



Universiteit  
Leiden  
The Netherlands

**Tanzania grain terminal Dar es Salaam: report of evaluation mission**  
Meilink, H.A.

**Citation**

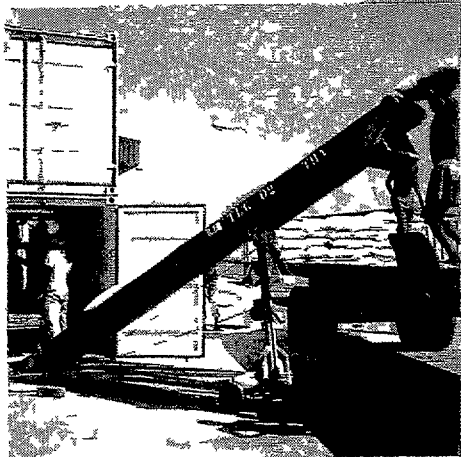
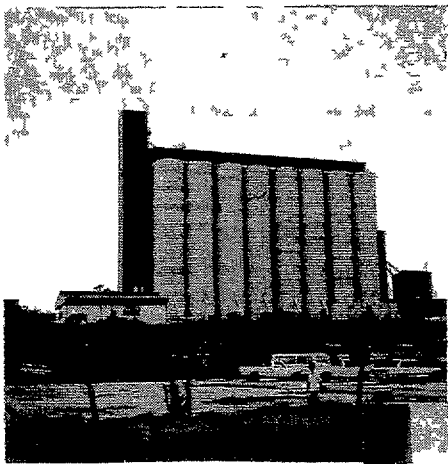
Meilink, H. A. (1992). *Tanzania grain terminal Dar es Salaam: report of evaluation mission*. The Hague: DGIS. Retrieved from <https://hdl.handle.net/1887/9044>

Version: Not Applicable (or Unknown)

License: [Leiden University Non-exclusive license](#)

Downloaded from: <https://hdl.handle.net/1887/9044>

**Note:** To cite this publication please use the final published version (if applicable).



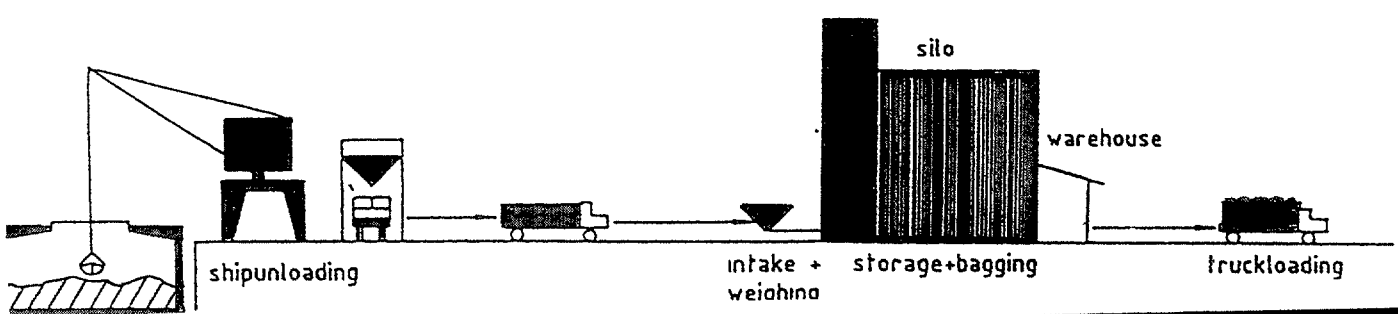
Tanzania  
Port of Dar es Salaam

Tanzania Harbours Authority  
Grain Terminal

*Evaluation Mission Report*

Leiden

December 1992





## Acknowledgement

The mission wishes to thank all the persons who were of great help in conducting this evaluation study. We are particularly grateful to the many Tanzanian officials, and the representatives of donors and international organisations in Dar es Salaam, who so patiently responded to all our questions.

Special thanks are due to Mr. S.M. Luhigo, Deputy General Director of THA and Mr. J. Thate, Grain Terminal Advisor, who kindly and willingly provided us with much relevant information.

The mission also acknowledges the support given by the Dutch Embassy in Dar es Salaam. Mr. E. Noorman, 1st Secretary, Mr. IJzermans, Counsellor and 'Loes" were all very helpful in discussing the Terms of Reference and organizing the mission's appointments.

In Rotterdam, the mission benefited much from the many informative and open discussions with the GEM consultants, in particular Mr. J. Vissers and Mr. J. v.d. Riet.

Henk Meilink (mission leader)

Henk Havinga

Gerard van Dongen

Leiden; December 1992.

## Glossary

THA:	Tanzania Harbours Authority
W.B.:	World Bank, Washington
GEM:	Graan Elevator Maatschappij, Rotterdam
DGIS:	Directorate General of the Netherlands Ministry of Foreign Affairs
IMF:	International Monetary Fund
NMC:	National Milling Corporation
SADCC:	Southern African Development Coordination Conference
SGR:	Strategic Grain Reserve
Tazara:	Tanzania Zambia Railways
TRC:	Tanzanian Railway Corporation
GTM:	Grain Terminal Manager
FAO:	Food and Agriculture Organization of U.N.
MOA:	Ministry of Agriculture and Livestock Development
WFP:	World Food Programme
FOB:	Free on Board
UNDP:	United Nations Development Programme

## Conclusions and Recommendations

At present, under the Nectar/THA management contract, (ending 1st of February 1994) the grain terminal will only be put to use in the event of congestion in the port arising from the insufficient offtake of grain bags by Tazara railways.

A normal, regular inflow of grain shipments can easily be handled by Nectar's bagging capacity (which includes the 3 THA mobile bagging units) of about 3000 tons a day. The bags are loaded directly onto flat wagons or trucks to be transported to railwagons or alternatively to warehouses in the port area. Storage capacity in the port and its neighbourhood is about 125.000 tons.

This explains why in 1992, of the 284.000 of grain discharged in Dar es Salaam only a small portion (13,6%) was handled through the terminal.

The mission learned that THA's decision to contract out the grain bagging operations and implicitly the management of the silo was in particular based on THA's inability to guarantee laydays (discharge time of the ship) in foreign currency (i.e. US dollars). Consequently a "third party" had to be brought in to provide this liability.

The mission urges THA management to commence discussions with the Treasury with the aim of altering this situation.

Considering the forecast of an inflow of about 500.000 tons of relief grain shipments in 1993, it is very likely that the terminal will be put to use. Informants anticipate that Tazara's offtake capacity will again pose problems in the coming year. In that event the terminal provides a valuable storage 'escape route' allowing Nectar/THA to discharge vessels as planned and thus prevent costly delays.

The terminal is a highly specialized asset and for the time being requires highly qualified external technical assistance. Intensive supervision and security is indispensable.

Therefore the mission recommends the continuation of expatriate presence at the grain terminal for the coming months until Nectars contract ends at the 1st February 1994.

Since hardly any grain was handled by the terminal in the first two years after completion in November 1989, the local management did not acquire sufficient experience and knowledge to operate the terminal in an efficient manner. Trained operators and labour are also few in numbers.

Nectar has begun to draw up a training programme for Tanzanian personnel involved in their bagging activities. Since the training carried out by the Dutch expatriates has met with limited success so far, there is great need to re-assess the levels at which further training is still required.

The mission recommends that a well-defined training programme, including clearly set objectives, evaluation methods, job descriptions and the formulation of rights and objections of all parties involved, should be drawn up as a product of close cooperation between THA, Nectar and expatriates. This can best be realized in an atmosphere of mutual trust and responsibility.

The mission holds the view that linking this programme to that of the port training school (Bandari College) would not be a good suggestion. It is feared that in that case "mixing up" general port training with specific demands for silo training would be detrimental to the objectives of the grain terminal training programme.

After February 1994, the mission advises THA to more actively seek for opportunities to attract private firms, having experience in grain handling and marketing, with the aim of establishing a **joint venture** which would enable the use of the silo to its full capacity. During discussions with informants in both Tanzania and the Netherlands, the mission learned that there are various firms potentially interested in trading commodities (such as wheat, maize and cassava root slices) through the THA grain terminal.

By February 1994, Netherlands assistance to the terminal project should come to an end.

In the meantime THA should pressurize Nectar to incorporate the terminal into their handling activities to the largest extent possible.

The workability of the terminal is seriously hampered by the numerous electrical power cuts, inactivating the silo for a great many days.

The mission therefore recommends that a **generator** should be installed at the terminal premises in order to eliminate dependence on a very unreliable external provision.

The terminal is not served by a rail siding, connecting the silo with Tazara and TRC railways. The mission does not recommend to construct such a rail for 3 reasons:

- a) the distance from the terminal to the Tazara railhead is only  $\pm 300$  metres, which can easily be covered by available trucks transporting grain in bags.
- b) additional investment would be high since a difference in height of  $\pm 15$  metres is to be "leveled out" needing a rail track of approximately 2 km in a port area where space is already limited and
- c) in the near future it is unlikely that Tazara will invest in railwagons suitable for bulk grain transport.

With regard to the constructional engineering aspects, the mission recommends the following:

*a. sewerage*

Improvement of the waste water system of toilet rooms that is connected to the existing septic tanks, by separating the household waste water from the other outlets of the toilets, and connecting these to cesspits to be constructed.

Estimated costs are f 8.000,-.

*b. bagging station/weighbridge*

The technical maintenance of the bagging station and the operation of the weighbridge will have to become a part of the instruction-programme to be determined later.

With regard to the transportation of the full sacks of grain from the bagging station to the trucks, the mission recommends the acquisition of a mobile conveyor belt.

Estimated costs are *f* 15.000,-.

*c. Silo building*

The leak can be repaired by treating the sewerage as mentioned under 'sewerage'.

*d. power supply*

Because of the irregular availability of the power supply from the city for the operation of the grain terminal, the mission recommends the acquisition and installation of an emergency power unit. Then, the terminal can operate completely independent from third parties.

Estimated costs are *f* 200.000,-.

Because fo the "impracticability" of making a link to the existing railway, one must settle for transport of the bags of grain by truck to the railway network that is 300 metres away.

## INTRODUCTION

In the Terms of Reference the mission is requested to address the different phases of the Grain Terminal Project.

Accordingly, this report has the following sections:

- 1) *identification*: what decisive factors played a role in the Netherlands commitment to finance the Grain Terminal Project;
- 2) *formulation and appraisal*: factors involved in the design of the grain terminal;
- 3) *implementation*: assessment of the structure and effectiveness of the project implementation and management;
- 4) *present situation*: what factors hamper the efficient and proper use of the terminal after its construction was completed;
- 5) *future options*: explore possible uses of the terminal i.e. grain importation, exports of grains and grain storage for Tanzania's Strategic Grain Reserve.

For specific tasks of the mission see ANNEX 1.

### **Approach**

The mission visited Dar es Salaam in the period November 15-29. Visits were paid to the Grain Terminal and a number of people involved, one way or another, in the Grain Terminal Project were interviewed (a list is in ANNEX 2).

In preparation of the field visit, project files were studied both in the Ministry of Foreign Affairs and at GEM consultants offices in Rotterdam (the main executor of the project).

Extensive discussions with GEM consultants took place in the week preceding departure to Tanzania.

Furthermore, at the Grain Terminal site a thorough technical inspection of the facility was carried out.

**Composition of the mission.**

The mission consisted of: a) a grain trade/handling expert, Mr. H. Havinga,  
b) an architect, Mr. G. van Dongen and  
c) an economist, Mr. H. Meilink (mission leader)

## **Section 1. Identification**

### *1.1. Dar es Salaam Port Development Project.*

At the end of the 1970s, the Government of Tanzania had decided to assign high priority to expanding and improving the operational efficiency of the country's main port: Dar es Salaam.

Several developments had affected this decision: a) the breakup of the East African Community in 1977 which induced Tanzania to develop more actively its own port operation and management structure; b) Tazara railways offering increased facilities for transshipment operations and c) the rapid development of the containerization of general cargo.

Tanzania was to exploit more effectively its favorable geographical location by offering efficient transit services on a competitive basis to its landlocked neighbouring countries (Zambia, Malawi, Burundi, Ruanda and Uganda).

In 1978 the Tanzanian Government established the "Tanzania Harbours Authority (THA) which nowadays has over 9,000 employees, of which 6.690 are employed in Dar es Salaam Port (June 1992). This parastatal was made responsible for cargo handling and management operations in all three Tanzania's seaports (Dar es Salaam, Tanga and Mtwara).

THA is administered by a Board of Directors which according to the THA Act of 1977 is to develop, improve, maintain, operate and regulate the harbours of Tanzania. The Board consists of:

- a. a Chairman appointed by the President of Tanzania,
- b. a Director-General appointed by the President of Tanzania,
- and
- c. not less than 7 and not more than 9 members appointed by Ministry of Communication and Transport.

The Director-General is assisted by a team of managerial and other staff distributed primarily on a functional basis among different departments such as finance, manpower, administration, operations, planning, purchasing and engineering.

As THA was not equipped to undertake the necessary long-term planning and engineering studies, the World Bank offered assistance. Since 1974, the Bank had already initiated studies aimed at rehabilitating East African ports. The W.B. commissioned the British consultancy firm, Bertlin and Partners who produced an extensive report and made recommendations with respect to the physical facilities and the institutional capacities required to handle the forecast port traffic in a proper way.

In 1982 THA and the World Bank reached an agreement on the highest priority needs of Dar es Salaam port development. In particular the project would enable THA to improve its handling operations with regard to container, grain and petroleum traffic.

Specifically, projects aimed to:

- (i) create a modern container handling facility by the conversion of existing general cargo berths (10 and 11);
- (ii) provide modern container handling equipment to replace some life-expired general cargo equipment and provide spare parts for other general cargo equipment;
- (iii) enable the port to discharge grain vessels more effectively, thus avoiding excessive ship time alongside, and loss and spoilage of grain by providing modern grain handling equipment and a 26,000 tons of silo storage within the confines of the port;
- (iv) complete the rehabilitation of the existing lighterage terminal, enabling the port to continue working at its present capacity while the conversion of berths 10 and 11 to a container facility is carried out;
- (v) rehabilitate the existing Kurasini petroleum products terminal;
- (vi) provide consultant services for engineering and supervision activities with respect to the proposed works; and

(vii) provide training and technical assistance to THA staff to: ensure the start-up of the new port training school (Bandari College), to improve the control and handling of containers; to improve the present management information services, and to improve the maintenance and control of port mechanical handling equipment.

(Source: W.B. Staff Appraisal Report, Tanzania; Port Rehabilitation Project, Nov. 1984).

Total project costs were estimated at U.S.\$ 91 million of which the foreign component of \$ 59 million was to be financed by a number of donors. The W.B. was prepared to provide a loan of \$ 18 million.

### *1.2. Paris Donor Meeting*

In May 1983 the World Bank invited potential donors for a meeting in Paris to discuss aid commitments to the project. Interested donors included: Australia, Canada, Denmark, Finland, Italy, the Netherlands, Norway, Sweden, United Kingdom and Unctad.

The 'Directorate General' of the Netherlands Ministry of Foreign Affairs (DGIS), in preparation to this meeting gave the Netherlands delegation two specific policy instructions:

- a) the Netherlands was seeking to reduce the 'programme aid' component in total aid to Tanzania following disappointment with the country's efforts to restructure and liberalize the economy. The W.B./IMF structural adjustment lending negotiations had met with great reluctance on the part of the Tanzanian Government.
- b) As total financial aid to Tanzania was not to be diminished, a shift to a **project financing** commitment was envisaged. More specifically, a project that would generate long term infrastructural benefits to the country was to be preferential. In the budget, an indicative sum of 20 to 25 million guilders could be made available for such a project (memo DAF/MF; May 27; 1983).

An additional consideration was that the Netherlands intended to strengthen cooperation with the World Bank. Financing a large project out of the totality of the project rehabilitation programme seemed to meet the policy

objectives. In this context, Netherlands interest in the grain handling project was conceivable.

The more so in view of the strongly DGIS supported policy of "Food Strategies for Sub Saharan countries", initiated in the early 1980s. Furthermore, the new grain facilities in the Dar es Salaam port were thought to contribute to the improvement of 'food security' in Tanzania, as well as in neighbouring SADCC countries.

## Section 2: Formulation and Appraisal

### *2.1. Grain handling in Dar es Salaam port.*

In their appraisal report, the World Bank wrote: "the present bulk grain handling methods are primitive. Discharge from ship is either via a vacuator of limited capacity, or by grab with the grain then being loaded directly into trucks. There is substantial spillage, and with year-round activity, spoilage have been estimated to be equivalent to about 2.5% of volume in aggregate. Additionally, the overall discharge rates are very slow, partly due to the poor state of the equipment, partly to shortage of trucks. The net result is that discharge rates average only 750 tons a day, resulting in an 18,000 ton ship taking up to a month to discharge. It is not uncommon for two ships to overlap with the result that two berths can be pre-empted for long periods" (W.B.; 1984, p. 40).

The proposed facility by W.B. and Bretlin/Partners was to largely eliminate these shortcomings. Grain would be discharged in covered conditions, at a high rate of up to 300 tons per hour and conveyed by belt or a truck shuttle service to storage. An average discharge rate of 3,000 tons per day was expected which would reduce berth occupancy by 75%. Next to this benefit, the demurrage payments resulting from excessive time spent at berth by ships would be virtually eliminated. The W.B. estimated these payments up to \$ 500,000 per year.

The third anticipated benefit was a substantial reduction (50%) of loss and spoilage. Employing wheat as the main expected import grain, the W.B. estimated the benefit savings to amount to \$ 6 per ton.

Characteristics of the World Bank/Bretlin Partners proposed facility were as follows: the construction of 10 steel silo bins with a joint storage capacity of around 30,000 ton. The silos would be connected to the existing NMC flour mill and to berth no. 4 (where grain vessels would primarily be handled) by simple belt conveyers or by a dedicated truck system. Mobile quayside pneumatic equipment would be provided to extract the grain from the ships and transfer it to the conveyers using moveable hoppers. Furthermore, a bagging plant, as well as truck and rail loading platforms were also included

in the proposed project together with provision for future installation of equipment for bulk operations by rail (see outline design ANNEX 3).

Total cost for the grain terminal were estimated at \$ 15 million (1984). It was recommended that the THA should own the silo, but that its operation should be entrusted to the National Milling Corporation who already had experience of running this type of facility.

The proposal was based on the expectation that grain imports would remain at a high level of a 170,000 tons per year (forecast 1985), increasing to over 200,000 tons a year by the year 1990. Out of the 170,000 tons, it was assumed that 125,000 tons would be exported on to Zambia (wheat).

## *2.2 GEM Consultants: alternative designs.*

In August 1983 DGIS requested GEM consultants, Rotterdam to study the grain facility proposals of the World Bank and Bertlin Partners. GEM's position was that given the expected annual throughput volume of 170,000 tons, investment costs of the proposed design were "extremely high", resulting in high handling costs per ton of grain. GEM raised serious doubts as to the justification of a 'capital intensive' solution compared to the existing grain handling system in the port. The proposed highly mechanized system would lead to high yearly operational costs and consequent high tariff setting.

Following a request from GEM consultants to discuss in detail, the project design with Bertlin and Partners, DGIS (in April 1984) jointly contracted the two consultancy firms to "review current and future grain traffic through the port of Dar es Salaam and appraise the planned facilities for handling and storing the grain". An alternative design was developed based on a systematic review of the technical and operational aspects of:

- vessel discharge,
- transfer to storage,
- storage,
- intake and outtake procedures and
- transport to the hinterland.

Alternative designs (4) were based on estimates of future grain imports through Dar es Salaam of the following magnitudes:

imports of bulk grains between 160,000 and 320,000 tons per year (averaging 240,000 tons) of which 80,000 tons of wheat for Zambia in bags, 40,000 tons of wheat in bulk for Tanzania destined for the NMC silo and between 40,000 and 200,000 tons of maize in bags for Tanzania.

Characteristics of the recommended alternative are summarized in ANNEX 4.

Main recommendations were to:

build a grain terminal with 26,800 tons of storage capacity in 10 steel bins and using a system of shore cranes, mobile hoppers and bulk trucks for shipunloading and transport to the silo.

Investment costs were estimated at \$ 10.36 million (with a foreign component of 7.60 million) and rates of economic return (ERR) were calculated at 8% (based on a low estimate of 160,000 ton throughput annually) or alternatively 34% (based at the high estimate of 320,000 tons yearly throughput).

Potential savings resulting from the construction of the terminal were assumed to stem from:

- a reduction of shiptime spent in the port;
- a reduction of grain losses during unloading and transport;
- a reduction in port tariff for stevedoring as a result of the higher shipunloading rate and
- improved bagging and transport efficiency.

However, mention was made by the GEM consultants of the 'major risk of the project' i.e. a possible reduction in annual grain volumes throughput.

Table 1 summarizes the main differences of both design proposals.

Table 1. Grain Terminal Designs

Design:	Proposed by Berlin & Partners	Proposed by G.E.M. Consultants
<i>Silo</i>		
- Material	Concrete	Steel
- Size	30,000 tons	26,800 ton
<i>Shipunloading</i>		
- Type	Advanced pneumats	Cranes
- Capacity	3,000 tpd	1,600 tpd
<i>Transport</i>		
- Type	Beltconveyors	Trucks
- Capacity	400 tph	200 tph
<i>Bagging/loading</i>		
- Type	Automated	Manual
- Capacity	High capacity	500 ton per shift
<b>Total costs</b>	± \$ 17 million	± \$ 10 million (1984)

In August 1984 GEM's recommended design was discussed with representatives of the World Bank and the Tanzania Harbours Authority. THA still favored the 'belt conveyer solution' for the transport of grain from the berth to the silo and rejected the suggested use of standard hoppers+ bulk trucks as a transport system. The main argument was that with the introduction of the latter system maintenance and management problems would arise.

Furthermore, pneumatic shipunloaders instead of grab dischargers were preferred and finally a concrete construction was favored over the suggested steel bins, the main argument being that a concrete construction would better maintain the grain quality in view of the prevailing temperature and relative humidity of the air in the Dar es Salaam area.

DGIS position in this (multi-party) debate on the most appropriate design for the grain terminal can be labelled as 'cautious' and reserved'. Specific considerations were that, in contrast to W.B. projections, total port traffic would not increase substantially, making large ship unloading capacities unnecessary. It was expected that imports of grain would come increasingly under pressure from donors, who emphasized already the increase of local

food production through an improved marketing system and the cultivation of more drought-resistant crops. The introduction of advanced technology was not appropriate in the present conditions in Tanzania and finally in view of the apparent project risks and the Netherlands budget limits, investment costs were to be kept low. (Meeting Nov. 1984, DGIS, W.B., Bertlin/Partners and GEM consultants).

In the same month (November, 1984), DGIS decided in favour of the alternative design no.3, formulated by GEM consultants. However a number of (compromise) adaptations of the following nature were accepted:

- a concrete silo construction instead of steel bins;
- silo layout should allow for future connections with berth no.4 and the NMC silo through overhead belt conveyers;
- when the terminal and grab discharge system are in operation, shipunloading by means of high capacity mobile pneumatic unloaders is to be reconsidered.

The Netherlands Embassy in Dar es Salaam also approved the silo project financing, but not without signalling a serious warning that high risks were involved with regards to future food import requirements in Tanzania and Zambia. (Letter of Amb. Fruin to DGIS, Nov.16.1984).

In July 1985 DGIS commissioned GEM consultants to prepare a proposal for the project implementation:

- Phase A : design and tender documents
- Phase B: supervision of construction and
- phase C: operational and management assistance.

GEM was to be the main consultant for the total project, but for the civil works of the concrete silo a Dutch civil consulting firm was to be selected. The sub-contract was awarded to Haskoning Royal Dutch Consulting Engineers and Architects.

DGIS officially approved the project financing in August 1985.

In retrospect, it took all parties involved (World Bank, Bretlin Partners, GEM consultants, DGIS, The Netherlands Embassy and THA Tanzania) two years to reach an agreement on the ultimate design of the grain facility.

Much of the deliberations focused on estimations of expected grain volumes going through Dar es Salaam port and secondly on the degree of technological sophistication needed for the grain handling operations.

Summarizing the positions, it can be concluded that the World Bank, Bretlin Partners and THA took an optimistic view on grain import forecasts and had a strong preference for 'advanced technology', whereas the Netherlands parties (DGIS, GEM and Embassy ) were much more prudent and reserved on both issues.

## Section 3 : Implementation

### 3.1. Tendering and construction

The total period for project implementation was scheduled to span 28 month of time. Three periods were planned:

- Design and tender documents : 6.5 months
- Tender period, evaluation and contract award : 2.0 months
- Silo construction, building and infrastructure : 19.5 months

In Feb. 1987 all services related to the preparation of the tender documents were completed and ready for submission to the pre-qualified contractors and suppliers (of which 11 were Tanzanian and 20 were Dutch).

Separate bid packages were tendered for:

- single rope grabs;
- mobile truckloading hoppers;
- sea transport;
- 10 dumptrucks;
- civil works;
- mechanical installations;
- electrical installations and
- forklift trucks.

Contractors were selected by GEM and approved by THA. These included:

for single rope grabs :	Jurg & de Bie B.V.	--De Meern
	Nemag B.V.	--Zierikzee
	Verstegen	
	Grijpers B.V.	--Nieuwegein

for the mobile hoppers:	Staalbouw Vianen B.V.	--Vianen
	Theelen B.V.	--Echt
	Z.N.S. B.V.	--Fijnaart
	Van der Cammen B.V.	--Rotterdam
for sea transport:	Interfreight	--Rotterdam
	Heprofoor	--Rotterdam
	Damco van Swieten	--Rotterdam
	Docra	--Rotterdam
for civil works	Aduco International B.V.	
	Interbeton/Verenigde Heymans Bedrijven	
	Volker Stevin B.V.	
	Wade Adams (Zimbabwe) Ltd.	
for mechanical works:	Machine factory	van Opstal B.V.
	" "	Wijnveen B.V.
	" "	Van Aarsen B.V.
for electrical works :	Beckman Electronics B.V.	
	Croon Electronics B.V.	
	Philips Export B.V.	
	Rietschoten & Houwens B.V.	
for dumptrucks:	DAF International B.V.	
	Scania Nederland B.V.	
	Terberg Benschop B.V.	
	Ginaf Nederland B.V.	
	De Uiver (Leyland) B.V.	
for forklift trucks:	Hyster B.V.	
	Mageon (Caterpillar) B.V.	
	Still Intern Transport B.V.	
	Van Eyle B.V.	

Tender evaluation was carried out by GEM consultants and submitted to THA and DGIS for approval. In close cooperation with representatives of THA, contract negotiations took place in Dar es Salaam and final recommendations were submitted to the Board of Directors of THA.

THA and GEM agreed to award contracts to the following firms:

- Verstegen Grijpers (single rope grabs);
- Theelen (mobile hoppers);
- Docra (sea transport)
- Joint venture Interbeton/Heymans (civil works)
- Machine factory Van Opstal (mechanical works)
- Croon Electronics (electrical works)
- DAF International (dumptrucks) and
- Hyster (forklift trucks).

Each of the contractors for the main works (civil, mechanical and electrical) sub-contracted Tanzanian firms for specific services.

In particular a large part of the budget (some 80%) for 'civil works' was spent in Tanzania (cement, sand, gravel and labour).

In response to a request made by THA, the tendering and contract awarding for the grabs and hoppers was speeded up. THA wanted to use the equipment for rapid onloading of expected grain and fertilizer vessels. After testing with 4,000 tons of grain, the grabs and hoppers were handed over to the THA in March 1987.

The remaining contract documents were signed by THA in Nov. 1987 and after issuing the 'orders to commence' the terminal construction could start on January 1st 1988.

The construction phase of the project proceeded in a very satisfactory manner and generally in accordance with the overall time schedule. The only significant delay was the shortage of locally supplied cement as a result of a breakdown and export obligations of the Wazo Hill cement factory. This caused a delay of approximately 1 month altogether.

In November 1989 the construction of the grain terminal was officially completed. All works had been carried out according to the specifications and well within the planned time schedule. In that same month the silo was handed over to the Tanzania Harbours Authority.

Remarkably enough, up until now (Nov. 1992), the official government-to-government transfer of the terminal has not yet materialized.

### *3.2. Description of the THA Grain Terminal*

What follows is a short description of the main possible operations and available facilities of the terminal at the time of completion.

#### **Main activities:**

- receiving, storage and bagging of imported bulk grain for Tanzania and the hinterland countries;
- receiving, storage and export in bulk or bags of local grain (and hinterland grain).

#### **Operations for import:**

- bulk unloading in port;
- discharge by grabs into 3 hoppers;
- transport in bulk by dumptrucks to grain terminal;
- weighing and discharge into 2 dumpsites;
- fumigation of incoming grain and storage;
- recirculation and aeration of grain to maintain quality;
- (outloading in bulk to e.g. NMC silo);
- bagging of grain for transport to hinterland and hinterland countries.

#### **Operations for export:**

- receiving of grain in bulk or bags (incl. weighing);
- fumigation of incoming grain and storage;
- recirculation, aeration and fumigation of grain;
- outloading in bulk for export;
- bagging of grain for export in bags.

### **Terminal facilities:**

- 3 receiving mobile hoppers of 15 tons holding capacity each and 3 single rope grabs (+ 1 spare);
- weighbridge, capacity 40 tons;
- 2 sheltered dumpsites. Capacity 200 tons/hr. each;
- intake elevator and conveyor system with 2 lines. Capacity 200 tons/hr each line;
- each line has a fumigation system (pellet dispenser);
- silo with storage capacity 30,000 tons and central control room.
- aeration system to aerate grain, to maintain quality;
- recirculation system to break-up heating spots of grain;
- outtake system to bagging station 3 lines. Capacity 100 tons/hr, average (peak capacity 150 tons/hr);
- bagstore (warehouse) approx. 10,000 tons with forklifts to handle pallets for stacking and truckloading;
- bulk loading spouts for each main bin and one bulk loading facility;
- office/canteen/workshop;
- spare part store and laboratory;
- bag fumigation room;
- fire fighting system and
- temperature control system in each bin and central control panel.

### *3.3 The Costs.*

At the start of the construction on January, 1 st 1988, the budget for the project amounted to over Dfl 42 million. Per item information is in table 2.

Table 2. Grain Terminal Budget; 1-1-1988  
(in Dfl)

	<b>Item</b>	<b>Amount</b>
1.	Unloading equipment	512,000
2.	Trucks	1,850,000
3.	Mechanical Works	6,380,000
4.	Electrical Works	1,479,000
5.	Civil Works	21,774,000
6.	General items	595,000
7.	Supply after implementation	2,346,000
8.	Consultancy services	4,584,000
9.	Start-up assistance	incl. in 7
10.	Technical assistance	736,624
11.	Provisional sum	1,872,376
<b>Total</b>		<b>42,129,000</b>

Compared to the 1985 initial budget (Dfl 32 million ), a substantial increase of over 10 million guilders had become necessary. This was mainly due to the fear of the civil contractors for the high risks involved in works put to contract to local firms. Hence they applied for inclusion of these works in the 'foreign component' of the project. Furthermore, it was decided by DGIS to finance an extra expatriate post to assist the overburdened THA management.

DGIS approved of this significant budget raise, giving much weight to the following considerations:

- a) the project was to be considered as forming a part of the ongoing wider SADCC rehabilitation Program and therefore should not be delayed;
- b) on the part of DGIS there was no wish to re-open discussions on the design, nor to start re-tendering procedures with the parties involved and
- c) it was assumed that the silo would allow Tanzania to earn considerable forex through handling grain imports needed as a result of uncertainties of future food supplies in the SADCC region.

By January 1st of 1992 actual costs for the different items were as follows:

Table 3

**Project Costs per 1.1.1992**

1.	Unloading equipment	Dfl	438,743
2.	Trucks	Dfl	1,174,237
3.	Mechanical Works	Dfl	6,338.506
4.	Electrical Works	Dfl	1,525,371
5.	Civil Works	Dfl	21,868.600
6.	General items	Dfl	411,319
7.	Supply after implementation	Dfl	144,959
8.	Consultancy services	Dfl	4,329,950
9.	Start-up assistance	Dfl	865,043
10.	Technical assistance	Dfl	741,624
11.	Export facilities	Dfl	74,930
12.	Logistic study	Dfl	97,199

---

	Total	Dfl	38,010,481
Project Budget :	Dfl	42,129,000	
Spent up to 1/1/92	Dfl	38,010,481	
1992 expenditures	Dfl	927,286	
Available provisional sum	Dfl	3,191,233	

**Source:** GEM Consultants B.V.; Report THA Grain Terminal, no.8521C/001, Section 3, March 1992.

In addition to the Grain Terminal Project, The Netherlands government agreed in 1988 to the funding of three mobile bagging units (including 6 belt-conveyers) for the quay-side bagging of principally bulk fertilizer. These were purchased at a total cost of Dfl 585,000 and handed over to the THA in 1989. The main reasons for the purchase-approval were, that fertilizer could be far cheaper imported in bulk-form and then bagged in Dar es Salaam, saving substantial forex. And the mobile units could also be used at the grain terminal, bagging grain via the spouts alongside the silo. In case of an electricity cut, the mobile units could easily continue to bag the grain.

### 3.4. *Organizational Structure of the Grain Terminal.*

Since the grain terminal is part and parcel of the totality of Dar es Salaam port operations, its functions and activities are integrated in the THA organizational structure. In a number of ways the terminal is linked up with the port organization for example with regard to *services* (personel, finance,

purchase and supply, medical officer, administration and security) and *utilities* (water supply, sewage, drainage and fuel).

The grain terminal manager responsible for the silo operations is answerable to the Assistant Port Manager. The technical department of the silo is located on the site, but for all technical matters related to the terminal, the Port Engineer is responsible.

The main reason for this is that many aspects of the terminal maintenance are closely linked to overall Dar es Salaam port maintenance activities carried out in the central port workshops.

The following chart(p. 21) provides an overview of the way the silo is integrated in the port structure. It can be seen that the accountability lines are rather confusing and ineffective. As a result of the three tier management structure, the Grain Terminal Manager has no direct control over engineering and supplies management. This led to problems and constraints, not only in the operations of the silo but also during the 'technical assistance' phase (see section 3.5).

The mission has noted constraints of the following nature:

- managers and supervisors endeavour to discharge accountability to higher echelons in the organization due to fear of accepting responsibilities;
- floor level personnel is often unable to react swiftly to problems due to the long lines of responsibility downward and the loss of time resulting from awaiting higher level approval and
- the strict application of the 'demarcation lines' that is, the refusal by for example an electrical technician to take up mechanical activities for fear of being held responsible for work not falling under his task description. Sometimes this situation is being aggravated as qualified staff is not always present to supervise tasks.

An overview of the organizational structure of the grain terminal itself is presented in chart 2, p. 22.

**CHART 1**

***GRAIN TERMINAL IN PORT ORGANIZATION***

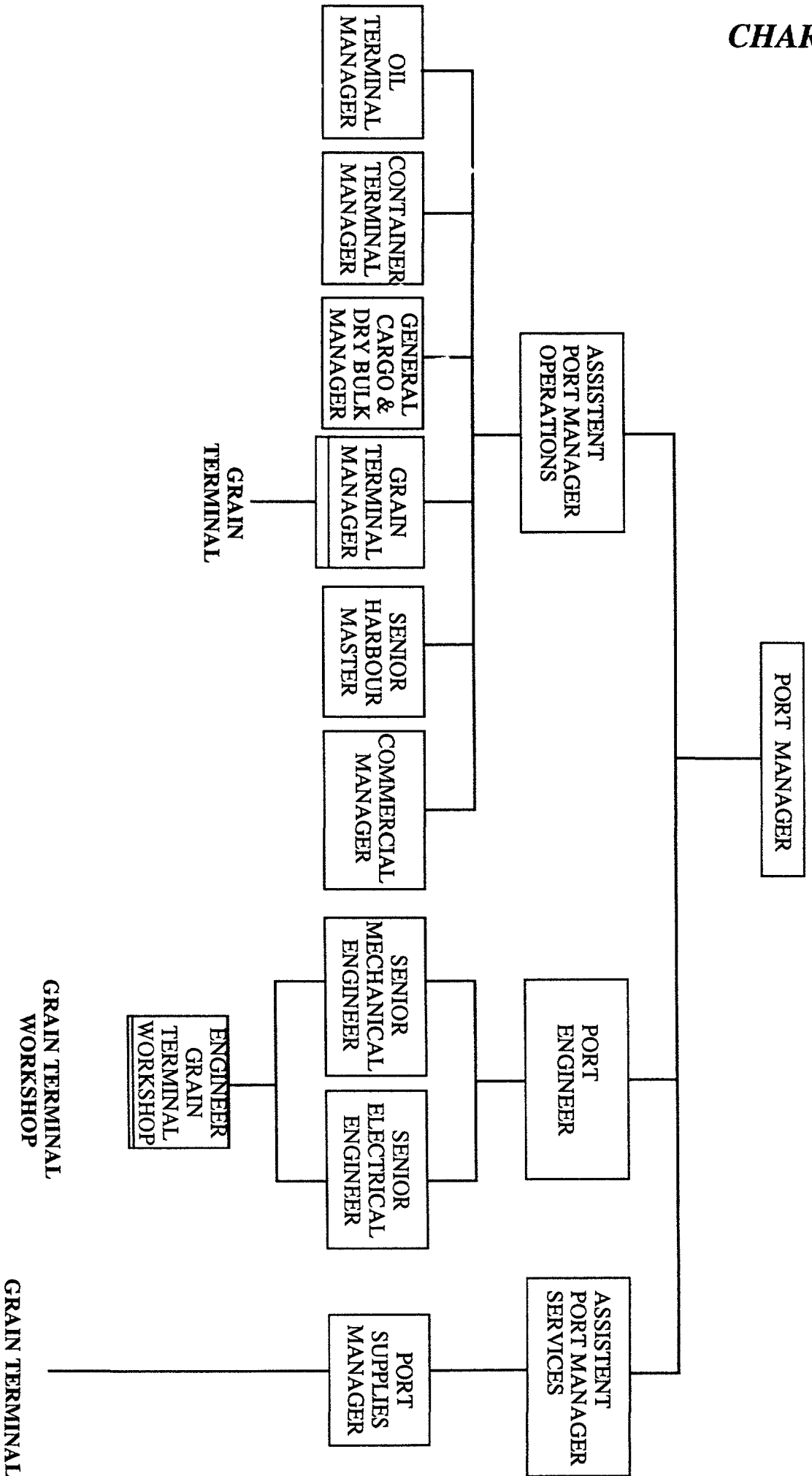
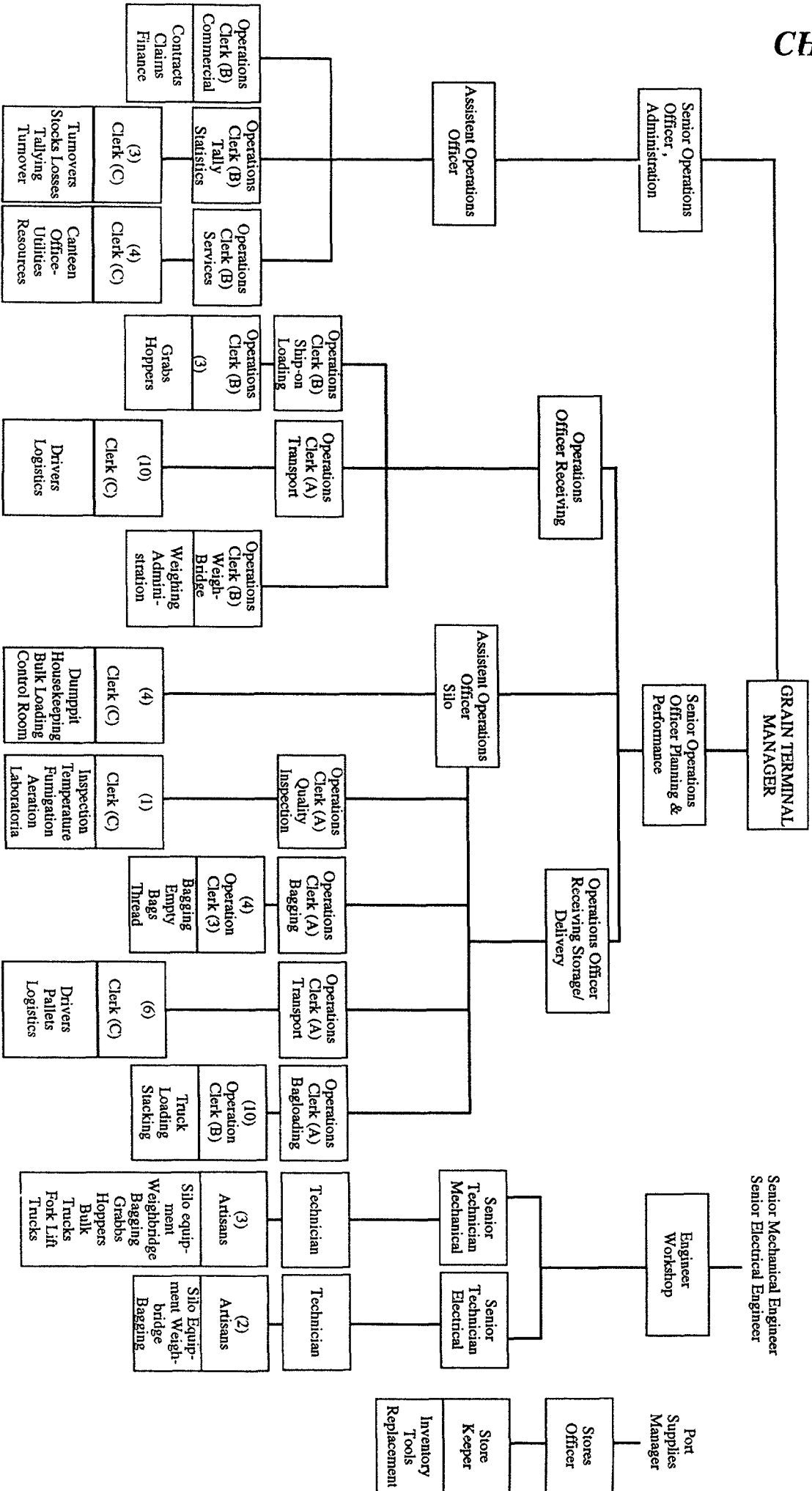


CHART 2

GRAIN TERMINAL ORGANIZATION CHART



### 3.5. *Technical Assistance and Training (Phase C;1989-1992).*

From the date of completion of the terminal, a technical assistance programme was started for the initial 3 years of operation and maintenance of the silo. To this end, 2 expatriate experts were stationed in Dar es Salaam i.e. one grain terminal operations adviser and one technical adviser to the terminal.

Various types of training were envisaged:

- **on the job training.** Technical experts of the main contractors (Interbeton, van Opstal, Croon, DAF and Hyster) would instruct Tanzanian trainees during the execution of their tasks and on the proper use of the equipment;
- **classroom training.** With the help of operational and technical manuals, experts were to instruct the Tanzanian trainees on the theoretical aspects of their jobs and
- **counterpart training.** The expatriate experts are assigned to high level Tanzanian officers in the grain terminal organization (i.e. the grain terminal manager and the workshop engineer), with the aim of gradually transferring the experience and responsibility to the Tanzanian officials.

Specific tasks of the expatriate operational adviser included :

- advise the THA grain terminal manager in establishing and maintaining contacts with clients (e.g. Governments of Tanzania, Zambia, Malawi, and donor countries) and other parties in the grain trade, such as the railways and trucking companies;
- advise on tariff structure and concluding of contracts;
- advise in setting up of a proper management information system with key information on commercial, operational and technical aspects of the grain terminal, as well as an administration system and maintenance monitoring system;
- advise the GTM in the preparation of an operational plan budget;
- give training to the operational and administrative staff of the terminal;

- ensure the availability of personnel needed to carry out daily terminal operations and administration and
- the setting up of a finance monitoring system for the grain terminal  
(Source: GEM Report Technical Assistance, no. 8521-C; Annex2, 1992).

Particular tasks for the expatriate technical adviser were:

- supervise the mechanical and electrical technicians in the execution of their day to day repair and maintenance tasks;
- implement and supervise maintenance schedules for the mechanical and electrical equipment;
- implement and supervise a tools and spare part inventory system and supervise storekeeping;
- implement and supervise preventive and corrective maintenance and work safety;
- enforce staff discipline and implement a security scheme and
- implement and organize an overall practical training programme for the electrical and the mechanical technicians.

For the Tanzanian staff of the terminal detailed job descriptions were also formulated by GEM consultants.

Training on the financial aspects of the silo included:

- a) tariff structure and costprice calculation,
- b) grain terminal tariffs for the various activities and
- c) information and data needed for tariff calculation for handling and storage of grain at the silo.

Finally, overseas training was to be offered at the GEM grain terminals in Rotterdam and visits to other terminals in the region (Amsterdam, Gent and Antwerp) were planned.

In retrospect, the success of the 3-year training programme (ended in Nov. 1992) has been limited.

The main explanation is that since its completion, the silo has hardly handled any grain, except in the period Oct.-Dec 1991 when 6000 ton of wheat with Malawi destination found its way to the terminal.

With terminal operations at such a low level, of course on the job training was also minimal. It also gave rise to undisciplined behaviour of the terminal staff with regard to attending the training courses. In general there was considerable lack of motivation and initiative, leading to high absence of staff from the silo.

THA officials too, apparently had difficulty in accepting and familiarizing themselves with the new grain handling facilities in the port.

Cooperation with the terminal management was therefore unsatisfactory. THA often failed to making available sufficient, well qualified staff/artisans to the terminal, either for operation or training purposes. Also supervision of operations proved to be problematic.

Another disappointment was that the numerous letters of advice from the expatriate terminal adviser to the THA counterparts remained largely unanswered.

However, on the expatriate side there were also shortcomings. For example the evidence of lacking teaching qualifications for classroom training of terminal staff. More generally there was little preparedness to work in and blend with the Tanzanian environmental characteristics. Imagining oneself in the position of a large parastatal employee might have helped a lot.

Nevertheless, what has become unequivocally clear is that for a training programme to succeed, well defined objectives, mutual rights and obligations, adequate job descriptions and mutual trust are a *sine qua non*. On-the-job training can be successful (as proved by Nectar) when the silo is actually in operation and when labourers are given (monetary) incentives as a reward for their full participation.

## Section 4. Present Situation.

### 4.1. *The Food Balance in Tanzania*

After its completion in Nov. 1989, the terminal remained idle for a period of more than two years (except for the handling of 6000 tons of wheat for Malawi).

The main explanation is that during the long period of project preparation and implementation (1983-1989) the pattern of maize imports for Tanzania showed radical changes. Table 4 indicates that the situation of massive maize imports during the first half of the 1980s abruptly ended in 1985/86. In the years thereafter small amounts of maize were imported and even the situation arose, in 1987/88, that maize could be exported.

Tabel 4

#### Tanzania: Production and Net Imports of Maize and Wheat ('000 tons)

Year	Maize Production	Maize Imports	Wheat Production	Wheat Imports
1970/71	719	-24 (1)	57	12
1971/72	621	63	57	45
1972/73	887	79	88	8
1973/74	761	291	85	91
1974/75	1367	225	82	29
1975/76	1449	107	69	61
1976/77	1664	42	64	34
1977/78	1465	34	55	41
1978/79	1720	-49 (1)	70	78
1979/80	1726	5	87	33
1980/81	1839	275	90	49
1981/82	1654	235	95	83
1982/83	1651	123	58	29
1983/84	1939	194	74	46
1984/85	2093	129	83	33
1985/86	2210	6	72	22
1986/87	2359	94	72	54
1987/88	2339	-91 (1)	76	34
1988/89	3125	-	97	29
1989/90	2432			
1990/91	2256			

(1) exports

Source: FAO; 1990; Marketing Development Bureau, MOA; Sym; 1990

Thus at the start of the silo construction (Jan. 1988), it was already very evident that the main justification for building a silo of the planned size had lost its immediate relevance.

However, the project went on as planned. There were no initiatives to reconsider. The mission is surprised that in 1987 none of the Dutch parties (DGIS, GEM, Embassy) took the trouble to (re)-examine on-going developments in the import volumes of maize.

Why have maize import developments been so erratic?

To answer this question, a short digression on Tanzania's 'food balance' might be of help.

Maize is the staple food in Tanzania accounting for a major share (30%) of total calorie intake. Other foods also significantly contributing to the diet include millet/sorghum, cassava, potatoes and bananas. Furthermore rice and to a lesser extent wheat is also produced in the country. With the exception of the crop failures in the early 1980s, production of the main food crops showed impressive increases in the 1974-1989 period. For maize the annual average growth rate in those 15 years was 4.8%, well above the average rate of population growth of 3,3%.

Confronting total food production data with aggregate food requirements (based on daily calorie needs) Table 5 demonstrates that Tanzania succeeded in producing sometimes substantial surpluses in the second half of the 1980s.

Table 5

**Estimated Total Production of Food in Tanzania, 1984-1989**

Year	Total main foods '000 tons	Total consumption requirements '000 tons	Balance %
1984/85	7.026	4.543	131
1985/86	6.972	4.670	127
1986/87	7.048	4.801	125
1987/88	6.780	4.935	117
1988/89	7.919	5.073	133

Source: Marketing Development Bureau, MOA; FAO; 1990.

However, aggregates usually present a misleading picture and Tanzania is no exception.

Among the 20 regions in the country, food balances may vary to a large degree due to wide differences in rainfall patterns and soil characteristics. But more importantly, in one region maize might be piling up in the open air (easily washed away by rain or destroyed by pests and diseases), whereas in other parts of the country serious food deficits may develop as a result of institutional shortcomings such as poor road infrastructure, lack of village storage- and processing facilities and a mal-functioning maize marketing system.

In general, marketing constraints are tried to be removed mainly through two types of policy reforms: a) market liberalization measures and b) the re-establishment of the agricultural cooperatives in 1986. Both types of policies aimed at reducing the high degree of state intervention in the pricing, marketing and production of agricultural produce, to the benefit of private traders and the cooperative production units. Nowadays, a very large percentage (80-90%) of all foodgrains is estimated to be handled by private traders (Marketing Development Bureau, 1992; p. 2).

In the past marketing and infrastructural constraints explained much of the country's maize imports in certain years. Often there was no clear-cut, causal relation between domestic output levels and the volumes of actually imported maize for Tanzanian consumption.

Much of the demand for maize comes from the urban consumers, predominantly in the Dar es Salaam coastal region (2 million inhabitants). Consumption of maize in this region is up to 15,000 tons per month.

If purchases through the formal marketing channels in the far-away surplus production areas (the southern highlands of Mbeya, Ruvuma and Iringa regions) are being constrained and therefore reach insufficient levels, the government may decide to import considerable amounts of maize, even when overall maize production in the country is quite sufficient.

#### 4.2. *The Food Aid Shipments.*

Southern Africa has been affected by the worst drought during this century. For 1993 import food requirements for the 10 SADCC countries are estimated at 1,8 million ton. Countries most in need of food are Mozambique (608,000) and Zimbabwe (517,000 tons). Table 6 gives the details.

Table 6

#### 1993 Food Aid Requirements

<i>Country</i>	<i>Affected population</i>	<i>Requirements tons</i>	<i>Pledges</i>
Angola	1.400.000	74.831	76.345
Botswana	100.000	5.000	1.700
Lesotho	170.000	15.702	18.950
Malawi	5.700.000	479.262	404.137
Mozambique	3.150.000	608.500	417.800
Namibia	250.000	17.850	18.203
Swaziland	250.000	46.475	28.163
Tanzania	800.000	16.500	10.407
Zambia	1.700.000	108.000	100.868
Zimbabwe	4.600.000	517.450	337.774
	18.120.000	1.800.570	1.415.356

Source: WFP; Dar es Salaam, Nov. 16; 1992.

Zambia and Malawi also experienced serious crop failures in recent years. These two landlocked countries can best be served through Dar es Salaam port and the existing railway and road systems: the Tanzania Zambia Railway (Tazara) and the Tanzam Highway.

In the last few years, neither Tanzania nor its neighbouring countries have imported or exported significant volumes of grain. The port of Dar es Salaam has therefore little experience in handling the large volumes of emergency shipments.

On the other hand, thanks to the comprehensive Dar es Salaam Rehabilitation Programme of the 1980s, port facilities have been modernized and expanded considerably. Therefore the actual and future food aid transports through Dar port are a 'test case' for the port and railways handling efficiency.

In 1992 some 284,000 tons of grain passed through Dar es Salaam port, the greater part to be conveyed to Zambia. Table 7 (p. 30) provides a summary of the ships discharge up to Nov.10.

Table 7

**Emergency Food Aid in 1992 through Dar es Salaam****Dar es Salaam Port - Summary of Ships Discharge 1992**

Vessel	Period	Commodity	Quantity	Accumulated Quantity	Store	Silo
Kapitain Vakula	16-16/4	Wheat	9800	9800	0	0
Zara	5-19/5	Corn	20800	30600	0	0
Atticos	20-2/6	Corn	19200	49800	0	0
South Wind		Corn	20000	69800	2000	0
Sugar Islander	29-13/7	Corn	21000	90800	3100	6365
OV. Harriette	22-1/8	Corn	20000	110800	9000	5790
Sea Wagner	25-11/8	Corn	20000	130800	2000	5514
Luis	5-20/8	Corn	20000	150800	3882	7673
Galina	20-27/8	Wheat	5000	155800	0	0
Laodiki	12-1/9	Corn	20000	175800	13000	0
Adr. Prestige	22-3/9	Corn	20000	195800	4500	6854
Leros Courage	5-26/9	Corn	21000	216800	4800	6642
Patricia	2-10/9	Wheat	10000	226800	0	0
Explorer	12-25/9	Corn	13200	240000	11000	0
Lyra	25-9/10	Corn	21000	261000	0	0
Petalouda	23-29/10	Corn	8000	269000	0	0
Maria G.L.	30-10/11	Corn	15000	284000	0	0
				284.000	73274	38838

PERIOD 16 April- 10 November: 284.000 ton

of which:	a) direct railed:	171.888
	b) in silo:	38.838
	c) stored:	<u>73.274</u>
		284.000

Source: Nectar Ltd, Dar es Salaam 1992

The port operated 'reasonably satisfactorily' (Coordination Secretariat; Oct.1992) but attention to the shortcomings in the port was diverted by the low off-take performance of Tazara and Zambia rail systems. The Tazara rail extends over a distance of 1,860 km from Dar port to Kapiri Mposhi where it links with The Zambian rail system. In theory Tazara should be able to transport some 90,000 tons per month to Zambia and Malawi. However, only a monthly average of 30,000 tons has been realized in 1992, giving rise to serious congestion problems in the port. In mid-September a stockpiling of maize, fertilizer and general cargo up to 78,000 tons awaited dispatch by rail to Zambia. This development necessitated diversion of ships to South African ports.

Basically, the underutilization of Tazara capacities is the result of insufficient management and operational routines. In addition there has also been a general shortage of railway wagons available for loading in Dar es salaam port. The latter problem is largely caused by Zambia Rail who failed to return empty wagons in time and in sufficient numbers. Thus, it must be acknowledged that part of Dar es Salaam problems is beyond the control of the port authorities.

#### *4.3. The role of the grain terminal.*

The grain terminal has hardly been operational since it was handed over to the THA. As is shown in the last column of Table 7, of the total volume of 284,000 tons discharged in the Dar es Salaam port in 1992, only 38,838 tons (13,6%) was handled by the terminal.

By far the greater part (245,162 tons) was bagged at the quayside and directly railed to Zambia or stored in nearby warehouses.

The bagging of maize alongside ship was carried out under management of a private firm, Nectar Ltd, London, who was contracted by THA in Febr.1991 for a period of 3 years. Nectar is a company, specialized in bagging of grain and fertilizer in various parts of the world.

The mission learned that THA's decision to contract out the bagging activities and implicitly the management of the silo, was based on the following considerations:

-- THA is legally not allowed to guarantee laydays(discharge time of the ship) in foreign currency (i.e. U.S.dollars). Consequently, a 'third party' has to be brought in, who can provide this liability.

Nectar guarantees to the shippers or owners of the vessels, a daily discharge of 1250 to 1500 tons depending on the size and workability of the ship. In case of slower discharge than guaranteed, Nectar pays a demurrage sum (of US\$ 6,000 per 24 hrs) but will receive a despatch (of US\$ 3,000 per 24 Hrs) when discharge is more than the guaranteed tonnage per day. From working sheets, the mission noted that discharge of 2000 up to 2600 tons materialized regularly.

--the second main THA argument for out-contracting was that they were inexperienced with respect to handling large volumes of grain and also had little access to international marketing information needed to set competitive grain handling tariffs.

--an additional argument was that, since it concerned emergency food transports, THA would hesitate to take the risks involved when the option of 'learning by doing' was accepted.

Nectar holds a *de facto* monopoly position, although officially competition is allowed. Another firm Norsk Hydro Ltd, Oslo, also has their own bagging units in the port of Dar es Salaam and is prepared to discharge and bag at a tariff of \$12 per ton. However, as a result of an agreement between THA and Nectar, they are to pay a royalty fee of \$2.85 to THA for not using THA equipment. This brings Norsk Hydro's tariff to \$14.85 which is very similar to THA/Nectar's of \$14 to \$16 depending on traffic volumes. According to the contract with Nectar, the THA is to receive 50% of the tariff charged to shippers by Nectar.

Nectar's bagging capacity at the quay side of around 3000 tons per day is amply sufficient to handle a normal, regular inflow of grain shipments. Bagging takes place during discharge of the vessel via hoppers. The bags are loaded directly onto flatwagons or trucks to be transported to railwagons or alternatively to depots and sheds in the port area. Storage capacity (for general cargo and grain bags) in the port is in the order of 125,000 tons.

In conclusion, the grain terminal will only be put to use in the case of congestion arising from offtake failures by Tazara railways and/or full warehouses in the port area. In those circumstances the terminal provides a valuable escape route allowing Nectar (and THA) to discharge vessels as planned.

Apart from this unprivileged position, the terminal has experienced other disadvantages.

No less than 50% of the capacity was lost due to electricity failures. This not only diminished the reliability of the facility, it also undermined the motivation of the terminal staff to a great extent.

The solution to this problem is either to install a generator to the silo or alternatively to make a cable connection to a nearby substation of the existing (container terminal) port generator. The mission holds the view that the installation of a generator would be preferable since this would increase the terminal's reliability, making it less dependent on outside provisions.

Furthermore, the silo is not provided with a rail siding connecting it with the Tanzanian (and Tazara) railway systems. As a consequence, maize bagged in the terminal's bagging station has to be transported by lorries to the nearest rail line. However, the construction of a rail line alongside the terminal would be a costly and inappropriate investment because in order to make the connection with Tazara rail, a difference in height of 15 meter must be "leveled out", needing a rail track of about 2 km to bridge the existing distance between the silo and the Tazara railhead of 200 meters. An additional argument is that Tazara railways up till now has not invested in railwagons suitable for bulk grain transport.

Fortunately, from a point of view of quality preservation, the terminal has a clear advantage over storage in the warehouses. Ventilation, fumigation and control of temperatures can be done far more effectively in a silo than in any warehouse. Moreover, risks of pilferage and theft can also be minimized.

#### 4.4. *Financial Aspects.*

As per October, 1st 1992 the official THA/Nectar tariff for grain discharge in bulk is as follows:

Discharge from vessels via shore cranes into hoppers	US\$ 6,50
Bagging of grain and delivery onto flatwagon or truck	US\$ 7,50
	-----
	US\$ 14,-
Wharfage ; transport within the port to rail, store or truck	US\$ 6,-
	-----
Total costs to be paid by the end-receiver	US\$ 20,-

The tariff for bagging at quayside is similar to the tariff charged by the terminal when grain is bagged at the terminal's bagging station.

The mission calculated the Grain Terminal tariff in the following manner:

Assumptions:	investment:	\$ 20.000.000 of which
	civil works:	\$ 13 million and
	mechanical + electrical works:	\$ 7 million

#### **Fixed costs:**

Depreciation civil works; 30 years	\$ 433.334 per year
Depreciation mechanical + electrical works; 15 years	\$ 466.666 per year
	-----
	\$ 900.000 per year

**Variable costs**

Expenditures budget 1992/93 as approved by THA

Total 1992/93: Tsh 59.746.000 à 410	\$ 145.730
	<hr/>
Total	\$ 1.045.730
Turnover: 100.000 tons per year	\$ 10,45 per ton
Discharge from shiphold into bunker	\$ 3,50 per ton
Wharfage; transport from terminal to rail or truck	\$ 6,00 per ton
	<hr/>
Total costs	\$ 19,95 per ton

The mission was informed that part of the Dutch grant for the financing of the silo was "relended" to THA as a loan by the Treasury for which THA had to pay interest and the redemption amounts.

However, accurate knowledge of the precise figures could not be obtained either from the Treasury nor from THA's head office.

The comparable tariff for Mozambique ports is US\$ 19,10 but these ports have a high percentage of pilferage and theft and only limited storage capacity.

South Africa's port of Durban has a lower tariff of US\$14,90 but charges a high penalty rate for storage exceeding a period of two weeks (US\$ 1,50 per ton per day). In the Dar es Salaam tariff, no storage costs have been invoiced.

The conclusion is that the Dar es Salaam port nowadays, offers a more or less competitive tariff for handling grain imports through its port (applying the afore mentioned assumptions).

#### *4.5. Constructional Engineering Aspects*

##### **a. Sites**

The site bordering the surfacing of the bagging unit and warehouse is on a reverse gradient. This results in flooding under the roofed-in area of the warehouse during heavy rains.

The entire site is fenced off. The fences on the port side of the site are on the edge of the bank due to the difference in level from the surrounding site.

During rainfall the bank crumbles away, causing deformation of the fencing.

##### **b. Sewerage**

The underground septic tanks near the sanitation building, workshop and head house cannot function properly because the waste water pipes from these areas are connected to the soil pipes. As a result, the bacterial decomposition process in the tanks cannot take place properly, causing the tanks to overflow with dirty water. This in turn results in permanent flooding of the site.

##### **c. Warehouse (*which also houses the bagging unit*)**

This is a very well built steel structure, covered with aluminum roofing, and very well built concrete structures.

##### **d. Bagging station**

The structure is very good. However, the design and installation of the equipment in this station used for weighing and filling the bags of grain is too sophisticated.

In the event of a breakdown, expertise has to be flown in from the Netherlands.

The transport of the full bags of grain from the bagging station to the trucks has to be done entirely with manual labour, since there is no conveyor belt.

Bagging stations → bags on pallets → transport of pallets to the trucks (10 m) → from pallet on truck. This procedure is unnecessarily complicated.

#### **e. Weighbridge**

The grain is transported from the port to the terminal on DAF trucks. The grain then goes to the silo via the weighbridge.

The length of the weighbridge is sufficient to weigh the DAF trucks but it is not long enough to weigh the trucks used for transporting the bags.

The weighbridge control panel (weighing/number/time/date) is seen as too advanced and the control is now being done by hand, visual observation and registration.

#### **f. Silo building**

This is an excellent concrete structure.

There is a small leak in the basement under silo 101, but this can be easily repaired by means of a resin injection.

Cause: overflowing of the septic tank outside the silo.

Roof covering: corrugated steel sheets fixed to the steel structure. Because of the 'open' ridge structure (for the purpose of ridge ventilation) and bolt holes made in the wrong places at the time the roof covering was installed, small leaks may occur when there is a combination of rain and wind.

#### **g. Power supply**

The terminal is totally dependent on the power supply from Dar es Salaam and this has resulted in a very vulnerable situation in terms of continuity.

The nearby container terminal has three emergency power units. The total capacity of these units is sufficient to service the entire port complex.

The continuity of the terminal would be guaranteed with a cable connection to the nearest substation (300 m) or alternatively the installation of an own generator.

#### **h. Rail links**

The grain terminal has no direct rail links.

There is a railway station of the Tazara railway 250 m from the grain terminal and the T.R.C. railway network is 60 m. away.

The terminal is separated by public roads from the Tazara railway and the T.R.C. railway network.

## Section 5: Future Options

### *5.1. Forecasts Food Relief Imports*

The Relief Logistic Secretariat, coordinating the emergency shipments to Southern Africa has an interest in seeing the grain being moved out of Dar es Salaam port as soon as possible after arrival.

They are therefore reluctant to incorporate the terminal in the handling activities and expressed to the mission specific doubts with regard to the reliability of the bagging station, attached to the silo and the need to transport bagged grain again down to the rail lines in the port. The mission, however, does not support this view. When grain is bagged at the quayside it is also loaded on flat wagons for further transport to either the Tazara railhead or port warehouses.

Nevertheless, both the Secretariat and Nectar did expect to use the terminal (as a last resort) in the coming year when Tazara offtake capacities will again pose problems.

Forecasts of relief shipments in 1993 were as follows:

100,000 tons of maize for Zambia;

300,000 tons of maize for Malawi and

a request of 150,000 tons of maize from Tanzania.

Furthermore, as waiting days (before start of discharge) in neighbouring harbours are a constraint: Beira (20); Maputo(7); Ncala (10) Durban(8), it is likely that some of the shipments will be diverted to Dar es Salaam.

### *5.2. Options for the Strategic Grain Reserve (SGR), exports or imports.*

#### **SGR**

Since 1986, fundamental changes in Tanzania's food policies have been effectuated:

- a) the growing emergence of the private sector as the principal vehicle for grain trade between surplus and deficit areas. As a result of government restrictions being progressively removed, the private market now covers 80 to 90% of the food trade in the country ;

- b) the restructuring of the National Milling Corporation (NMC) which is now confined to (mostly wheat) milling operations and
- c) the re-establishment in 1987 of the Strategic Grain Reserve (SGR) within the newly created Food Security Unit in the the Ministry of Agriculture.

Reserve stocks are currently being held for two reasons: to meet relief aid requirements for regions hit by flood or drought disaster and secondly, through periodic release of stocks, SGR would endeavour to mitigate market price rises associated with seasonal shortages.

SGR is presently assisted by funds from a number of donors: UNDP, FAO, World Bank and the Netherlands government. Total storage capacity is aimed at 150,000 tons of maize.

SGR has two godowns in the Dar es Salaam region with a maximum storage capacity of 20,000 tons. But grain losses, quality deterioration and a shortage of storage facilities in Dar es Salaam are causing much concern.

In view of this the SGR is well prepared to include the grain terminal in its strategic stockholding policies.

To follow up the SGR's intentional use of the silo, a request was made to the grain terminal to set a storage tariff for 20,000 tons of maize procured by SGR.

Unfortunately, the tariff offered was twice as high as the current storage rate in the existing depots. This is due to the fact that a silo is basically a facility meant for rapid turn-over of large grain volumes, not for long term storage purposes. Consequently, for the time being the grain terminal's participation in the SGR is off.

## **Exports**

Under normal circumstances, Tanzania is self-sufficient in maize. In good rainfall years small surplus volumes can be exported, whereas in poor years imports might be required.

However, exports of maize hardly provides an attractive business opportunity, taking into consideration the wide difference between the world market price and the high price of locally produced maize (mainly due to high transport and marketing costs).

The THA/GEM study on the 'logistics of transport of maize' (Dec. 1991) calculated a fob world market price of US\$ 11 0 per ton (1991) compared to a locally produced maize price of US\$ 225 per ton! fob Dar es Salaam (p. 31).

Notwithstanding, in 1990, Oxford Services Ltd came to an agreement with the management of the grain terminal to export 16,000 tons of maize, thereby making use of the silo for export deliveries throughout 1991.

However, in January 1991 the Tanzanian government suddenly decided to ban all exports of maize from the country for fear of a likely forthcoming poor harvest due to the inadequacy of rainfall in the main producing areas. Again this potential role for the terminal was never effectuated. But apart from maize, the mission learned that there are various firms potentially interested in trading other commodities (such as wheat and cassava root slices) through the terminal.

## Imports

Generally, the food situation in the country is such that, unless calamities occur, no large amounts of grain imports are needed. Moreover, even in the event of maize importation into Dar es Salaam, the terminal may be 'ignored' because importers have a choice to bag maize alongside the vessels at the quay-apron.

However, according to estimates of the Ministry of Agriculture Tanzania has experienced a worrying overall decline in maize production in the recent years:

1988/89	3,125 million tons
1989/90	2,432 million tons
1990/91	2,256 million tons
1991/92	2,110 million tons

Although Tanzania is in a much favorable situation than all the other surrounding SADCC countries, it is expected that the country will be faced with an overall cereal (not only maize) deficit of 400,000 tons for the

1992/93 marketing year (figures are from The Economist Intelligence Unit; Country Report no. 3; 1991).

When these expectations materialize, the grain terminal might after all be in a position enabling it to prove its value.

## **Bibliography**

Drought Emergency in Southern Africa (DESA) Situation Report; October 1992, SADCC.

### **FAO**

Government of the United Republic of Tanzania. Comprehensive Food Security Programme, Dar es Salaam, October 1992.

### **GEM Consultants**

THA Grain Terminal Project, Report 8414; June 1984.

### **GEM Consultants**

Technical Assistance to the Management of SGR. Progress Reports no. 1 (Jan. 91), no. 2 (Sept, 91), no. 3 (Febr. 92) and no. 4 (June 92).

### **GEM Consultants**

THA Grain Terminal Project, Report 8510; July 1985.

### **GEM Consultants**

THA Grain Terminal Project, Technical Assistance; Progress Reports no. 1 (Febr. 92), no. 2 (March 92) and no. 3 (May 92).

### **GEM Consultants**

THA Grain Terminal; Progress Reports 1-11 (April 1987 - May 1990)

### **GEM Consultants**

Technical Assistance Grain Terminal Progress Report; 8521-C; Febr. 1992 and Progress Report; 8521C/001; March 1992

Logistics of the Secretariat for Emergency Transport Coordination; Quarterly Report; aug. - Oct. 1992; Dar es Salaam.

Marketing Development Bureau: The Wholesale Trade in Grains and Beans in Tanzania, Ministry of Agriculture, Livestock Development and Cooperatives, January, 1992.

Southern Africa Drought Relief Transport Report. SIDA; Bo Sedin and Sten Lööf, May 15, 1992, Dar es Salaam.

J. Sym; Food Security and Policy Interventions in Tanzania, Tinbergen Instituut; Nov. 1990.

THA and Strategic Grain Reserve (SGR), Study on the logistics of transport of maize from the Southern Highland regions to Dar es Salaam. Netherlands Ministry of Foreign Affairs; The Hague, GEM consultants, Rotterdam, December 1991.

THA; Review of Dar es Salaam Port Development Study Vol. 1, 2 and 3. Bertlin and Partners, consulting engineers and The Economist Intelligence Unit Ltd., March 1979.

#### Tanzania

The Economist Intelligence Unit; Country Report no. 3, 1992.

World Bank; Staff Appraisal Report Tanzania Port Rehabilitation Project, November, 1984.

## **ANNEX 1**

### **Terms of Reference for the evaluation mission of the Grain Terminal**

#### *Identification Phase:*

- a. to evaluate the decision making process leading to the Netherlands commitment to finance the construction of the Grain Terminal, thereby amongst others taking into account the role of the Grain Terminal in the Dar es Salaam Port Development Project.

#### *Formulation and appraisal phase:*

- b. to evaluate the decision making process leading to the design (technical, institutional) of the Grain Terminal, thereby describing the positions and opinions of the different actors.
- c. to evaluate the design of the Grain Terminal, thereby taking into account the choice of the location, choice of (building)material, and the choice of technique to link the quay with the Terminal through the use of trucks.

#### *Implementation phase:*

- d. to assess and evaluate the institutional framework of the Grain Terminal within the Tanzanian Harbour Authorities.
- e. to assess the structure and effectiveness of the project implementation and management. The construction was arranged through financial assistance (through NIO-Bank) and the consultancies through technical assistance. The mission will evaluate and present an overview of all contracts signed in the context of this project.

#### *Present situation:*

- f. to assess factors hampering the efficient use of the Grain Terminal during the present operations.

- g. to determine the most efficient option for bagging grain in the Port of Dar es Salaam: bagging on quay side with mobile bagging units versus at the Grain Terminal. Thereby also taking into account the tariff setting by THA.
- h. to describe how the contract negotiations take place for the grain handling in the Port of Dar es Salaam, taking into account the role of THA and Nectar Ltd.

*Future:*

- i. advise the Netherlands and Tanzanian Government on
  - how to ensure that the Grain Terminal remains technically operational,
  - if and how the Grain Terminal can be made attractive for the THA to include it in their grain handling operations.

## ANNEX 2

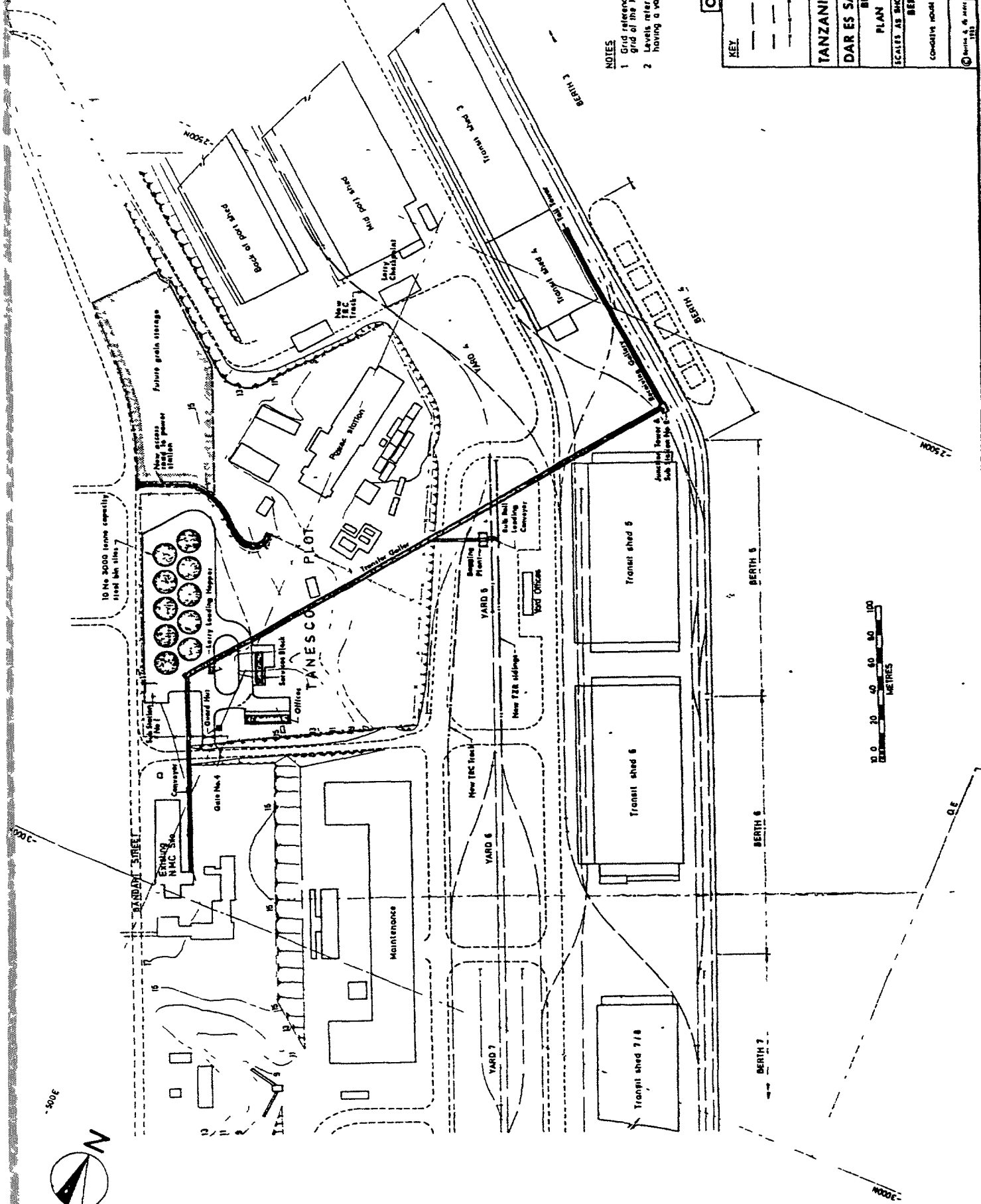
### *List of Interviews:*

1. Briefing Dutch Embassy: *Mr. Wijenberg*, Ambassador and *Mr. E. Noorman*, 1st Secretary.
2. *Mr. A.S. Janguo*, Director General of Tanzania Harbours Authority.
3. *Mr. Col. S.H. Mnyani*, Executive Assistant to General Director.
4. *Mr. S.M. Luhigo*, Ag. Director General, Tanzania Harbours Authority.
5. *Mr. IJzermans*; Counsellor Dutch Embassy.
6. *Mr. Kibwana*, Head of Department for Public Investment; Treasury, Ministry of Finance.
7. *Mr. W.T.M. Mdundo*; Commissioner for Public Investment; Treasury.
8. *Mr. J. van Liere*; Finnida Project Manager; Dar es Salaam Port Development.
9. Captain *Tom Smitt*; SIDA/Finnida Operations Manager; DSM Port Development Project.
10. *Mr. E. Lätti*; Port Operations Expert DSM Port Development Project.
11. *Mr. J. Thate*; Grain Terminal Advisor, Technical Assistance; GEM Rotterdam.
12. *Mr. Sten Lööf*; Logistics Office Secretariat for Emergency Transport Coordination.
13. Captain *Hans Madsen*; Logistics Office Secretariat to Emergency Transport Coordination (Food Aid).
14. *Mr. Roy Southworth*; Operations Officer World Bank, Tanzania.
15. *Mr. Richard Fuller*; FAO Representative in Tanzania and the Seychelles.
16. *Mr. Suvanto*; Embassy of Finland, 2nd Secretary; Development Cooperation.
17. *Mr. Zergaber*; World Food Programme (WFP); Director of Operations.
18. *Mr. Tej. Mathur*; USAID; Regional Engineering Officer.
19. *Mr. Cam Bowes*; Canadian High Commission; First Secretary (Development) CIDA.

20. *Mr. R. Mariki*; Principal Secretary; Ministry of Communications and Transport.
21. *Mr. Peter Mtandu*; Director of Engineering and Technical Services, Tanzania Harbours Authority.
22. *Mr. Bagachwa*; Economic Research Bureau; University of Dar es Salaam.
23. *Mr. Chande*, Chairman of THA Board of Directors.
24. *Mr. E. Kok*; Representative of Nectar Shipping and Projects; London.
25. *Mr. B. Bakileki*, Secretary and legal Officer of THA; Dar es Salaam.
26. *Mr. Bloemaarts*; ECC Representative in Tanzania.
27. *Mr. Banda*; Food Security Unit of the Ministry of Agriculture and Livestock Development.
28. *Mr. W. Ngirwa*; Commissioner for Planning and Marketing; Ministry of Agricultural and Livestock Development.

LAY OUT OF BERTLIN AND PARTNERS /  
WORLD BANK CONCEPT

PORT GATE NO. 3



**NOTES**

- Grid references refer to the Dar es Salaam local grid of the Ministry of Lands & Surveys
- Levels refer to a benchmark on transit shed No 1 having a value of 5.950 m chart datum

**OUTLINE DESIGN**

KEY	DESCRIPTION
---	NEW TCR TRACKWORK
---	NEW TZR TRACKWORK
---	PORT BOUNDARY FENCE

<b>TANZANIA HARBOURS AUTHORITY</b>	
<b>DAR ES SALAAM PORT DEVELOPMENT</b>	
<b>BULK GRAIN TERMINAL</b>	
<b>PLAN OF BULK GRAIN TERMINAL</b>	
SCALE: AS SHOWN	
<b>BERTLIN AND PARTNERS</b> CONSULTING ENGINEERS	
CONTRACT NO.	NO. 81004/1984
DATE	14 APRIL 1984
<b>CONTRACT DRAWING No. R1</b>	

SOURCE: THA Dar es Salaam Grain Terminal Project

GEM Consultants B.V.; Report no. 8414, p. 29; June 1984.

## ANNEX 4

### *GEM Alternative Design (no. 3) for the Grain Terminal, Dar es Salaam*

- Shipunloading : Shore- or ships cranes with special single rope grain grabs and 4 mobile hoppers of 9 tons content for truckloading.
- Transport : 12 bulktrucks (9-tons capacity) with tipping discharge.
- Storage : 10 steel bins of 15 m diameter and 26 m total height with bottom hopper and outtake with screwconveyors. Total capacity  $10 \times 2,680 = 26,800$  tons.
- Weighing : Weighbridge for truckweighing.
- Intake : 4 intake lines each consisting of dump-pit, 2 x 50 tph screwconveyors, 100 tph bucketelevators, 100 tph screwconveyors over the silo bins.

#### *Out take*

- bulk : one 50 tph screwconveyors in each silo bin leading to a central 100 tph beltconveyor between the two rows of silo bins. This line is used for bulkloading/recycling. Bulkloading of trucks by means of two spouts and hoppers.
  - bags : Two 20 tph screwconveyors in each silo bin leading each to a bagging plant.
- Dispatch : 10 bagging plants next to each silo bin with 10 tph bagging capacity, an area for stacking filled bags, an area for empty bags, and a ramp for truckloading.

#### *Capacities*

- Shorecranes : 43 tons per hour  
 $6 \times 43 = 258$  tons per shift.
- Shipunloading : With 4 cranes the annual average shipunloading capacity is 1,600 tons per day.
- Trucktransport : 22 tons per hour for one truck

- Bagging : 10 tph per machine, corresponding to about 120 bags per hour or 2 bags per minute. Total plant capacity is 1,000 tons/day for two shifts.

In addition to the grainhandling facilities, the following service buildings are provided:

- Office for the permanent personnel of the terminal. The office also contains the control room with the synoptic panel.
- Canteen + pantry for the labourers.
- Workshop for maintenance of trucks and equipment. The workshop is provided with locked spaces for tools and spare parts. There is a separate space for clean work with electrical equipment.
- Substation for HT power supply with separate rooms for main switch and transformer.
- Sanitation house with toilets and wash basins for labourers.
- Huts for the weighbridge and for the guards at the two gates.
- Empty bags store to store the empty bags prior to ship arrival.
- Fencing and gates for the bulk traffic between port and silo and for the bag traffic from silo to outside destinations.

The terminal is furthermore provided with the normal systems such as drainage, sewage, roads, pavements, freshwater supply and telephone.

Source: THA; Grain Terminal Project  
GEM Consultants; Report 8414; June 1984, p. 51/52.