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附属資料１．要　請　書

PROJECT AID PROPOSAL

FOR

TECHNICAL ASSISTANCE

FOR

DAR - ES - SALAAM
SOLID WASTE MANAGEMENT
MASTER PLAN

SEPTEMBER 1994

1. Project Title

Dar-es-Salaam Solid Waste Management Master Plan

2. Executing Ministry/Agency

Office Of The Prime Minister And First Vice President and Dar-es-salaam City Council.

3. Background

The City and region of Dar-es-Salaam is located between 6° 34' and 7° 10' south on the west of Indian coast line, enclosing some 1350 km^2 of land including 8 off-shore islands.

Dar-es-Salaam is the industrial, commercial and government center of Tanzania with an estimated 2.3 million people or 25% of the country's urban population.

Whilst this rapid growth would normally provide numerous economic opportunities to the urban population and stimulate National Socio-economic development, these have been severely restricted by an almost total lack of infrastructural investment in the City over the last 15 to 20 years. This has in turn resulted in rapidly deteriorating environmental conditions which have adversely affected the health and welfare of the City's residents (especially the disadvantaged groups), further retarding economic growth. In particular, by 1990:

Recognising the serious Socio-economic consequences of these environmental problems to both the City of Dar-es-Salaam and the nation at large, the government requested assistance from the World Bank and UNDP/UNCHS (Habitat). Both agreed to support the government, through the office of the Prime Minister and First Vice President.
The former through the Urban Sector Engineering project (USEP).

Meanwhile, UNDP agreed to fund technical assistance to the City Council through the sustainable DSM Project (SDP), to strengthen the capacity of the Council to prepare a strategic development plan, to be implemented through a series of Action Plan Proposals. Several donor agencies are now being invited to extend additional assistance such as waste disposal, road works, water works etc.

4. Project Rationale

4.1 Importance of the Project Area

1) Dar-es-Salaam with more than 2.3 million inhabitants or close to 4.7% of the national total population will continue to grow at high rates receiving a large number of migrants. Population growth is estimated to reach 5 million by the year 2000.
This will further aggravate the already degraded urban environment due to inadequate solid waste management.

2) The office of the Prime Minister and First Vice President and the Dar-es-Salaam City Council (DCC) are most concerned over the continuing decline of urban environmental conditions not least because of the inadequate solid waste management system in the City which will aggravate the already pressing health problems and suppress the future economic performance of the city as the engine of National Socio-economic development.

4.2 Solid Waste Problem in the Project Area

Solid waste management in DSM has long been recognised as one of the most serious urban environmental issues. Whilst solid waste generation was estimated at 1,400 tonnes/day in 1993, at present nearly 20% of the solid waste is collected by DSM City Council by using 20 trucks. This waste is taken to the disposal site at vinunguti where it is disposed without proper treatment of formal sorting for recycling. Since the disposal area is located close to a residential area and located in a river valley, it is critical to introduce and implement suitable sanitary land filling measures immediately to prevent adverse effects to the inhabitants and the city residents as a whole. Recent privatisation measures for refuse collection are expected to more than double waste collection rates in the next 12-18 months, reinforcing the need for urgent action.

4.3 Approach to the Project

Degradation of urban environment has become a major constraint to safe and pleasant urban life and has impeded efficient economic activities in the Dare-es-Salaam City. The improvement and development of waste disposal must be high on priority for future development initiatives.

Garbage collection and disposal plants may be installed also individually. Such piecemeal measures, however, will not guarantee effective overall urban environment development nor economic efficiency. Long term development of the DSM city on a sustainable basis will become possible only within the overall strategic framework of a waste disposal management master plan. The plan should ensure maximum realization of environmental sanitation in the long run through environmental sound and sustainable development of the DSM city.

5 Objectives

The ultimate objective of the project is to realize pleasant urban environment for residents and visitors in the DSM city by formulating an integrated plan for solid waste management. Specific objectives are:

- to evaluate the present urban environmental condition,
- to formulate a master plan with integrated partial and Socio -economic framework,
- to carry out pre-feasibility studies for selected project priority, and
- to give recommendations on the solid water management

6. Scope of Work

The study area covers the entire Dar-es-Salaam city area

The study will be conducted in two phases of master plan study and preparation of Implementing plan as states below.

Master Plan Study

1) Data collection of the existing condition
Genéral

- Location and area
- Population
- Industries and income levels
- Natural conditions
- Land use and housing

Solid Waste Management

- Service coverage, population and service level
- Solid waste generation, classification, characterization and collection
- Organization,
- Laws, regulations and guidelines,
- Intermediate treatment and recycling of resources,
- Main equipment and facilities.

2) Evaluation of the existing condition

3) Framework formulation for Solid Waste Management

4) Preparation of Master Plan

Feasibility Study

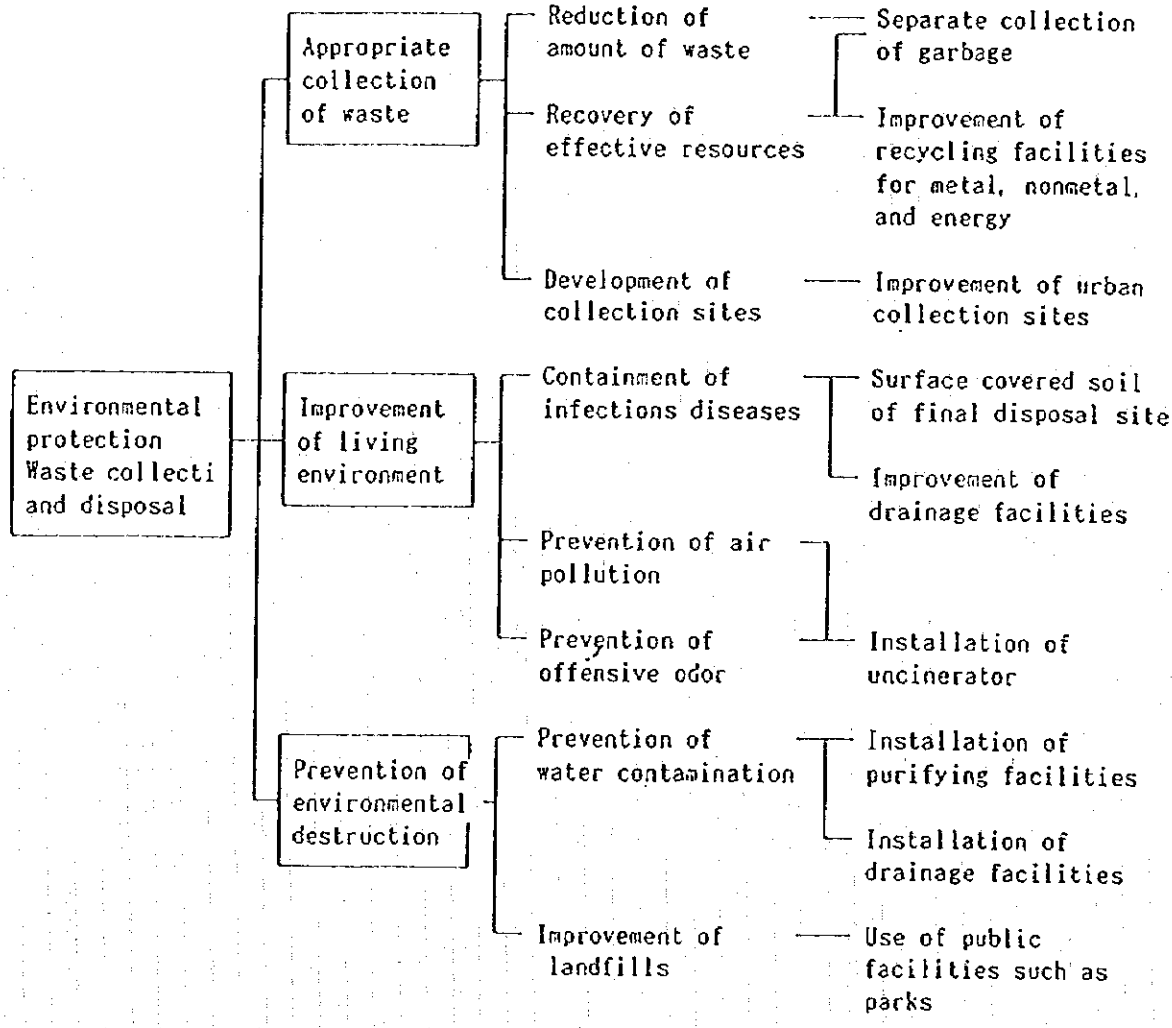
5) Framework adjustment of the selected priority project

6) Preliminary design

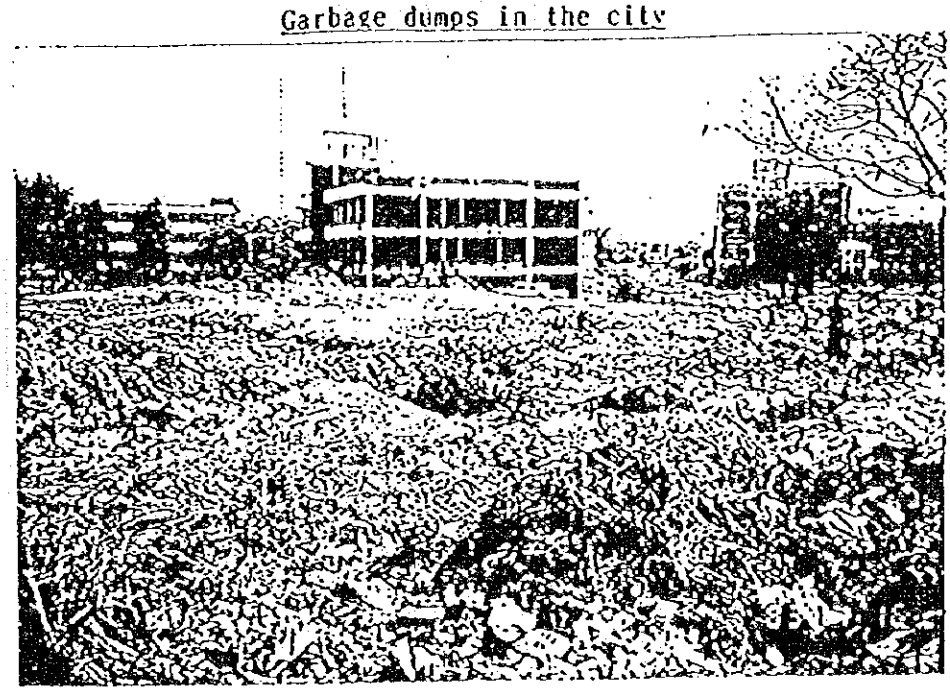
7) Project implementation Plan

8) Project evaluation

Outline of Waste Collection and Disposable Project

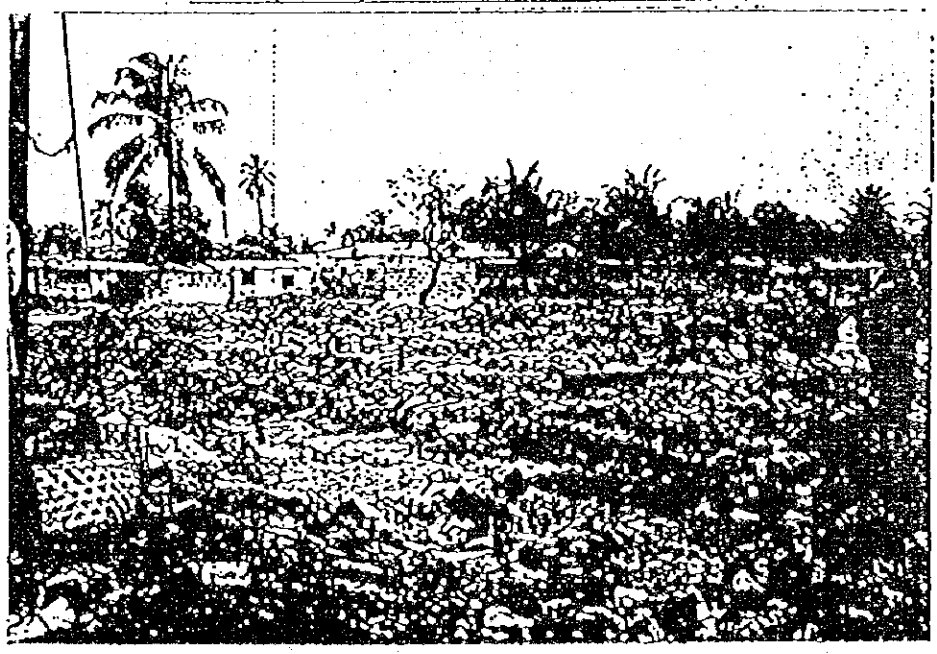


Garbage dumps in the city



Existing facilities located in the center of city.
Garbage is discarded in a disordely fashion, and is not separated for collection.

Garbage disposal near residential area

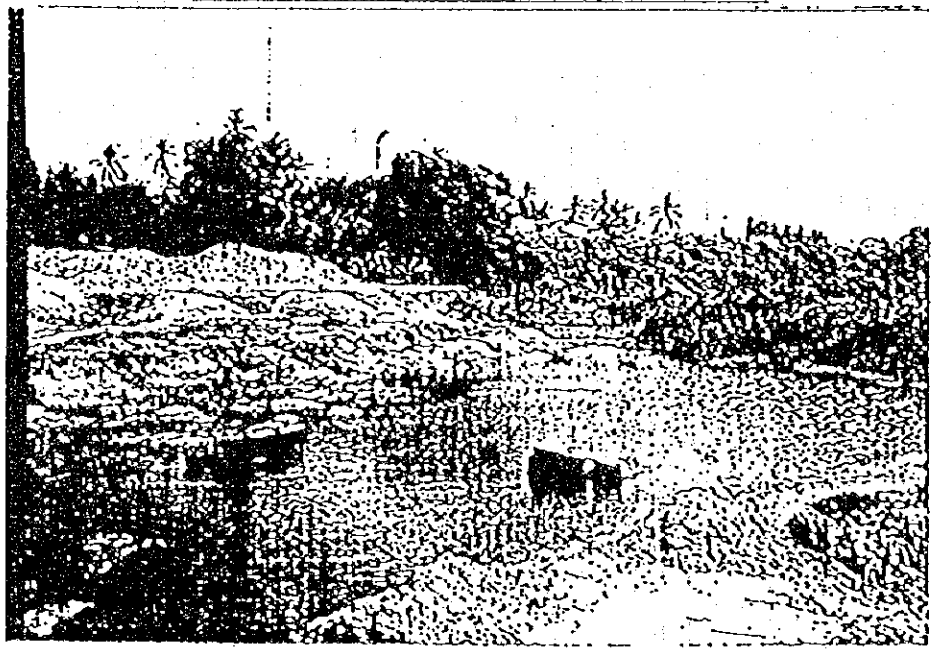


Organic waste is disposed of by being buried under ground.
However, paper and nylon garbage is scattered by wind.

Garbage in area surrounding the markets

Garbage collected from markers is mostly organic waste, including vegetables and fruits.

Existing final garbage disposal areas



They are located in elevated areas alongside the river. When it rains, contaminated water flows into the river.

ANNEX 1.

The World Bank
INTERNATIONAL BANK FOR RECONSTRUCTION AND DEVELOPMENT
INTERNATIONAL DEVELOPMENT ASSOCIATION

1818 H Street N.W.
Washington, D.C. 20433
U.S.A.

(202) 477-1234
Cable Address: INTBAFRAD
Cable Address: INDEVAS

April 2, 1993

Mr. W.H. Shellukindo
Principal Secretary
Office of the Prime Minister and First Vice President
P.O. Box 3021
Dar es Salaam, TANZANIA

Dear Mr. Shellukindo:

Re: TANZANIA - Urban Sector Engineering Project (Cr. 2291-TA) [illegible]

I wish to thank your Deputy and your staff and the management and staff of other project agencies for the excellent cooperation and assistance extended to the recent mission led by Mr. Richard Beardmore to review progress on the implementation of the Urban Sector Engineering Project. The mission has briefed me on their findings and I would like to take this opportunity to summarize the major conclusions and the actions to be taken. A copy of the mission's aide-memoire outlining the status of the various components of the project and the agreements reached with your Ministry is attached for your information.

First of all, let me commend the Project Management Unit (PMU) for so efficiently carrying out the actions agreed during the mission of October 1992. It is gratifying to note that consultants are now in place to continue the important work of the IWG. We have received and reviewed the final report on the Strategic Integrated Infrastructure Development Programs (SIIDP) for each town. Two valuation specialists have taken up their posts to assist the project towns to revitalize their property tax systems. ARDHI Institute submitted the final copy of the Land Study. The mapping activity financed by NORAD is on track. The socio-economist consultant has completed her contribution to the preparation of Financial Performance Improvement Program (FPIP) for each town. The Controller and Auditor General has completed the audit of the 1991 accounts of the nine towns. Local consultants have been selected to install the streamlined accounting systems according to the new Accounting Manual and Financial Memorandum in Dar es Salaam, Mwanza and Tanga.

During the mission, the team visited four regional towns (Arusha, Moshi, Tanga and Morogoro) and held discussions with local officials and regional water engineering staff. The SIIDPs for each of the towns were reviewed on the site. The team confirmed that the reports had been prepared in consultation with local officials and represented their priorities. There were, however, some proposed components about which the team had some reservations and which would need to be the subject of further study in Phase II of the Technical Working Group's program, e.g., sewerage system in Morogoro.

RCA 248423 (WUI 64145) FAX (202) 477-6391

It also came to the attention of the mission that a number of infrastructure projects are being identified with the assistance of other multilateral and bilateral donors. It was emphasized that PMU ought to maintain close contact with relevant central and local agencies to keep abreast of such proposals to avoid any future duplication of effort. This is particularly true of Dar es Salaam and the interest expressed in the improvement of its water supply system.

As far as donor involvement in the proposed project is concerned, it would be useful to keep them informed generally about the progress of the preparatory work being carried out under the Urban Sector Engineering Project.) Future missions can assist with this effort. However, I think it is important to have the scope and nature of the proposed investment program well defined and a solid assessment of local authority implementation capacity in hand before approaching the donor community as a whole in the form of a workshop. As a minimum, I think that the engineering design work for all proposed components of the project should be underway and that measurable progress in strengthening the revenue base and financial management capacity of the towns has been made.

On the question of the institutional framework for managing urban water supply, I am very pleased at the initiative taken by the Ministry of Water, Energy and Minerals to establish a degree of autonomy at the level of urban authorities. It is proposed that water funds be established for each urban authority administered by a committee chaired by the Regional Director of Development and including representatives of water consumers. The committee would oversee the performance of the water supply system operated by the Regional Water Engineer and ensure that revenue received from user charges was applied to its operation , maintenance, and even expansion. We look forward to further development of the proposal as part of the Water Sector Review being undertaken by MWEM.

We understand that progress on the preparation of the FPIPs is being achieved, although not as quickly as assumed in October. The mission worked with the Financial Working Group to clarify many of the assumptions needed to be made about the financial parameters governing the project in an effort to reduce the number of possible scenarios which need to be examined. Preliminary results of the FPIP analysis indicate that the recovery of capital costs, financed on the easiest of terms, will not be possible in the early years of the proposed project. This realization will have to be taken into account when identifying the ultimate scope of the future project and may dictate that the size of the next investment be considerably smaller than the full investment program identified in Phase I of the TWG. We suggest that a realistic approach to a long-term urban investment program would be a phased approach in which an initial project would combine a major element of institutional strengthening of those local authorities showing promising results in revenue mobilization with a more modest investment in the rehabilitation of physical infrastucture. Thereafter, a follow-up operation could be considered

With regard to the other items in the mission's aide-memoire, I fully confirm their findings and the actions to be taken. I can assure you that our staff will be working along with your staff and the other agencies to ensure that the next steps will be completed in a timely manner. We look forward to the continued smooth implementation of the project in the future.

Sincerely yours,

Stephen Weissman
Division Chief
Infrastructure Operations
Eastern Africa Department

cc: Mr. Ben Moshi, Principal Secretary, Ministry of Water, Energy and Minerals, Dar es Salaam
Mr. L.L. Mollel, Director of Suveys, ARDHI, Dar es Salaam
Mr. P.G.L. Affa, Project Manager, Project Monitoring Unit, OPMFVP, Dodoma

DAR ES SALAAM INVESTMENT PROGRAM - ISSUES TO BE ADDRESSED IN TWG2

a) General

- The need for good coordination and exchange of information on the part of donors has been discussed in the main text to ensure effort is not wasted and all of the various initiatives are complementary.

b) Sectoral

Roads and Road Drains

- Large size of roads program, its coordination with or coverage in part by IRP (JICA) need to adopt basic functional planning and design standards; affordability of program for full recovery of operation and maintenance costs for complete road system and burden on property tax.

Water Supply

- Large size of water supply program; a major element of the program should address unaccounted for water, leakage and repair if not already being comprehensively addressed by others; coordination of programs either on-going or proposed of, for example, JICA, ADB, Italian Government; need to define in detail what other donors are doing or proposing to do and frame USEP program accordingly; O & M costs for DSM water supply as estimated by TWG1 consultants (over US$ 1 million per month) and reviewed.

Sanitation

- Sanitation focuses on rehabilitation of existing waterborne sewerage schemes and pond treatment systems and an objective of this component would need to optimise use of sewage by encouraging proper connection; connection charges are however high and a policy to achieve affordable connections needs to be developed; for the vast majority of persons with no access to a sewer no investment proposals are included in, for low cost on plot solutions, and this needs to be reconsidered;

Solid Waste Management

- A generic solid waste system has been proposed as a basis for costing works in all towns, this may not be totally appropriate for DSM, in parts of DSM tractor/trailer systems might be more appropriate; DSM is moving towards privatisation of the service starting with the city centre, currently with contractors using DSM City Council vehicles; this initiative needs to be monitored carefully and if successful expanded; if this occurs and contractors invest in their own vehicles then investments proposed in the USEP may be reduced.

Annex 3.

Opinion Poll Concerning Waste and Environment of Resident area in Dar es Salaam

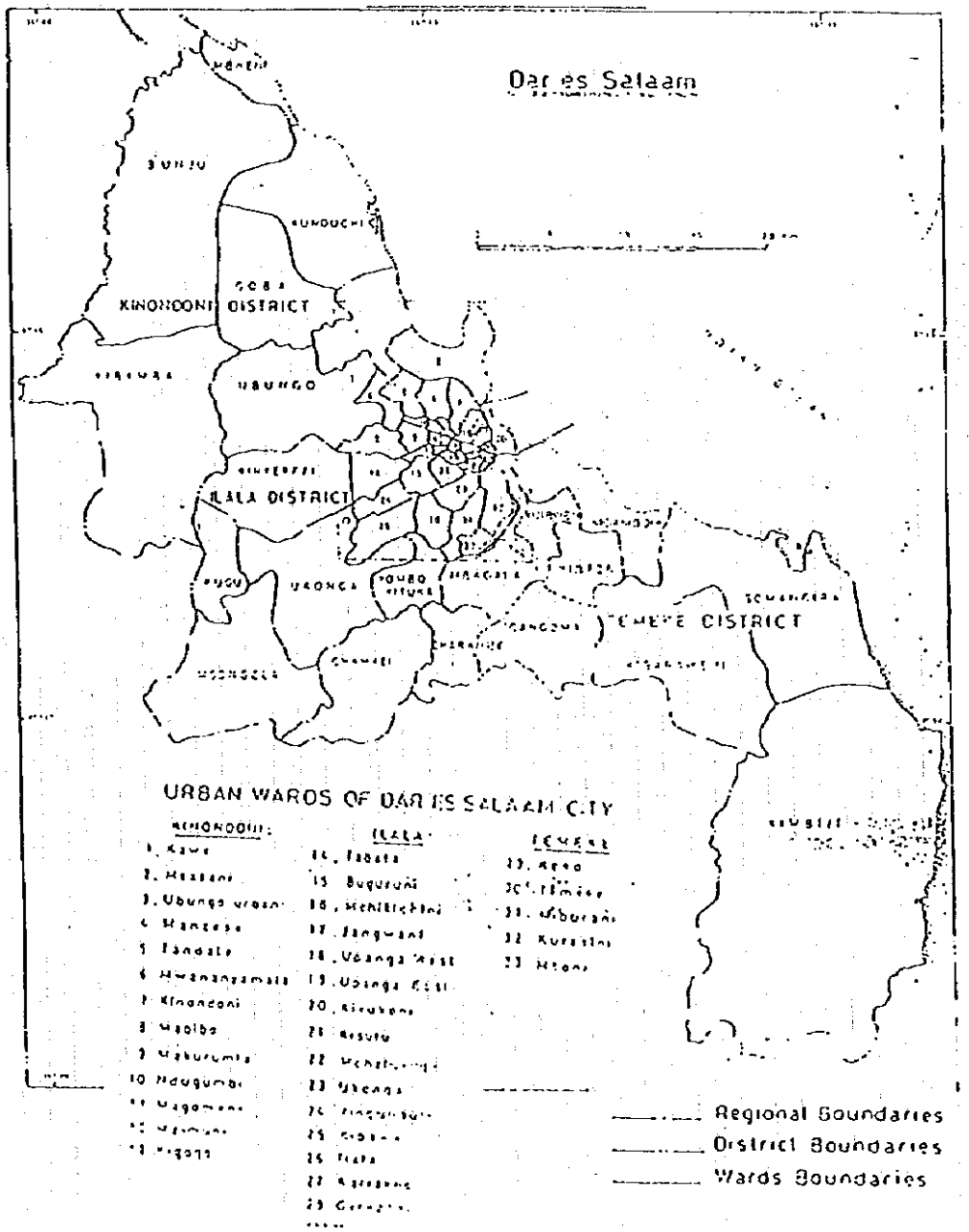
October, 1993

Health Section
Dar es Salaam City Council

Opinion Poll Concerning Waste of Residents of Dar es Salaam

I. Purpose:

One year has elapsed since the start of the Dar es Salaam Emergency Clean up Project. The Health Section of the Dar es Salaam Municipal Office conducted during the two weeks period of 7th ～ 21th October, 1993. An opinion poll among residents concerning waste and environmental problems troubling households. This poll aimed at realizing the smooth progress of the project in the future and at appropriately improving the project.



2. Method:

Interviews were conducted and questionnaires were distributed by the health officers of each district (see materials for Ilala, Kinondoni, Temeke) in Dar es Salaam City (state). Questionnaires were sent to 400 households in Ilala, and 300 each in Kinondoni and Temeke.

3. Result:

The response rate was 68.4 %, 40-% in Ilala, 83.2 % in Kinondoni and 96 % in Temeke (The response rate in Ilala was low because the majority surveyed consisted of stores and thus questionnaires were used. Another reason is that the residents were vary of such a survey.).

Details of the questionnaire and results for each district and Dar es Salaam City (state) are presented below.

Questionnaires	Ilala	Kinondoni	Temeke	Dar es Salaam
Q-01. How many people are in your family?				
1) 1 - 2 persons	35.7 %	36.4 %	30.6 %	33.9 %
2) 3 - 6 persons	40.6 %	36.4 %	34.0 %	36.4 %
3) 6 - 8 persons	14.0 %	16.8 %	21.1 %	18.1 %
4) 8 persons > N	8.7 %	10.4 %	14.3 %	11.6 %
Q-02. Do you own or rent your home?				
1) Own	43.4 %	46.8 %	43.5 %	44.8 %
2) Rented	36.6 %	53.2 %	56.5 %	55.2 %
Q-03. What kind of house do you live in?				
1) Individual	70.0 %	98.0 %	84.3 %	87.6 %
2) First type	30.0 %	2.0 %	15.7 %	12.4 %
Q-04. Is there any regional group or organization that serves neighborhood cleanliness? (Example: in an group of 10 neighbors, etc.)				
1) Yes	99.1 %	64.4 %	79.9 %	75.2 %
2) No	20.9 %	35.6 %	20.1 %	24.8 %
Q-05. If you live in a rented hours, do you discuss your neighborhood's cleanliness with the owner of your house?				
1) Yes	63.0 %	68.8 %	70.5 %	77.0 %
2) No	37.0 %	31.2 %	23.5 %	22.7 %
Q-06. What do you think of the present Dar es Salaam?				
1) Very dirty	9.8 %	28.4 %	8.8 %	16.2 %
2) Dirty	68.6 %	60.0 %	64.2 %	63.5 %
3) Clean	21.6 %	11.6 %	27.0 %	20.3 %

Questionnaires	Ilala	Kinondoni	Temeke	Dar es Salaam
Q-07. How does it look compared to a year ago?				
1) Cleaner	77.0 %	60.4 %	71.7 %	66.6 %
2) Uncharged	17.5 %	28.8 %	13.6 %	21.6 %
3) Dirtier	5.5 %	10.8 %	14.7 %	11.8 %
Q-08. Who is in charge of cleaning in your area?				
1) Government	6.3 %	2.4 %	0.4 %	2.4 %
2) City Office	21.7 %	25.2 %	8.5 %	17.8 %
3) Residents themselves	71.4 %	66.2 %	90.7 %	79.0 %
4) I don't know	0.6 %	6.2 %	0.4 %	0.8 %
Q-09. Is the environment important for your life?				
1) It is important	96.5 %	94.0 %	96.0 %	96.3 %
2) I don't care	3.5 %	5.6 %	4.0 %	3.5 %
3) I don't know	0.0 %	0.4 %	0.0 %	0.2 %
Q-10. How do you dispose of your garbage?				
1) Throw it outside	1.4 %	1.6 %	1.0 %	1.1 %
2) Bring it to a designated garbage collection area	6.3 %	14.8 %	14.0 %	13.4 %
3) Burry it somewhere around the house	47.6 %	78.0 %	75.5 %	72.1 %
4) Have garbage collector remove it by bicycle cart	45.7 %	5.6 %	9.5 %	13.4 %
Q-11. How often do you clean the area surrounding your home?				
1) Every day	86.1 %	96.4 %	86.0 %	89.2 %
2) 3 or 4 times a week	7.7 %	0.8 %	6.0 %	6.2 %
3) 1 or 2 times a week	4.9 %	2.8 %	6.0 %	4.3 %
4) Once a month	1.3 %	0.0 %	2.0 %	1.3 %
Q-12. If you have garbage bags, do you use them?				
1) Yes	83.3 %	61.2 %	73.5 %	72.7 %
2) No	16.7 %	38.8 %	26.5 %	27.3 %
Q-13. If you have to buy garbage bags, do you use them?				
1) Yes	63.7 %	54.4 %	55.8 %	59.4 %
2) No	36.3 %	45.6 %	44.2 %	40.6 %
Q-14. How much garbage do you have in a day at your house?				
1) 0 - 1 kg	13.3 %	13.8 %	27.2 %	22.8 %
2) 1 - 2 kg	26.6 %	39.2 %	22.5 %	31.6 %
3) 2 - 5 kg	38.5 %	28.4 %	29.2 %	33.2 %
4) 5 kg > Q	21.6 %	5.2 %	21.1 %	1.4 %

APPLICATION FOR JAPANESE GOVERNMENT GRANT AID FOR DAR ES SALAAM SOLID WASTE PROJECT IN THE UNITED REPUBLIC OF TANZANIA.

DAR ES SALAAM CITY COUNCIL

OCTOBER 1994

1. Background (Please describe in detail)

(1) Current Situation of the Sector

Dar es Salaam is facing the problems of many cities of the developing world with a high population growth rate. This is caused by a combination of the overall population growth of the country combined with urban migration from the rural areas.

The migration from rural to urban areas can be attributed to push and pull factors. Push factors in the rural area are shortage of agricultural lands, few job-opportunities and a low level of public services like education, health, etc. Pull factors are the imagined job opportunities, the expectations of social and infra-structural services and the lure of adventure in the city.

The population of the city has grown from 843,000 in 1978 to around 2.8 million in 1994 and is projected to reach more than 8 million by the year 2010. This rapid growth combined with a declining economy and large national debt has resulted in a gradual breakdown of many of the urban services including in particular the roads infrastructure and the solid waste collection service.

In general, Refuse Collection and Transportation face difficulty to treat city garbage all and to realize and maintain healthy and sanitary city-environment because of

a) Urban population growth of 7.4%.
b) Inclination of population to major cities.
c) Lack of budget.

The Dar es Salaam City Council have been having increasing difficulty in the collection and disposal of their solid wastes due primarily to a lack of adequate financial and physical resources. The annual budget for refuse collection by the City Council is only about 5% of what would be required to provide an adequate service and most of the City's trucks are out of commission and require substantial repairs and maintenance.

The deteriorating situation is creating a serious health hazard especially at the Kariaoo market which has no collection facilities at all.

(2) Problems to be solved in the Sector:

a) Improve public health and community living conditions by providing adequate solid waste collection services;

b) Minimize the cost of solid waste collection services by selecting cost-effective collection, transport, and disposal systems;

c) Optimize the potential for economies-of-scale and minimization of transport costs by implementation of strategically selected transfer and disposal sites;

d) Protect sensitive groundwater regimes through implementation of environmentally selected sites for sanitary landfill and following protective designs standards; and

e) Reduce clandestine dumping and increase community participation through improved public education and clean-up campaigns.

(3) Relations between the Sector and the Project

The Dar es Salaam City Council will be directly responsible for the project

2. Objectives and Outline of the Project

(1) Objectives of the Project

(i) Short-term objectives

To improve the Collection and Transport systems specially at high density population areas where it has narrow streets and garbage collection takes long time to remove which cause bad smell, flies and maybe disease so with the equipments cleaning the city will be more efficient and will be done in short time.

(ii) Medium and Long-term Objectives

As mentioned under 1.(1) and (2) above

(iii) Please fully describe the relations between the project and objectives, and how the project will contribute to the accomplishments of the objectives.

- Reinforcement of several equipments by newly stationing Compactors, Dump trucks, Refuse collectors, Bulldozers, Dozer shovels and loaders.

- The above several equipments will help in Refuse Collection and Transport to be more efficient and which will realize healthy and sanitary daily life of the citizens.

(2) Outline of the Project (Please give a full description of each facility and equipment and their detailed specifications)

As per attached list -A-

(3) Location Plan of each Facility and/or Equipment

Attached please find map on location of markets in Dar es Salaam which is mostly within the higher density city areas.

3. Benefit, Effect and Publicity of the Project

(1) Population that will benefit directly from the project
About 2,700,000 people (estimated population of Dar es Salaam city)

(2) Population that will benefit indirectly from the project
3,200,000 people

(3) Area that will benefit from the project
Approx. 900 km^2

(4) Economic and Social Effects of the Project
(Please describe in detail)

(i) Current situation:

SOLID WASTES IN DAR ES SALAAM

The present population of Dar es Salaam is estimated at around 2.8 million with an annual growth rate of 7.4% per annum; of this around 1.7 million are in the higher density city areas and the rest in low density peripheral areas.

WASTE QUANTITIES

It is estimated that the total wastes generated amount to around:-

Domestic	860 tons/day
Market	200 tons/day
Institutional	80 tons/day
Industrial	100 tons/day
Commercial	50 tons/day
Street cleanings	40 tons/day
Car wrecks	30 tons/day
Hazardous wastes	30 tons/day
Construction wastes	5 tons/day
Hospital wastes	25 tons/day
TOTAL	1,420 tons/day

It can be seen from the above that more than 80% of this total consists of domestic, market and commercial wastes and street

cleanings. A further 15% consists of industrial wastes (including hazardous wastes) which are disposed of by the industries and institutions themselves and the hospitals also dispose of their own wastes. As it is only anticipated that a proportion of the total wastes can be collected in the immediate future any collection system must concentrate on the domestic, market, and commercial wastes in the central area.

The Dar es Salaam City Council obtained 30 Japanese make tipping trucks and three "skip lift" container trucks under a grant in 1987. Around 20% of the value of the trucks was supplied as a stock of spare parts but these have been all used up.

In November 1991 ~~six~~ calabrese compactor trucks were supplied under an Italian aid programme. No spares were supplied with these trucks.

Three second hand bulldozers were purchased around 1987-1988 but these were operational for only about three months and the City Council now depends on the loan of a wheel loader for a landfill. As this loader is only available intermittently there are very serious problems at the disposal site resulting in constant friction between the City Council and local inhabitants and the closure of disposal sites which would be perfectly acceptable with controlled sanitary landfilling.

At most sites there is deliberate burning of the refuse every day.

The constant burning of the sites creates air pollution and bad smell.

Most trucks being old are currently off the road or requiring major overhaul which not economically viable.

The situation has now deteriorated to such an extent that the City Council are capable of at most collecting 5% of the total city refuse and no more than 20% of the city centre wastes and the Kariakoo market has no collection facilities at all. There are now heaps of uncollected wastes throughout the City Centre, and in particular in the Kariakoo area creating a serious health hazard and extremely unpleasant conditions for the inhabitants.

(ii) Expected Effect of the Project:

The above project will enable an emergency clean-up to be carried out in the city centre area and city markets and provide a regularised sustaining services.

The benefit especially takes effect in low-income people.

(5) Publicity (How many people are expected to notice the benefit or positive effect of the project implemented with Japan's grant aid when it is completed?)

The government of Japan has been assisting Tanzania in improvement of transport sector, especially the assistance in road infrastructures in Dar es Salaam through the grant aid projects.

Through the implementation of those projects, Tanzanian people acknowledge that the projects have greatly contributed not only to the economic recovery but also to the improvement of basic human needs in Dar es Salaam.

Since the project site is located in the urban area of Dar es Salaam where many people are focusing on everyday, the project will become the objective of the public attention. Hence the Japanese grant aid under this project will have the maximum effect of publicity in terms of visibility and people are expected to take notice of and benefit from this project.

4. Request to Other Donors

(1) Is there any request made to other donors for assistance closely related to this project

(i) Yes (ii) [No]

(2) If yes, please fill in below:

(i) Name of the donors;

(ii) Title and outline of the assistance;

(iii) Possibilities that the donor will extend the assistance requested;

(iv) In the case where other donors do not extend assistance, please describe in detail appropriateness and effectiveness of this project;

(v) In the where other donors extend loans, please describe the reason why Japan's Grant Aid is requested for the project.

ATTACHMENT - A
(LIST OF REQUIREMENT AND SPECIFICATION)

SR. NO.	NAME OF EQUIPMENT	QUANTITY	COST (CIF DAR ES SALAAM IN JAPANESE YEN)	SPECIFICATIONS
1	DUMP TRUCK FOR GARBAGE (7M3)	20 UNITS	¥ 98,000,000.-	ATTACHMENT D
2	DUMP TRUCK FOR GARBAGE (15M3)	10 UNITS	¥ 86,000,000.-	ATTACHMENT E
3	COMPACTOR TRUCK (9M3)	7 UNITS	¥ 62,300,000.-	ATTACHMENT F
4	WHEEL LOADER (55HP)	4 UNITS	¥ 37,480,000.-	FLYWHEEL HORSEPOWER 55HP. BACKET CAPACITY 1.0M3. OPERATING WEIGHT APPROX 4.6 TON ROPS CANOPY
5	WHEEL LOADER (85HP)	1 UNIT	¥ 14,020,000.-	FLYWHEEL HORSEPOWER 85HP. BACKET CAPACITY 1.7M3. OPERATING WEIGHT APPROX 8.8 TON ROPS CANOPY
6	BULLDOZER (124HP)	1 UNIT	¥ 18,000,000.-	FLYWHEEL HORSEPOWER 124HP. OPERATING WEIGHT APPROX 13.5 TON. STRAIGHT-TILT DOZER. ROPS CANOPY. WASTE DISPOSAL PACKAGE PER PER ATTACHMENT G
7	BULLDOZER (180HP)	1 UNIT	¥ 27,000,000.-	FLYWHEEL HORSEPOWER 180HP. OPERATING WEIGHT APPROX 18.4 TON STRAIGHT-TILT DOZER ROPS CANOPY. WASTE DISPOSAL PACKAGE PER ATTACHMENT G
8	4WD JEEP TYPE WAGON FOR PUBLICITY USE	1 UNIT	¥ 7,900,000.-	4x4 5 PERSONS,DIESEL ENGINE APPROX 3 LITER APPROX 90PS WHEEL BASE APPROX 2.7M EQUIPMENT FOR PUBLICITY WORKS SHALL BE EQUIPPED
9	4WD PICK-UP TRUCK (DOUBLE CABIN)	5 UNITS	¥ 14,500,000.-	4X4 5 PERSONS.DIESEL ENGINE 2.5 LITER APPROX 70PS WHEEL BASE APPROX 3M.PAY LOAD 1 TON
10	4WD PICK-UP TRUCK (SINGLE CABIN)	5 UNITS	¥ 14,750,000.-	4X4 3 PERSONS DIESEL ENGINE 2.5 LITER APPROX 70PS WHEEL BASE APPROX 3M. PAY LOAD 1 TON
	SPARE PARTS		¥ 37,995,000.-	
	TOTAL		¥417,945,000.-	

ATTACHMENT D

DUMP TRUCK FOR GARBAGE ($7M^3$)

DUMP TRUCK FOR GARBAGE (7m³)

This DUMP TRUCK can perform transporting GARBAGE and discharging with dumping body.

1. Truck specification

(a) Type:	Left-hand drive, forward or normal control type, 4x2 traction suitable for utilization in TANZANIA.		
(b) Dimensions:	Overall length	Less Than.	6400 mm
	Overall width	Less Than.	2300 mm
	Overall height	Less Than.	2500 mm
	Wheel base	Less Than.	3800 mm
(c) Min. turning radius		Less.than.	6500 mm
(d) Weight:	Gross vehicle weight	Not less than.	11000 kg
	Max. payload	Not less than.	3500 kg
(e) Max. speed:	Not less than.80 km/h		
(f) Gradeability tan θ:	Not less than.20.0%		
(g) Engine:	4 cycle Water-cooled diesel engine Max. output Approx. 170PS at 2800 rpm		
(h) Tire size:	Approx.8.25-20-14PR		
(i) Clutch:	Hydraulic transmission control dry single plate		
(j) Transmission:	5 forward and 1 reverse speed direct drive 2nd to 5th synchromesh		
(k) Axle:	Full floating type		
(l) Service brake:	Air-over hydraulic dual circuit system.		
(m) Parking brake:	Mechanical, expanded type at rear of transmission.		
(n) Steering:	Recirculating ball nut type		
(o) Suspension:	Semi-elliptic laminated leaf springs		
(p) Fuel tank:	Not less than 100 litters		
(q) Batteries:	12 Volt X 2, 65 Ah		
(r) Accessories:	Floor mat, standard tool sets, jack and spare tyre.		

2. Body specification

(a) Body volume:	Approx. 7.0 cu.m	
	All steel welded construction .	
(b) Body thickness	Floor panel	Approx. 4.5mm
	Side panel	Approx. 3.2mm
	Front panel	Approx. 3.2mm
	Rear gate	Approx. 3.2mm
(c) Dump angle	Not less than . 46 deg.	
(d) Dump speed,rising	20 ~ 30 sec.	
(e) Dump speed,lowing	20 ~ 30 sec.	
(f) Rear gate	Top hinge and automatically bottom side is opened and closed when it's dumping.	

ATTACHMENT E

DUMP TUCK FOR GARBAGE (15M^3)

DUMP TRUCK FOR GARBAGE 15m³

This DUMP TRUCK can perform transporting GARBAGE and discharging with dumping body.

1. Truck specification

(a) Type: Left-hand drive, forward or normal control type, 6x4 traction suitable for utilization in TANZANIA.

(b) Dimensions:	Overall length	Less Than.	7600 mm
	Overall width	Less Than.	2500 mm
	Overall height	Less Than.	3500 mm
	Wheel base	Less Than.	4900 mm
(c) Min. turning radius		Less than.	13000 mm
(d) Weight:	Gross vehicle weight	Not less than.	14000 kg
	Max. payload	Not less than.	7500 kg
(e) Max. speed:	Not less than. 80 km/h		
(f) Gradeability tan θ:	Not less than. 20.0%		
(g) Engine:	4 cycle Water-cooled diesel engine Max. output Approx. 186PS at 3000 rpm		
(h) Tire size:	Approx. 10.00-20-14PR		
(i) Clutch:	Hydraulic transmission control dry single plate		
(j) Transmission:	6 forward and 1 reverse speed direct drive 2nd to 6th synchromesh		
(k) Axle:	Full floating type		
(l) Service brake:	Full air dual circuit type.		
(m) Parking brake:	Full air brake model.		
(n) Steering:	Recirculating ball nut type		
(o) Suspension:	Semi-elliptic laminated leaf springs		
(p) Fuel tank:	Not less than 200 litters		
(q) Batteries:	12 Volt X 2,150 Ah		
(r) Accessories:	Floor mat, standard tool sets, jack and spare tyre.		

2. Body specification

(a) Body volume:	Approx. 15 cu.m		
(b) Body thickness	All steel welded construction .		
	Floor panel	Approx.	4.5mm
	Side panel	Approx.	3.2mm
	Front panel	Approx.	3.2mm
	Rear gate	Approx.	3.2mm
(c) Dump angle	Not less than . 45 deg.		
(d) Dump speed, rising	20 ~ 30 sec.		
(e) Dump speed, lowing	20 ~ 30 sec.		
(f) Rear gate	Top hinge and automatically bottom side is opened and closed when it's dumping.		

ATTACHMENT F

COMPACTOR TRUCK (9M³)

COMPACTOR TRUCK (9m³)

This REAR LOADING COMPACTOR TRUCK can perform loading refuse from rear hopper to coopress and discharging with ejection plate.

1. Truck specification

(a)	Type: Left-hand drive, forward or normal control type, 4x2 traction suitable for utilization in TANZANIA.		
(b)	Dimensions:	Overall length	Less than 7100 mm
		Overall width	Less than 2200 mm
		Overall height	Less than 3100 mm
		Wheel base	Less than 3700 mm
(c)	Min. turning radius		Less than 6500 mm
(d)	Weight:	Gross vehicle weight	Not less than 11000 kg
		Max. payload	Not less than 3500 kg
(e)	Max. speed	Not less than 80 km/h	
(f)	Gradeability tan θ	Not less than 20.0%	
(g)	Engine	Water-cooled, 4-cycle, diesel engine, Max. output not less than 170PS at 2800rpm	
(h)	Tire size	Not less than 8.25-20-14PR	
(i)	Clutch	Dry single plate, Hydraulic or manual transmission control	
(j)	Transmission	5 forward and 1-reverse speed direct drive synchromesh 2nd-5th	
(k)	Axle	Full-floating type	
(l)	Service brake	Air-over hydraulic dual circuit.	
(m)	Parking brake	Mechanical, expanded type at rear of transmission,	
(n)	Steering	Recirculating Ball type	
(o)	Suspension	Semi-elliptic laminated leaf springs	
(p)	Fuel tank	Not less than 100 litors	
(q)	Batteries	12 Volt x 2, 65Ah	
(r)	Accessories	Floor mat, standard tool sets, jack and spare tyre.	

2. Body specification

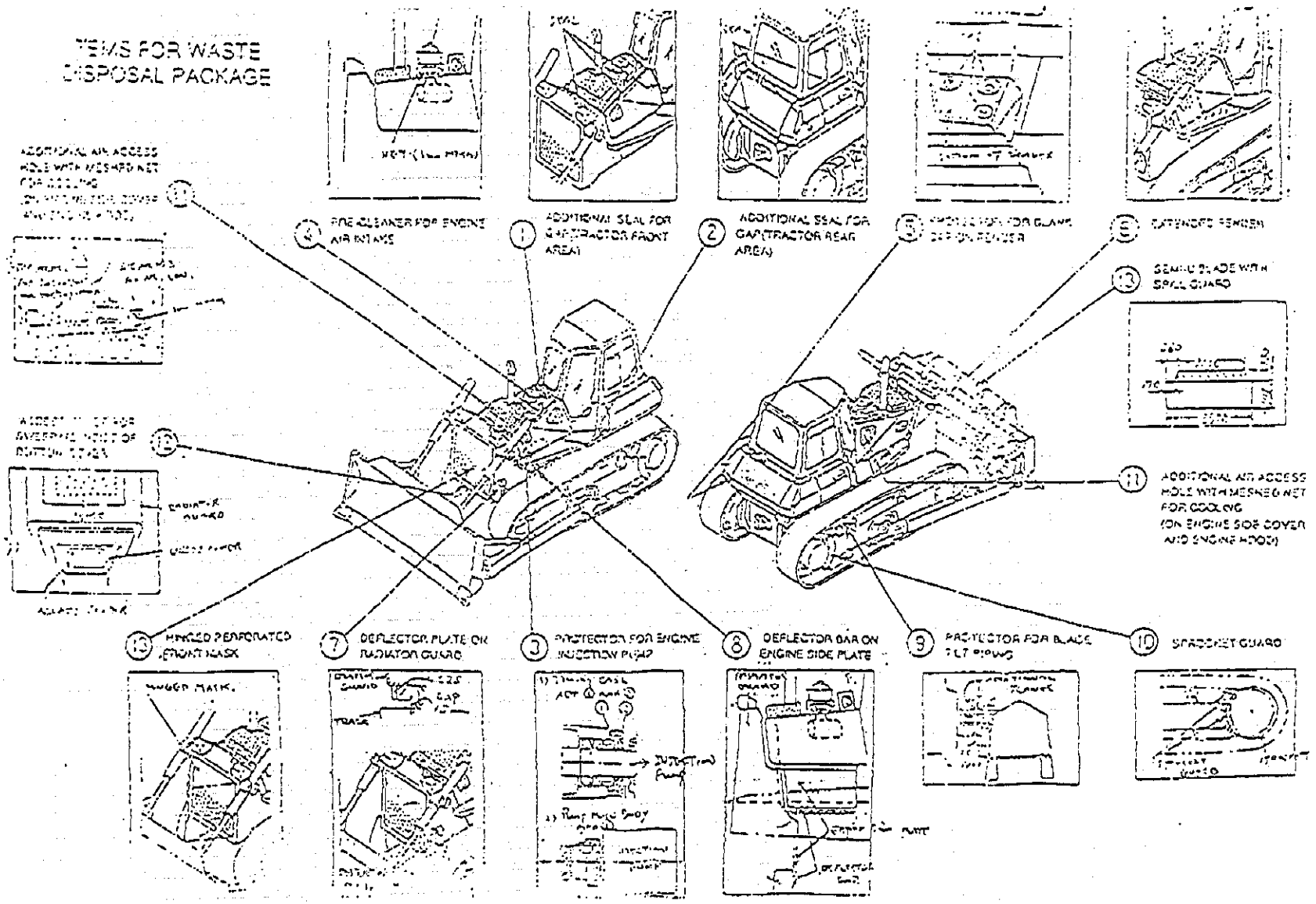
(a)	Body volume	Not less than 9 cu.m(incl. hopper) Closed type, all steel welded construction with ejection plate and link type hydraulic ejection device.	
(b)	Hopper volume	Not less than 0.7 cu.m	
(c)	Body thickness	Floor panel	Approx. 3.2 mm
		Side panel	Approx. 2.3 mm
		Roof panel	Approx. 2.3 mm
		Ejection panel	Approx. 2.3 mm
(d)	Hopper thickness	Side panel	Approx. 4.5 mm
		Floor panel	Approx. 6.0 mm
		Press panel	Approx. 4.5 mm

(e)	Loading time	Approx. 10~20 sec./cycle
(f)	Discharging time	Approx. 45~70 sec.
(g)	Hopper lock device	Automatic lock system locking the hopper with the body should be provided for safety when the hopper is down.
(h)	Control method	Mechanical hydraulic type, lever control

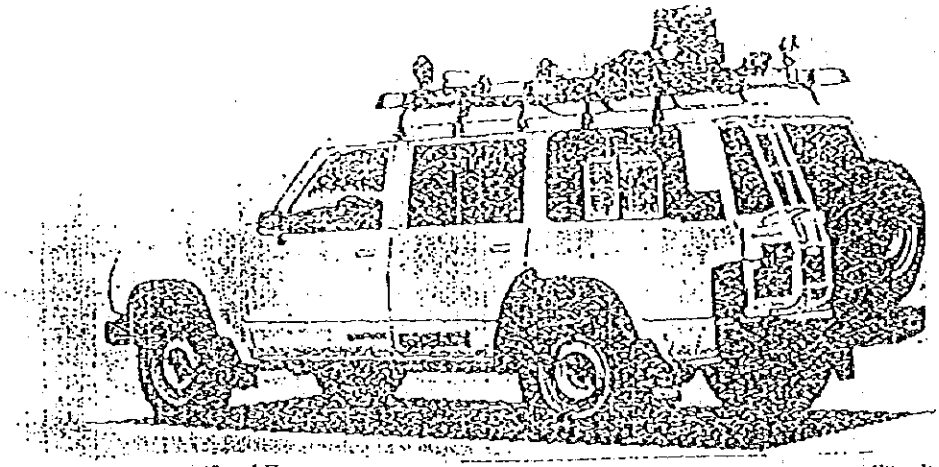
ATTACHMENT G

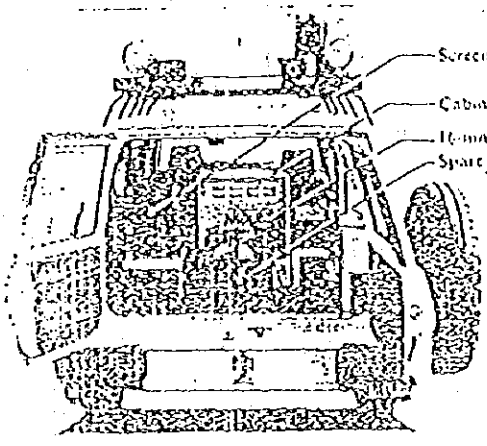
BULLDOZER 124HP

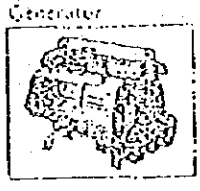
ITEMS FOR WASTE DISPOSAL PACKAGE

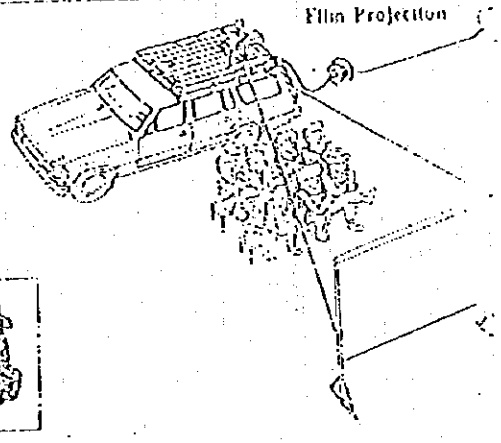


ATTACHMENT H









Standard Equipment

1) 16-mm projector	1	ELMO 16-CL (MKII)
2) Screen	1	ELMO EH-6 (2.4 m × 1.8 m)
3) Projector stand	1	
4) Amplifier	1	20 W, with a microphone, for public address
5) Generator	1	220 V, 800 W, 50 Hz
6) Cord reel drum	1	30 m
7) Fire extinguisher	1	ABC type, 1 kg
8) Spare parts set	1	projector lamp, fuse, reel
9) Roof rack	1	with a handle
10) Ladder	1	
11) Searchlights	2	on the roof rack
12) Speakers	2	10 W each, on the roof rack for public address
13) Cabinet	1	
14) Flashlights	2	
Dust cleaner	1	

Optional Equipment

1) 35-mm slide projector	1	[illegible]
2) Overhead projector (OHP)	1	[illegible]
3) Slide cradle	1	
4) External speaker	1	[illegible]
5) Additional searchlights	2	[illegible]
6) Spare gasoline tank	1	[illegible]
7) Amplifier	1	[illegible] with a microphone and cassette player, for public address
8) Desk	1	[illegible]
9) Video deck	1	[illegible]
10) TV monitor	1	Video cassette Standard only
11) Screen	1	ELMO EH-7 (3.05 m × 2.05 m) (instead of standard EH)

附属資料 2．Scope of Work

SCOPE OF WORK

FOR

THE STUDY

ON

THE SOLID WASTE MANAGEMENT

FOR

DAR ES SALAAM CITY

IN

THE UNITED REPUBLIC OF TANZANIA

AGREED UPON BETWEEN

THE DAR ES SALAAM CITY COUNCIL

AND

JAPAN INTERNATIONAL COOPERATION AGENCY

Dar es Salaam, October 13, 1995

Brigadier General H. A H. NGWILIZI
City Director
The Dar es Salaam City Council

Mr. ALFRED E. CHALE
Acting Principal Secretary
Office of the Prime Minister and First Vice President

Mr. HIROKI HASHIZUME
Leader, Preparatory Study Team,
Japan International Cooperation
Agency

Mr. M. T. KIBWANA
Commissioner for External Finance
and Technical Cooperation
Ministry of Finance

I. INTRODUCTION

In response to the request of the Government of The United Republic of Tanzania (hereinafter referred to as "Tanzania"), the Government of Japan has decided to conduct a Study on the Solid Waste Management for Dar es Salaam City in Tanzania (hereinafter referred to as "the Study") in accordance with the relevant laws and regulations in force in Japan.

Accordingly, the Japan International Cooperation Agency (hereinafter referred to as "JICA"), the official agency responsible for the implementation of the technical cooperation programs of the Government of Japan, will undertake the Study in close cooperation with authorities concerned of the Government of Tanzania.

The present document sets forth the Scope of Work with regard to the Study.

II. OBJECTIVES OF THE STUDY

The objectives of the Study are:

1. to formulate a master plan for the improvement of the solid waste management (hereinafter referred to as "SWM") of Dar es Salaam City,

2. to conduct a feasibility study on priority project(s) to be selected from the master plan, and

3. to transfer technologies for solid waste management to counterpart personnel in the course of the study.

III. STUDY AREA

The study shall cover the area under the authority of the local council of Dar es Salaam City.

IV. SCOPE OF THE STUDY

In order to achieve the above mentioned objectives, the Study shall cover the following:

Phase I: Basic Study

1. Collection and review of existing data, information and relevant studies

(1) data and information on physical conditions such as climatic, topographic, meteorological , hydrological, soil and geological, geographical conditions

(2) social and economic conditions and relevant statistics

(3) present environmental conditions such as water pollution, solid wastes, noise, vibration, subsidence, air pollution, and so on,

(4) city planning, urban development plans and land use plan related to the Study

(5) legislation and regulations concerned with environmental protection and sanitation

(6) financial conditions of the Dar es Salaam City and the Government of Tanzania

(7) national and municipal policies and development plans related to SWM

(8) others

2. Measurement of environmental quality (rainy season and dry season)
   (1) natural conditions such as topographic, surface water, groundwater, fauna, flora, landscape, and so on

   (2) environmental pollution such as water pollution, soil pollution, offensive odor, air pollution, and so on

3. Evaluation of present environmental condition

Phase II: Master Plan

1. Collection and review of existing data and information of the institutions of Dar es Salaam City on:
   (1) legislation on SWM

   (2) institutional and managerial aspects on SWM

   (3) present condition of SWM

   (4) on-going projects related to SWM

   (5) conditions and environmental aspects of SWM

(6) Others

2. Field survey
   (1) present condition of SWM system

   (2) amount of solid waste and its composition

   (3) geology, water quality, land use on existing dumping area and future landfill sites

   (4) public awareness on SWM

   (5) environmental survey

3. Analysis of collected data and information; identification and evaluation of issues on SWM

4. Forecast of socio-economic changes and future demand for SWM

5. Formulation of a master plan of SWM

   (1) Identification and Confirmation of planning framework
      a) Target year
      b) Planning area
      c) Amount and composition of solid waste
      d) System components

   (2) Setting goals and strategies for the improvement of SWM toward the target year

   (3) Comparison of alternatives for system components

   (4) Selection of the best alternative

   (5) Planning for technical aspects

   (6) Planning for operation and maintenance

   (7) Planning for institutional, organizational and managerial aspects

   (8) Cost estimation

(9) Financial plan

(10) Evaluation of the master plan
a) financial aspects
b) socio-economic aspects
c) environmental aspects including initial environmental examination

(11) Implementation plan

(12) Selection of priority project(s)

Phase III: Feasibility Study

1. Feasibility study on the priority project
(1) Confirmation of planning framework
a) target year
b) planning area
c) service level
d) components of Environmental Impact Assessment

(2) Supplemental study
a) field survey for further planning

(3) Public relations for SWM

(4) Preliminary design of facilities and equipment

(5) Operation and maintenance plan

(6) Planning for institutional and organizational development

(7) Planning for public education program

(8) Cost estimation

(9) Financial plan

(10) Project evaluation
a) financial evaluation
b) socio-economic evaluation
c) environmental impact assessment

(11) Implementation plan

V. STUDY SCHEDULE

The Study will be carried out in accordance with the tentative schedule attached in Annex 1.

VI. REPORTS

JICA will prepare and submit the following reports in English to the Government of Tanzania.

1.Inception Report:
Twenty (20) copies at the commencement of the first work in Tanzania.

2.Progress Report (1):
Twenty (20) copies at the end of the first work in Tanzania.

3.Progress Report (2):
Twenty (20) copies at the end of the second work in Tanzania.

4.Interim Report:
Twenty (20) copies at the beginning of the third work in Tanzania.

5.Progress Report (3):
Twenty (20) copies at the end of the third work in Tanzania.

6.Draft Final Report:
Twenty (20) copies at the beginning of the fourth work in Tanzania.The Government of Tanzania will submit its comments to JICA within thirty (30) days after receipt of the Draft Final Report.

7.Final Report
Forty (40) copies within thirty (30) days after JICA received of comments on the Draft Final Report.

VII. UNDERTAKINGS OF THE GOVERNMENT OF TANZANIA

1.To facilitate smooth conduct of the Study, the Government of Tanzania shall take necessary measures as follows:
(1) to secure safety of the Japanese Study Team (hereinafter referred to as "the

Team")

(2) to permit the members of the Team to enter, leave and sojourn in Tanzania for the duration of their assignment therein, and exempt them from foreign registration requirements and consular fees.

(3) to exempt the members of the Team from taxes, duties, fees and other charges on equipment, machinery and other materials brought into and out of Tanzania for the conduct of the Study.

(4) to exempt the members of the Team from income tax and charges of any kind imposed on or in connection with any emoluments or allowances paid to the members of the Team for their services in connection with the implementation of the Study.

(5) to provide necessary facilities to the Team for remittance as well as utilization of the funds introduced into Tanzania from Japan in connection with the implementation of the Study.

(6) to secure permission for entry into private properties or restricted areas for the implementation of the Study.

(7) to secure permission for the Team to take all data and documents (including photographs and maps) related to the Study out of Tanzania to Japan, and

(8) to provide medical services as needed. Its expenses will be chargeable on members of the Team.

2.The Government of Tanzania shall bear claims, if any arises, against the members of the Team resulting from, occurring in the course of, or otherwise connected with, the discharge of their duties in the implementation of the Study, except when such claims arise from gross negligence or willful misconduct on the part of the members of the Team.

3.Dar es Salaam City shall act as the counterpart agencies to the Team and also as coordinating bodies in relation with other governmental and non-governmental organizations concerned for the smooth implementation of the Study.

4.Dar es Salaam City shall, at its own expense, provide the Team with the following, in cooperation with other organizations concerned:
(1) available data and information related to the Study,

(2) counterpart personnel,
(3) suitable office space with necessary equipment in Dar es Salaam City,
(4) drivers for the vehicles.
(5) credentials or identification cards.

VIII. UNDERTAKINGS OF JICA

For the implementation of the Study, JICA shall take the following measures:

1. to dispatch, as its own expense, the Study Team to Tanzania, and

2. to pursue technology transfer to the Tanzanian counterpart personnel in the course of the Study.

IX. CONSULTATION

JICA and Dar es Salaam City shall consult with each other in respect of any matter that may arise from or in connection with the Study.

ANNEX 1

The Study
on
The Solid Waste Management
for
Dar es Salaam City in the Republic of Tanzania

TENTATIVE SCHEDULE

NOTE IC/R : Inception Report
P/R : Progress Report
IT/R : Interim Report
DF/R : Draft Final Report
F/R : Final Report

附属資料３．Minutes of Meeting

MINUTES OF MEETING

FOR

THE STUDY

ON

THE SOLID WASTE MANAGEMENT

FOR

DAR ES SALAAM CITY

IN

THE UNITED REPUBLIC OF TANZANIA

AGREED UPON BETWEEN

THE DAR ES SALAAM CITY COUNCIL

AND

JAPAN INTERNATIONAL COOPERATION AGENCY

Dar es Salaam, October 13, 1995

Brigadier General H. A H. NGWILIZI
City Director
The Dar es Salaam City Council

Mr. HIROKI HASHIZUME
Leader, Preparatory Study Team,
Japan International Cooperation
Agency

Based on the formal request of the Government of the United Republic of Tanzania, the Government of Japan, through the Japan International Cooperation Agency (JICA), has agreed to conduct a Study on the Solid Waste Management for Dar es Salaam City in the United Republic of Tanzania (hereinafter referred to as "the Study").

The JICA Preparatory Study Team (hereinafter referred to as "the Team"), headed by Mr. Hiroki Hashizume, visited Tanzania from 5th to 13th of October, 1995, where they held a series of meetings with the Prime Minister's Office, Ministry of Finance, Dar es Salaam City Council and other authorities concerned of the Government of the United Republic of Tanzania. The list of participants is shown in the Appendix I.

During the visit, both sides agreed to the Scope of Work to be undertaken by the Prime Minister's Office, Ministry of Finance, Dar es Salaam City Council and JICA for successful execution of the Study. In addition to the Scope of Work, the Team and the Tanzanian representatives confirmed the following:

1) The title of the Study will be "The Study on the Solid Waste Management for Dar es Salaam City in the United Republic of Tanzania".

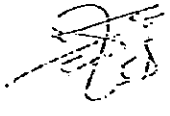
2) The target year of the Study will be 2005.

3) The area of the Study will be thirty-nine (39) wards under the jurisdiction of the Dar es Salaam City Council as shown in the Appendix II.

4) Types of solid waste to be studied will be limited to municipal solid waste: household waste, market waste, office waste, institutional waste and street sweeping waste. As far as industrial waste and hospital waste are concerned, Tanzanian side requested that these be included in the Study and that this request be forwarded to JICA headquarters. The Team stated that policy suggestion regarding industrial waste management should be included in the Master Plan study to meet this Tanzanian side's request.

5) The Tanzanian side will provide suitable office space with air-conditioners, furniture, electricity, light, telephone and access to a facsimile machine for the team of the Study. International telecommunication fees in the office, however, will be paid by the team of the Study. The Tanzanian side requested that the team of the Study bring a photocopy machine, a facsimile machine and a portable generator. The Team will convey the request to the JICA headquarters.

6) The Tanzanian side requested that JICA supply a truck scale for the conduct of the Study. The Team will convey the request to the JICA headquarters. The Tanzanian side will be responsible for installing and operating the truck scale.



4

7) The Tanzanian side requested that JICA provide equipment, such as a photocopy machine and a truck scale, which are used for the Study for the Tanzanian side after completion of the Study. The Team will convey the request to the JICA headquarters.

8) The Tanzanian side requested that costs for land survey, topographic survey and solid waste quantity/quality survey be borne by JICA. The Team will convey the request to the JICA headquarters.

9) The Tanzanian side will organize a "Steering Committee" for the Study, comprising representatives from the Prime Minister's Office, Ministry of Finance, Ministry of Lands, Housing and Urban Development, Ministry of Tourism, Natural Resources and Environment, Dar es Salaam City Council, National Environmental Management Council and other relevant organizations.

10) Dar es Salaam City Council will organize a "Counterpart Team" which will cooperate with the team of the Study. The Counterpart Team will consist of the City Council's professional staff who are in charge of various aspects of solid waste management, such as planning, collection, transportation, landfilling, financing, contracting and environmental management in the city. Consequently, each member of the team of the Study will work together with a respective counterpart to transfer technologies from the Japanese side to the Tanzanian side and achieve objectives of the Study effectively.

11) The Tanzanian side requested that pollution abatement and environmental conservation should be considered in the Study.

12) When landfilling is to be studied in the Feasibility Study, the landfill site shall be selected in the course of the Master Plan study in close discussion between the team of the Study and Dar es Salaam City Council among the places proposed by the City Council.

13) Without prior acquisition of the landfill site or necessary procedures for the right of way by the Dar es Salaam City Council, such projects as landfilling and landfilling related projects will not be priority projects to be studied in the Feasibility Study.

14) In order to smoothly implement the Study, the Dar es Salaam City Council will explain what is included in this Minutes of Meeting to the Prime Minister's Office, and if necessary, other related organizations.

Appendix I

LIST OF ATTENDANTS

Office of the Prime Minister and First Vice President

Mr. Alfred. E. Chale	Acting Principal Secretary
Mr. P. Baruti	Acting Commissioner of Local Government

Ministry of Finance

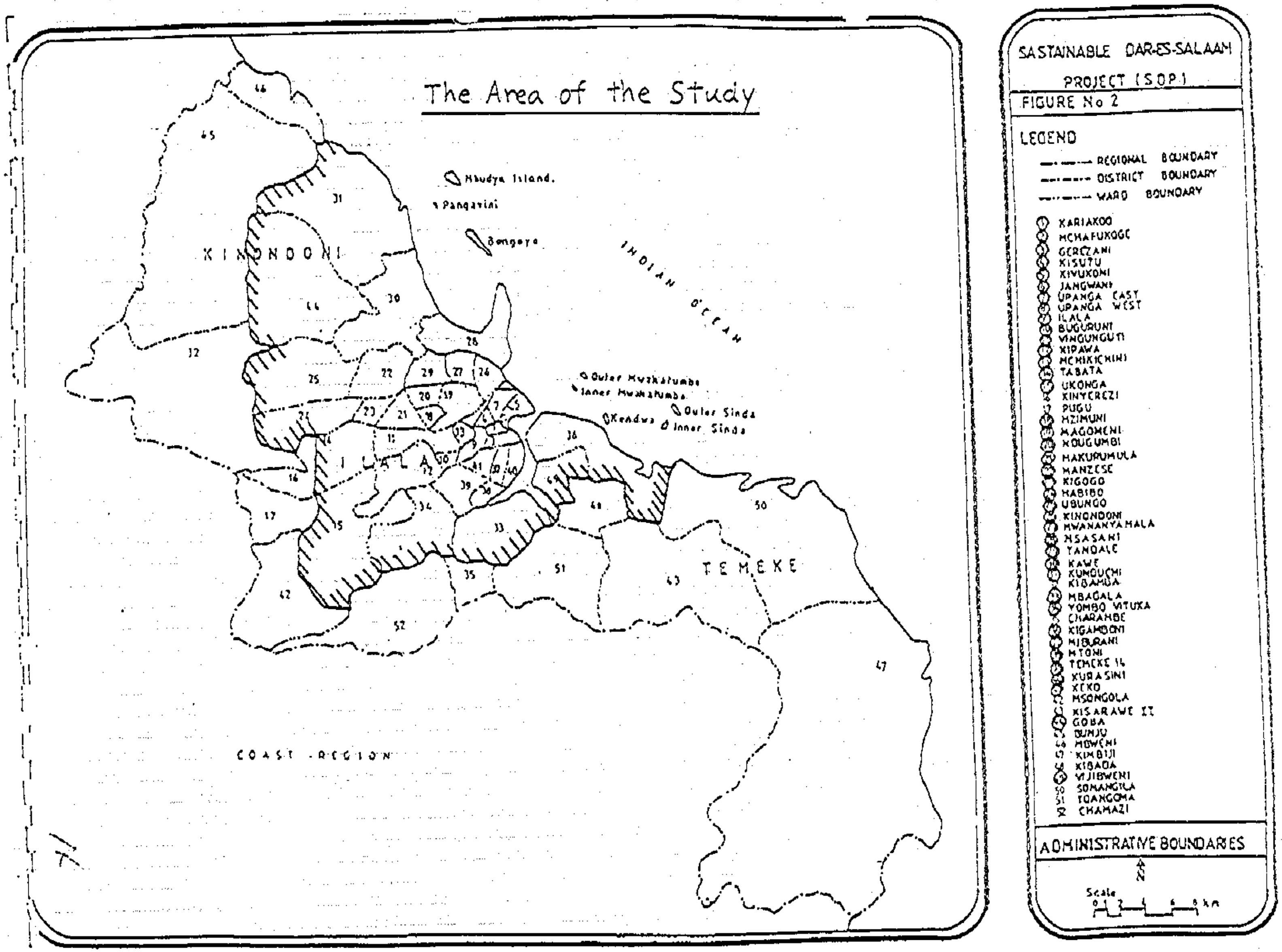
Mr. M. T. Kibwana	Commissioner for External Finance and Technical Cooperation
Mr. Paul A. Mwafongo	Finance Officer, External Finance and Technical Cooperation

Dar es Salaam City Council

Brigadier General H. A. H. Ngwilizi	City Director
Dr. Samuel M. Biseko	City Medical Officer
Mr. Daudi I. Daudi	City Planner
Mr. A. R. M. Gamba	City Engineer
Mr. L. A. Lwabutaza	Acting City Health Officer
Mr. N. C. X. Mwihava	Acting Coordinator of Solid Waste Management
Ms. Anna A. Mwavahehe	Manpower Management Officer
Mr. Thomas A. Lyimo	Sanitary Landfill Manager
Mr. K. Nkwabi	Officer, Health Department
Mrs. P. Lerise	SDP, Member of Solid Waste Management
Mr. Masanori Takeishi	JICA Expert

JICA Preparatory Study Team

Mr. Hiroki Hashizume	Director, Japan Waste Research Foundation
Mr. Satoshi Kimura	Staff, Second Development Study Division, Social Development Study Department, JICA
Mr. Tetsuro Fujituka	Deputy Director, Strategic Environmental Division, Environment Agency, Prime Minister's Office
Mr. Shigeaki Katsuhata	Ostrand Corporation
Mr. Masakazu Maeda	CTI Engineering Co., Ltd.


The Area of the Study
Mbudya Island.
Pangavini
Bongoyo
INDIAN OCEAN
Outer Mwakatumbe
Inner Mwakatumbe
Outer Sinda
Inner Sinda
Kendwa
KINONDONI
ILALA
TEMEKE
COAST REGION
SASTAINABLE DAR-ES-SALAAM
PROJECT (SDP)
FIGURE No 2
LEGEND
REGIONAL BOUNDARY
DISTRICT BOUNDARY
WARD BOUNDARY
KARIAKOO
MCHAFUKOGE
GEREZANI
KISUTU
KIVUKONI
JANGWANI
UPANGA EAST
UPANGA WEST
ILALA
BUGURUNI
VINGUNGUTI
KIPAWA
MCHIKICHINI
TABATA
UKONGA
KINYEREZI
PUGU
MZIMUNI
MAGOMENI
NDUGUMBI
MAKURUMULA
MANZESE
KIGOGO
MABIBO
UBUNGO
KINONDONI
MWANANYAMALA
MSASANI
TANDALE
KAWE
KUNDUCHI
KIBAMBA
MBAGALA
YOMBO VITUKA
CHARAMBE
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MIBURANI
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附属資料4．質　問　票

QUESTIONNAIRE

FOR

THE STUDY ON THE SOLID WASTE MANAGEMENT
FOR
DAR ES SALAAM CITY
IN
THE UNITED REPUBLIC OF TANZANIA

submitted to:
Office of the Prime Minister and First Vice President
and
Dar es Salaam City Council

submitted by:
Preparatory Study Team
Japan International Cooperation Agency

October 1995

QUESTIONNAIRE (I)

(General Aspects)

In order to understand sufficiently the background and state of solid waste management in Dar es Salaam City, the Japan International Cooperation Agency (JICA) Preparatory Study Team would appreciate very much if you could prepare the following data and information before our arrival.

Please provide the following data and information:

1. Natural Conditions of Dar es Salaam City Area

- Topographical map
- Geological map
- River/canal map
- Ground subsidence records, if any
- Aerial photos
- Hydrological data
- Climate data

2. Socio-Economic Conditions of Dar es Salaam City Area

- Population
  (present trends, population growth, situation of migration and the future projection)
- Population density map in the study area
- Infrastructure (present and future water supply/drainage systems, road condition, etc.)
- Main fuel people depends on
- Electric power supply condition
- Land use map (present and future maps including descriptions of plan)
- City planning map
- Road map
- Administrative district division map in the study area
  (including population of each district)
- Race and Religion
- Major industries (industrial classification, number of workers of each industry, etc.)
- NGO: Non Governmental Organization
  (number of members, activities of each groups, etc.)

3. Regional/Development Plans, Programs, and Projects

- National Development Plan
- Long and middle term regional/development plans of the study area
  e.g. Strategic Integrated Infrastructure Development Programs (SIIDP)
- Implementing/planned regional/development projects in the study area
  e.g. Urban Sector Engineering Project (USEP)
- Implementing/planned ministry and agency

4. Organization

- Organization chart of the Office of the Prime Minister and First Vice President and the Dar es Salaam City Council
- Duties and authorities of the above offices
- Budget and budgetary system
- Function of each section
- Number of personnel of the section
- Name of persons in charge
- Number of staff (professional and the other)

5. Related Information

- Procurement of major construction materials and equipment
  source country
  list of imported materials
- Related industrial standards, if any
- Design standards, if any

QUESTIONNAIRE (II)

(Environmental Aspects)

In order to understand sufficiently the background and state of solid waste management in Dar es Salaam City, the Japan International Cooperation Agency (JICA) Preparatory Study Team would appreciate very much if you could prepare the following data and information before our arrival.

1. LEGISLATION AND REGULATIONS

a) Do you have law/guidelines on environmental impact assessment?

Please attach the detail, e.g. responsible ministry or agency, procedure, if any.

b) Do you have environmental quality standards?

Please attach the detail, e.g. values, penalties, if any.

c) Do you have law/guidelines on solid waste management?

Please attach the detail, e.g. responsible ministry or agency, procedure, if any.

2. INTERNATIONAL CONVENTIONS ON ENVIRONMENTAL CONSERVATION

Have you affiliated to bilateral or multilateral conventions concerning environmental conservation, e.g. Ramsar Convention, Washington Convention ?

Give the names of the conventions affiliated and the date of affiliation, if any.

3. PRESENT SITUATION OF THE PROPOSED PROJECT SITE

Please provide the following data:

a) Socio-Economic Environment

- Number of people to be resettled and plan of resettlement or compensation
- Experience of resettlement in previous projects, if any
- Use of spring / river / lake / ground waters, i.e. domestic, industrial, commercial and agricultural use of water
- Number and distribution of schools, hospitals, and religious facilities
- History of epidemic disease

b) Natural Environment

- Vegetation map
- Location of environmentally vulnerable areas
- Species of valuable animals and plants in the area, if any
- History of natural disaster, such as landslide, high tide, earthquake, and flood
- Location of particular areas officially protected such as national parks and natural parks
- Distribution of important landscape or scenery for tourism or religion

c) Environmental Pollution

- Present air quality
- Regulation of emission gas
- Regulation of water quality
- Present water quality (raw, treated, and drainage water)
- Regulation of effluent
- Present condition of soil contamination
- Regulation for prevention of soil contamination
- Present condition of noise and vibration
- Regulation for prevention of noise and vibration
- Plan of measuring sites for environmental quality

4. SOLID WASTE MANAGEMENT SYSTEM

Please provide the following data:

a) Generation and Storage of Solid Wastes

- Generation of solid wastes (kg/capita/day, ton/year)
- Types of solid wastes (residential, commercial, industrial, medical wastes, etc.)
- Composition of solid wastes (garbage, papers, plastics, cans, bottles, etc.)
- Present situation of self disposal (composting, onsite burning)
- Present situation of source separation
- Activities of regional groups or organizations

b) Collection and Transportation of Solid Wastes

- Service population and service area (ha)
- Collection method of household wastes
  (combined or separate, by own staff or contracts)
- Collection method of medical wastes (separation, by own staff or contracts)
- Collection method of commercial wastes
  (separation, by own staff or contracts)
- Collection method of other industrial wastes
  (separation, by own staff or contracts)
- Collection frequency (days/week, times/day)
- Cost of collection and transportation
- Collection charge (an amount and collection method of the fee)
- Collection container (bags or bins)
- Collection vehicles
  (number and condition of collection vehicles, tractors, compactors, etc.)
- Work shop for maintenance (size and capacity, present situation of operation)
- Illegal dumping (quality and quantity)
- Road sweeping (amount, sweeping area)
- Transfer station (outline of the facility, size and capacity)
- Travel frequency (collection area to treatment facility of disposal site)

c) Treatment and Disposal of Solid Wastes

- Intermediate treatment (method, location of facilities, surroundings, etc.)
- Inventory and capacity of the existing dumping sites
  (location, area, surroundings, etc.)
- Construction and running cost of each dumping site
- Inventory of prospective landfill sites for future use
- History and present situation of public acceptance of the facilities
- Disposal method
  (sanitary landfill or open dumping, soil coverage method, lining works)
- Soil characteristics of final disposal site
- Leachate treatment and influence by leachate

d) Recycling

- Recycled materials like papers, iron, aluminum and their prices
- Resource recovery system (private institutions, organizations)
- Scavengers at final disposal sites

e) Present Status of Solid Wastes Management

- Organization and staffing of Dar es Salaam City for solid waste management
  (including organization chart, duties and authorities, number of staff, person in charge)
- Regulations/Ordinance and other rules for waste management
  (including definition of waste and classification)
- Financial situations of Dar es Salaam City Council
  (expenditures in 1994 and budget for 1995)
- Details of environmental education
  (for citizens/public staff members, clean-up campaigns, etc.)
- Information management system
  (collection, management and disclosure method of data/information)
- Privatization policy
- Present situation and capacity of private sectors for waste treatment and management
- Local consultants and institutes for study of solid waste management

附属資料５．ローカルコンサルタント等一覧

ローカルコンサルタント等一覧

土木・建築関係の設計コンサルタントは、いくつか市内にある（MD Consultant, QS Consultant等）様である。この中からごみ量・ごみ質調査や住民に対するアンケート調査、また環境調査・環境影響評価といったいわゆるソフト系業務の経験と能力という観点より、発注者である国家環境管理協議会（National Environmental Management Council）や施工業者からのヒアリング結果から、これらの業務の実施能力が比較的高いと思われる次の３機関について面接調査を行った。次頁以降に各機関のプロフィールをまとめる。

Norconsult (Tanzania) Limited
Ardhi Institute
The Centre for Energy, Environment, Science and Technology (CEEST)

他に以下の機関も環境調査の経験を有している様であるが、各々得意分野が限られており、環境調査全般を網羅して実施するのは難しいと思われる。

University of Dar es Salaam
- Department of Chemical & Process Engineering
- Department of Civil Engineering
- Department of Geology
- Department of Chemistry
- Department of Physics

Tanzania Industrial Research and Development (TIRD)
Tanzania Bureau of Standards (TBS)
Environmental Association of Tanzania (ENATA)

Norconsult (Tanzania) Limited

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【担当者等】

Mr. Francis Mponjoli Kifukwe	Managing Director
Mr. Stuart Stevenson	Senior Environmental Adviser

【概要】

本社をノルウェーにおき、１９５６年に創立した国際的なコンサルタント会社である。アフリカを中心として世界１６ヶ国に現地法人を設立している。タンザニアでの活動は２５年を越えており、現地には昨年４月に事務所を開設した。現在の現地職員（Professional staff）は４名で、内２名がイギリス人、２名がタンザニア人という構成になっている。

【ごみ量・ごみ質等の調査実績と能力】

現地職員はごみ量・ごみ質等の調査の経験は無いとの事である。しかしながら、住民意識調査等のアンケート調査の経験は豊富でノウハウを持っている様である。ごみ量・ごみ質等の調査を行うとすれば、他の機関へ再委託することになると思われる。

【環境調査・環境影響評価等の実績と能力】

現地職員は環境調査や環境影響評価等の経験は持っているとの事である。また、本社ベースではタンザニアを始めとして、ケニヤ、ザンビア、スーダンといったアフリカ諸国の道路プロジェクト及び発電プロジェクトにおける環境調査や環境影響評価の実績を有しており、本社からの支援を得てこれらの実施が十分に可能と判断される。ただし、環境調査に要する水質や大気の測定機器、試験室等は持っていないため、この部分は他の機関へ再委託することになると思われる。

【その他】

現地事務所を開設したばかりであり、新しい仕事に対する意欲は十分である。調査の実質的な作業は他の現地業者にまかせ、それらの結果の分析・評価及びレポーティングに対して、それなりの自信を持っていることが感じられた。

Ardhi Institute

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【担当者等】

Prof. S. K. Gupta	Head, Dpt. of Environmental Engineering
Mr. S. Mgana	Lecturer-Environmental Engineer
Mr. R. B. Kiunsi	Senior Lecturer, Computer Centre

【概要】

ダルエスサラーム大学の隣にある３年制の国立専門学校で、次の６つの学部と１つのセンターより構成されている。国の組織上は、現在のところ Ministry of Lands, Housing and Urban Development の下に属している。

Department of Environmental Engineering
Department of Urban & Rural Planning
Department of Architect
Department of Building Economy
Department of Land Management & Valuation
Department of Land Surveying
Centre for Human Settlement Studies

このうち、ごみ量・ごみ質等の調査や環境調査及び環境影響評価を担当するDepartment of Environmental Engineering の職（教）員（Professional staff）は１２名である。また、組織全体の職（教）員（Professional staff）は約１００人で、その他事務等の管理部門職員約３００人を合わせ約４００名のスタッフがいる。

【ごみ量・ごみ質等の調査実績と能力】

現地職員はごみ量・ごみ質分析および住民意識調査等のアンケート調査等の調査の経験をもっている様である。

【環境調査・環境影響評価等の実績と能力】

当機関は、ダルエスサラーム市道路整備計画調査、ほか１件のJICAプロジェクトにおける環境調査や環境影響評価等の業務を既に経験している。また、現行処分場であるVingungutiの環境基礎調査・基本設計、新規処分場候補地の一つであるKinzudiの初期環境調査やダルエスサラーム市の大気、水質、および土壌汚染に関する評価等、数多くの環境調査、環境影響評価の実績を有している。加えて、環境調査に要する水質の測定機器、試験室等を持っているため、他に再委託することなくこれらの調査が十分に可能と思われる。

【その他】
当機関を訪問した印象では、設備がしっかりしており、面会したエンジニアの方々の本プロジェクトの内容に関する質問も非常に的を得ており、信頼できるものが感じられた。

The Centre for Energy, Environment, Science and Technology

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【担当者等】

Prof. Mark J. Mwandosya, Ph.D	Chairman and Director
Mr. Hubert E. Meena	Senior Economist
Mr. Wilfred Kipondya	Principal Research Coordinator

【概要】

１９９２年に創立した民間の調査・研究機関である。天然資源、エネルギー、環境、科学技術の分野を専門としている。現在の正規職員は１０名で、内６名が Professional staff、４名が Supporting staff となっている。

【ごみ量・ごみ質等の調査実績と能力】

現地職員のごみ量・ごみ質等の調査に関する経験は不明である。しかしながら、住民意識調査等のアンケート調査の経験は持っている様である。

【環境調査・環境影響評価等の実績と能力】

世銀等の開発プロジェクトにおける環境調査や環境影響評価等の経験を有している。また、大気、水質、土壌に関する環境調査や環境影響評価の実績を有している。ただし、環境調査に要する水質や大気の測定機器、試験室等は持っていないため、この部分は他の機関へ再委託することになると思われる。

【その他】

Norconsultと同様に調査の実質的な作業は他の現地業者にまかせ、それらの結果の分析・評価及びレポーティングを行う様である。実績等からは、社会・経済関係の評価が得意と思われる。

附属資料６．収集資料リスト

収集資料リスト

No.	著者名	書名	発行	種別	言語
1	Tanzania Society	Dar es Salaam - City, Port and Region	1970.	ガイドブック	英語
2	NEMC	National Environment Management Council (NEMC)	-	パンフレット	英語
3	Norconsult	Annual Report 1993	-	パンフレット	英語
4	Norconsult	Annual Report 1994	-	パンフレット	英語
5	Norconsult	Environment and Development	-	パンフレット	英語
6	Norconsult	Surveying, Mapping and Geographical Information Technology	-	パンフレット	英語
7	Norconsult	Transportation Planning and Engineering	-	パンフレット	英語
8	Norconsult	Norconsult's Environmental & Socio-economic Services Throughout Eastern Africa	1995/10/16	業務実績	英語
9	CEEST	Annual Report 1994	-	実績報告	英語
10	DCC	Environmental Profile of The Metropolitan Area	1992/8.	実績報告	英語
11	DCC	Financial Statement	-	実績報告	英語
12	DCC	Estimated Refuse Collection Charges in terms of T.SHs. Per Year (1994/4)	-	実績報告	英語
13		Equipment and Motor Vehicles Current Status Mwananyamala Sub-depot	1995/7.	実績報告	英語
14		Cost of Refuse Collection and Haulage	-	実績報告	英語
15		Daily Lubricant Consumption 1993-1995	-	実績報告	英語
16		Existing Land Use (1992) and Land-Use Concept (2002)	-	実績報告	英語
17		Fuel Consumption 1993-1995	-	実績報告	英語・スワヒリ語
18		Monthly Report on Sanitary Landfill Vingunguti 1993-1995	-	実績報告	英語・スワヒリ語
19		Physical Composition 1993-1995	-	実績報告	英語
20		Recyclable Materials Obtained from Vingunguti Landfill	-	実績報告	英語
21		Recycling 1993-1995	-	実績報告	英語
22		Sustainable Dar es Salaam Project - Briefing Notes, April 1993	-	実績報告	英語
23		Sustainable Dar es Salaam Project - Briefing Notes, September 1995	-	実績報告	英語
24		Workshop on Solid Waste Management	-	実績報告	英語
25		ダルエスサラーム市住民のゴミと居住周辺の環境に対する意識調査報告書	-	実績報告	日本語
26	DCC	Assessment of Solid Waste Management for Dar es Salaam City (25th September - 3rd October, 1995)	-	質問への回答	英語
27	A World Bank Policy Research Report	Adjustment in Africa - Reforms, Results, and the Road Ahead	1994.	書籍	英語
28	John A.O. Max	The Development of Local Government in Tanzania	1991.	書籍	英語
29	M. Sawaya	Elements of Ecology	1994.	書籍	英語
30	Ole Therkildsen	Watering White Elephants?	1988.	書籍	英語
31	T.L.Maliyamkono & M.S.D.Bagachwa	The Secon Economy in Tanzania	1990.	書籍	英語
32		各種新聞記事	-	新聞記事	英語
33	DCC	Provisional Organization Chart	-	組織図	英語
34		Organization Chart and Member List (Office of The Prime Minister and First Vice President/ City Council)	-	組織図	英語
35	MLHUD	Road Map of Tanzania	-	地図	英語

36	Survey & Mapping Division	Dar es Salaam 1/2,500 (Sheet H14-1: KIGOGO)	1994/2.	地図	英語
37	Survey & Mapping Division	Dar es Salaam 1/2,500 (Sheet H14-2: TABATA)	1994/2.	地図	英語
38	Survey & Mapping Division	Dar es Salaam 1/2,500 (Sheet H14-3: SEGEREA)	1994/2.	地図	英語
39	Survey & Mapping Division	Dar es Salaam 1/2,500 (Sheet H14-4: VINGUNGUTI)	1994/2.	地図	英語
40	Survey & Mapping Division	Dar es Salaam 1/2,500 (Sheet H15-1: VINGUNGUTI)	1994/2.	地図	英語
41	Surveys & Mapping Division	Dar es Salaam City Map and Guide	1995.	地図	英語
42	URT	East Africa 1/50,000 - KAWE	-	地図	英語
43	URT	East Africa 1/50,001 - DAR ES SALAAM	-	地図	英語
44	Ardhi Institute	A Feasibility Study on Integration of Refuse Recycling Service in the Solid Waste Management of Dar es Salaam City	1994/4.	調査報告	英語
45	Ardhi Institute	Industrial Survey of Hazardous Solid Waste Producing Industries in Dar es Salaam City	1994/1.	調査報告	英語
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47	Basil Whyte	Managing The Sustainable Growth and Development of Dar es Salaam (Volume Two - Refuse Disposal)	-	調査報告	英語
48	CEEST	CEEST Report 08/1994 - Determination of Methane Emission Factors from Sanitation Systems in Tropical Conditions	1995/5.	調査報告	英語
49	COWIconsult	Vingunguti Landfill Study Dar-es-Salaam Tanzania	1994/3.	調査報告	英語
50	Danish Institute of Technology, etc.	TAKAGAS/ Biogas for Tanzania-Preinvestment Study 1993		調査報告	英語
51	DCC	Managing The Sustainable Growth and Development of Dar es Salaam	1995/1/8.	調査報告	英語
52	ENATA	Final Report on Environmental Survey of National Bicycle Co.Ltd, Simba Plastic Co.Ltd, Sapa Chemicals Industries Ltd., Shely Pharmaceutical Co.Ltd	1994/12.	調査報告	英語
53	Manus Coffey Associates Ltd.	Managing The Sustainable Growth and Development of Dar es Salaam (Volume One - Solid Waste Collection)	-	調査報告	英語
54	Marshall Macklin Monaghan Ltd.	Dar es Salaam Master Plan / Technical Supplement 1,2,3&4	1979/10.	調査報告	英語
55	Marshall Macklin Monaghan Ltd.	Dar es Salaam Master Plan/Five Year Development Programme	1979/10.	調査報告	英語
56	Mgana S.	Environmental Survey Proposed Sanitary Landfill Kinzudi"B"	1992/7.	調査報告	英語
57	Ministry of Water	Study On: Solid Waste Management and Pollution Caused by Sewerage Systems in Dar es Salaam / Draft - Solid Waste Management	1988/11.	調査報告	英語
58	MLHUD	The River Msimbazi, Dar es Salaam. Investigations of the Water-quality and Discharges of Waste-water into the River and its Tributaries	1986/6.	調査報告	英語
59	MLHUD	Dar es Salaam Master Plan	1979/10.	調査報告	英語
60	MTNRE	National Environment Action Plan - A First Step	1994/6/10	調査報告	英語
61	NEMC	Report on Environmental Assessment of Industrial Development Activities in Mikocheni Area, Dar es Salaam	1995/5.	調査報告	英語
62	NEMC	National Conservation Strategy for Sustainable Development (NCSSD)	1995/4.	調査報告	英語
63	NEMC	Environmental Impact Audit for Tanzania Italia Petroleum Refinery, TIPER	1995/2.	調査報告	英語
64	NEMC	Environmental Impact Auditing for The Tanzania Chemical Industries Limited	1995/2.	調査報告	英語
65	NEMC	Report on Management of Solid Waste in Referral Hospitals in Tanzania	1994/8.	調査報告	英語
66	NEMC	A Consultancy Report on Pollution Survey of -UFI-GALCO-STEELCO-Tanzania Distilleries LTD.	1994/12.	調査報告	英語
67	NEMC	Consultancy Report on Pollution of Yuasa Battery Factory, Kibo Paper Mills, Mount Carmel Rubber Factory	1994/12.	調査報告	英語
68	NEMC	Collapsed Sewage and Stormwater Pipeline in Keko Area, Dar es Salaam / A Study on Causes and Possible Measures	1993/9.	調査報告	英語
69	The World Bank	Urban Sector Engineering Project World Bank Review Mission	1993/3.	調査報告	英語
70	University of Dar es Salaam	The Extent of Air Pollution in Dar es Salaam	-	調査報告	英語

71	URT/MTNRE	Sources and Sinks of Greenhouse Gases in Tanzania	1995/6.	調査報告	英語
72	WHO/Ardhi Institute	Rapid Assessment of Air, Water and Land Pollution in Dar es Salaam and Tanga - Tanzania	1993/5/23.	調査報告	英語
73		ダルエスサラーム都市圏環境整備計画（案）	1993/12/23.	調査報告	日本語
74		Improving Solid Waste Management	-	調査報告	英語
75		Refuse Collection Vehicles for Developing Countries	-	調査報告	英語
76		Urban Sector Engineering Project	-	調査報告	英語
77		Vinguguti Landfill	-	調査報告	英語
78	Research and Publications Committee	Government Accounting & Financial Reporting Procedures (Tanzania)	-	統計	英語
79		Housing Indicators	-	統計	英語
80		Population	-	統計	英語
81		Selected 1988 Census Data for the Region	-	統計	英語
82		Urban Indicators	-	統計	英語
83	DCC	The Dar es Salaam City Council (collection and disposal of refuse) By-Laws 1993	-	法律等	英語
84	NEMC	Proposal to Amend the National Environment Management Act No.19 of 1983	1994/1.	法律等	英語
85		Temporary Tanzania Water Standards	-	法律等	英語
86	DCC	Possible Areas for Dar es Salaam Solid Waste Management Which Probably Should Be Considered	1995/10/10.	要望書	英語

著者名略語

CEEST: The Centre for Energy, Environment, Science and Technology
DCC: Dar es Salaam City Council
ENATA: Environmental Association of Tanzania
MLHUD: Ministry of Lands, Housing and Urban Development
MTNRE: Ministry of Tourism, Natural Resources and Environment
NEMC: National Environment Management Council
URT: The United Republic of Tanzania

附属資料７．面会者リスト

面会者リスト

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Mr. A. R. M. Gamba	City Engineer
Mr. L. A. Lwabutaza	Acting City Health Officer
Mr. N. C. X. Mwihava	Acting Coordinator of Solid Waste Management
Ms. Anna A. Mwavahehe	Manpower Management Officer
Mr. Thomas A. Lyimo	Sanitary Landfill Manager
Mr. Kizito L. Nkwabi	Officer, Health Department
Mrs. P. Lerise	SDP Member of Solid Waste Management

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Mr. H. M. Gondwe	Commissioner for Local Government
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Mr. Kassam	Director
Mr. Lema	Operation Officer
Mr. Zahra Suleiman	Collection & Office Administration

附属資料8．物価調査票

現地委託調査　参考費用

参考として、現地で水質調査等を再委託した場合の調査費用（人件費等）を以下に示す。

Senior environmentalist	US$600/day
Senior ecologist	US$300/day
Environmental chemist	US$180/day
Senior economist	US$120/day
Senior sociologist	US$120/day
Social survey assistant	US$60/day
Social survey enumerator	US$30/day

上記には、レポート作成・現場までの移動費用等を全て含んでいる。これらを含まない単価としては、一般的に次のとおりである。

技術者（エンジニア）	Tsh.12,500 - 45,000/day (US$20-70/day)
技能者	Tsh.4,000 - 5,000/day (US$6-8/day)
人夫	Tsh.17,500/month（最低賃金：US$27/month）
水質・大気質分析（１項目）	Tsh.1,500 (US$2.3)

また、ボーリング調査費用は土質、削孔深度、現場状況、現場までの距離によって異なるが、ダルエスサラーム市中心部から２０km以内、砂質土、深度３０mとした場合の見積りより、削孔１mあたり約US$85である。その他土質試験関係をまとめて以下に示す。

ふるい分け試験	Tsh.1,950
比重試験	Tsh.3,780
ｱｯﾀｰﾍﾞﾙｸﾞ限界試験	Tsh.1,950
線収縮試験	Tsh.1,560
一軸圧縮試験	Tsh.8,640
三軸圧縮試験	Tsh.8,850

トラックスケール　参考費用

トラックスケールは現地調達ができないため、イギリスより輸入した場合の費用を示す。

ﾌﾟﾗｯﾄ･ﾌｫｰﾑのサイズ	：１５m×３m
許容荷重	：３０トン
費　用	：£12,712.00（VAT含まず、約US$20,000-）

事務所用品　参考費用

現地調達可能な事務用品等の参考価格を示す。

机（スチール製、60" x 30"）	： Tsh.145,750（両側に引き出しのあるもの）
	： Tsh.126,500（片側に引き出しのあるもの）
いす	： Tsh.90,850（背もたれ高いもの）
	： Tsh.81,650（背もたれ低いもの）
事務用いす	： Tsh.28,750
秘書用いす	： Tsh.65,550
本棚	： Tsh.110,200（スチール製、36"x12"x72"）
	： Tsh.198,750（木製、36"x12"x72"）
自家発電機	： Tsh. 4,025,000（5KVA, イタリア製）
	： Tsh. 6,325,000（10KVA, 日本製, ヤンマー）
エアコン	： Tsh. 448,500（東芝製）
	： Tsh. 494,500（三洋製）
	： Tsh. 448,500（General製）
	： Tsh. 488,000（Super General製）
コピー機	： Tsh. 4,456,480（Nashuatec製, Type-3426）
	： Tsh. 4,251,136（Nashuatec製, Type-3322）
	： Tsh. 2,998,466（Nashuatec製, Type-3415）
ファックス機	： Tsh. 517,500（Panasonic製）
コピー用紙	： Tsh. 4,500 - 5,500（A4ｻｲｽﾞ）
	： Tsh. 10,000 - 12,000（A3ｻｲｽﾞ）

地図購入費用

ダルエスサラーム市及びタンザニア全国の地図は、Ministry of Lands, Housing and Urban Development の Surveys and Mapping Division （ダウンタウンの Kivukoni 通り沿いに看板がありそこから少し入った所）にそろっている。地図の種類と購入価格は次のとおり。

縮尺	価格
1/2,500 （ﾀﾞﾙｴｽｻﾗｰﾑ市）	: Tsh. 2,000-
1/20,000 （ﾀﾞﾙｴｽｻﾗｰﾑ市）	: Tsh. 5,000-
1/50,000 （全国をカバー）	: Tsh. 2,500-
1/250,000 （全国）	: Tsh. 2,000-
1/1,000,000 （全国）	: Tsh. 2,500-
1/2,000,000 （全国）	: Tsh. 3,000-

JICA