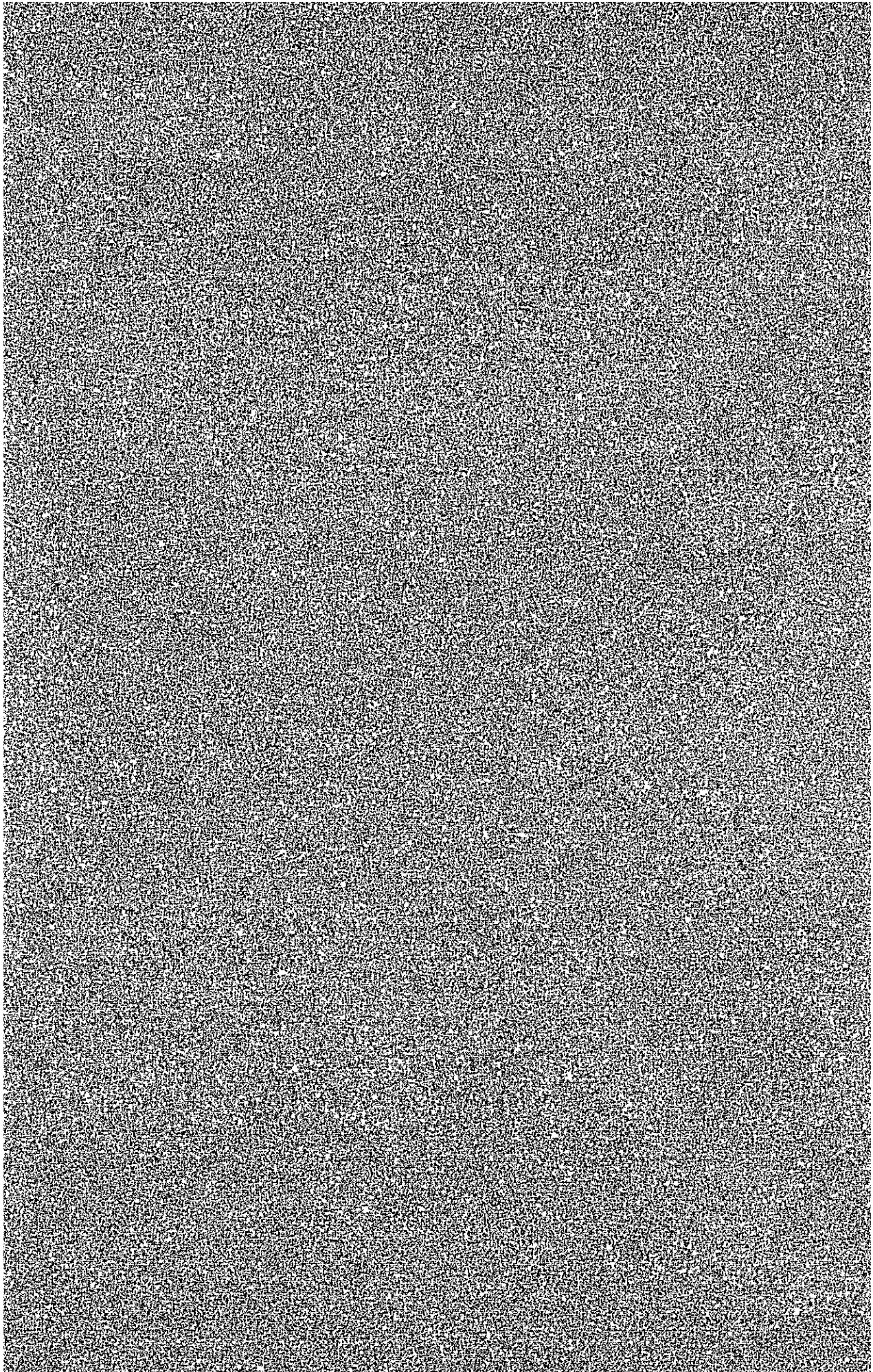
The techno-economic justifiability of this project was evaluated as follows. The deficit storage capacity based on the estimation as of the end of 1984/85 fiscal year (end June, 1985) has been estimated at 645,000 tons and such tendency for capacity shortage would be prevalent even in all the proposed sites. In order to cope with this deficit capacity, this project will provide an extra capacity of 35,000 tons in total. And geographical importance on foodgrain distribution has been recognized in all the proposed construction except for the Muladuli CSD. Accordingly, the implementation of this project would

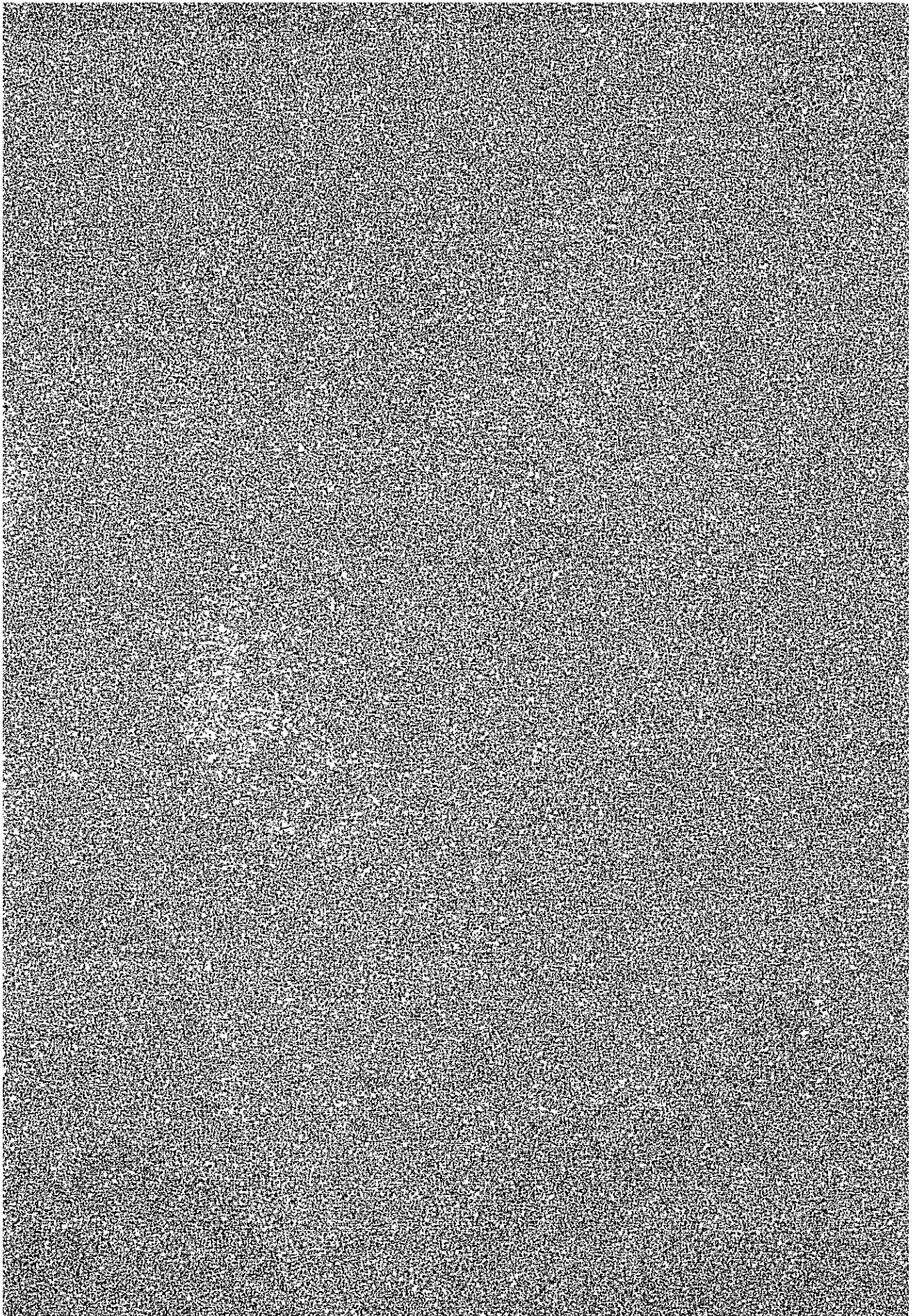
contribute significantly to accelerating the foodgrain storage capacity under the Programme worked out by the Government of Bangladesh.

From such technical points of view as construction materials, labour force and construction method and by taking into due consideration the issues on the site conditions and transportation, the construction cost would be possibly minimized. The expenses for operation and maintenance of the completed foodgrain storages would be minimized by effective use of local technique and materials available in Bangladesh.

Finally, in implementing this project our recommendation is as follows. As it is anticipated that a great deal of expenditures have to be budgeted by the Government of Bangladesh for construction of all proposed foodgrain storages including this project, the simultaneous implementation of this project at selected sites would be considered unfavorable. Therefore, the stage-wise implementation of the project would be recommendable. Based on the socio-economic impacts of the project, the site-wise priority for the implementation of this project has been placed as shown below;

- (1) Mymensingh CSD,
- (2) Tejgaon CSD,
- (3) Boyra and Haliashahar CSDs,
- (5) Santahar CSD, and
- (6) Muladuli CSD.





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MINISTRIES CONCERNED WITH FOODGRAIN STORAGE CONSTRUCTION

[Ministry of Finance - - - -	ERD (External Resources Division)
	Ministry of Public Works Department and Urban Development	- - PWD (Public Works Department)
	Ministry of Planning - - -	P/C (Planning Commission)
	Ministry of Food — Secretary —	Joint Secretary — Deputy Secretary

ABBREVIATIONS

ADB	:	Asian Development Bank
CIDA	:	Canadian International Development Association
CSD	:	Central Storage Dept
EC	:	European Community
GOB	:	Government of Bangladesh
IDA	:	International Development Association
JICA	:	Japan International Cooperation Agency
LSD	:	Local Supply Depot
MOLGRD	:	Ministry of Local Government, Rural Development and Co-operation
Neth.	:	Netherlands
PECU	:	Project Engineering Construction Unit of PWD
PIW	:	Project Implementation Wing
PWD	:	Public Works Department
TNH	:	Twin Nissen House
TPC	:	Temporary Purchasing Center

WEIGHTS AND MEASURES

1 foot (ft)	≅	0.3048 metres (m)
1 pound (lb)	≅	453.6 grams (g)
1 maund (md)	≅	37.3 kilograms (kg)
1 square foot (sft)	≅	0.0929 square metres (m ²)
1 square inch	≅	0.0006 square metres (m ²)

CURRENCY EQUIVALENTS

US\$ 1.00 = Taka (TK) 20.00 = Yen (¥) 240.00

