

2.2.4 Implementation Plan

2.2.4.1 Implementation Policy

(1) Basic Items of Project Implementation

After related agencies on the Japan side examine the Project based on this report, the Government of Japan shall make a Cabinet approval regarding implementation. The Project shall then be transferred to the implementation stage following conclusion of the Exchange of Notes (E/N) between the governments of both countries. Project detailed design shall be carried out by a Japanese consultant, and construction works shall be implemented by a Japanese contractor. The said consultant and contractor shall, in accordance with the Grant Aid Scheme of the Government of Japan, respectively conclude a consultant contract and a construction works contract with the implementing agency on the Yemeni side. Both these contracts require verifications by the Government of Japan.

(2) Project Implementation Setup

The responsible organization on the Yemeni side concerning the Exchange of Notes (E/N) for Project implementation is the Ministry of Planning and Development (MOPD). The implementing agency in Yemen is the Ministry of Education (MOE), which will coordinate and act as the overall interface for the Project, while the Governorate Education Offices (GEO) in Taiz and Ibb and the education offices on the district level (DEO) shall be responsible for everyday operation. The MOE shall be the parties to the detailed design contract and consultant supervision contract with the consultant and the construction works contract with the consultant. The GEO shall supervise and manage the grading of land, extension of power and water lines, and erection of perimeter fences, etc. at the target school sites.

1) Consultant

Following signing of the exchange of notes (E/N) between the governments of both countries, the MOE shall bind a detailed design and consultant supervision contract with the Japanese consultant. After the Government of Japan verifies the contract, the consultant shall carry out detailed design of facilities and equipment and prepare tender documents based on the Basic Design Study Report and in consultation with the MOE and GOE. After obtaining approval from MOE concerning the detailed design and tender documents, the consultant, acting on behalf of MOE, shall carry out tender work for the building contractor based on the consultant supervision contract, and it shall conduct all subsequent consultant supervision work up till completion of the construction works.

2) Building Contractor

The Project works are composed of construction of facilities and supply of equipment and furniture. The building contractor shall be selected in a general competitive tender from Japanese building companies that comply with certain tender qualifications. The successful tender participant shall basically be the lowest price bidder, and this company shall bind a works contract with MOE. The contractor shall execute the works within the

scheduled works period designated in the contract and, following completion of the completion inspection, it shall hand the finished facilities and equipment over to MOE.

(3) Scope and Methods of Activity of Local Consultants and Contractors

Construction of school facilities is currently carried out independently by MOE and GEOs in Taiz and Ibb and also by other international assistance agencies and donors. Construction operators do exist in both Governorates; however, there are few consultants or operators that have the capability to manage overall projects. Consultants and contractors based in the capital Sana'a carry out most major projects. Leading consultants have adequate technical levels and are well versed in local building and social conditions; therefore, in order to smoothly implement works supervision over a wide area such as that in the Project, it would be effective to utilize these consultants in the role of supervision assistants.

Concerning building contractors, there are numerous contractors of various scale possessing the necessary technology and experience in the capital Sana'a. Compared to major construction companies on the national level, since problems are pointed out regarding financial capacity and schedule control capacity, etc., it will be necessary to carry out thorough examination based on capital and works performance when selecting contractors, but it is possible to utilize such companies in the form of subcontractors. Since the Project area covers 2 Governorates with numerous sites, the area shall be appropriately divided into zones and a number of construction operators, each possessing knowledge of local conditions and the necessary technical capacity, shall be utilized.

2.2.4.2 Implementation Conditions

(1) Construction Situation and Local Characteristics

1) Construction Situation

The construction situation in Yemen is generally as described below.

Major local construction companies are found gathered in large cities such as the capital Sana'a, Aden and Hodeida, etc. Foreign affiliated local construction companies carry out many large-scale works. Not many local construction companies are general contractors, but there are many small enterprises that focus on specialized areas of work. These companies only receive small-scale orders for the construction of houses, apartments and so on. Many craftsmen belong to such companies.

There are professional carpenters, plasterers, rebar fixers and stonemasons, however, other job classifications are not established and there are no specialist positions such as decorators and waterproofing works. Moreover, many laborers are casual workers and lack specialist. If work efficiency in each work area was averaged out, it is thought that Yemeni workers take several times the work time taken by workers in Japan.

Prior to 1996, depreciation of the local currency had a major impact and there were large increases in the price of construction materials and labor. As a result, contracts and transactions are now frequently based on the US dollar.

There is no value added tax in Yemen at the moment, no plans for introduction are reported.

2) Construction Materials

All major materials can be procured in Yemen, and local procurement shall be adopted as a rule. Moreover, cement, sand, aggregate, rebars, furnishings, and other important materials are abundantly available in Ibb and Taiz, and maximum consideration shall be given to utilizing items procured within the both Governorates in order to reduce transportation costs and make some contribution to the local economy. Depending on the site, however, there may be cases where judging from cost and supply stability, etc., it may be more advantageous to procure materials from neighboring areas. However, since quality varies according to area, it will be necessary to secure adequate quality by basically using products that conform to standards.

3) Transportation Conditions

Since almost all the national routes and local main roads in the Governorates are paved, there are no problems regarding transportation of equipment and materials. District roads leading from main routes to the sites are unpaved, however, transportation is possible throughout the year. However, concerning concrete blocks and other heavy objects, since transportation costs account for a high ratio in comparison to distance, it is necessary to carefully examine procurement sources, select products that are produced inside the Governorates as much as possible, and take other necessary measures.

(2) Important Points to Consider in Execution

Attention shall be given to the following points when constructing the Project facilities.

- Compile a works plan that enables construction works at numerous sites in three areas to be efficiently implemented according to schedule while at the same time upholding a certain standard of work.
- When implementing works, carry out demonstrations to offer guidance on work manuals, procedures and goals, etc. for each job classification. Also, implement job training and promote the transfer of technology.
- Convene construction meetings attended by members from the Governorate Education Offices, district education offices and mobile offices to make sure that personnel understand and give their cooperation to the construction objectives and to ensure that necessary measures are thoroughly implemented.
- At sites where facilities already exist, examine execution plans that give full consideration to securing lesson times and safety of children, and only embark on works after holding close consultations with the school operators on each site.
- Local subcontractors shall as a rule be selected from operators based on the Governorates upon giving full consideration to past performance, technical capacity and capital, etc.
- Concerning the utilization of local materials, conduct proper study of quality and supply capacity and compile plans that secure multiple supply routes, thus ensuring realization of competition and securing stable supply.
- As far as possible utilize local labor and raise capacity levels through providing technical guidance and training.

2.2.4.3 Scope of Works

(1) Works to be Borne by the Government of Japan

1) Facilities construction

- **Construction of classroom buildings (classrooms, administrative rooms)**
- **Construction of toilet buildings**
- **Supply of furniture (desks, chairs, blackboards and shelves for students and teachers)**

2) Supply of equipment

- **12 items of basic equipment every one set for 30 schools**

(2) Works to be borne by the Government of Yemen

- **Securing of school construction sites**
- **Removal of obstacle buildings and structures, grading of sites prior to construction**
- **Installation of fences and gates**
- **Supply of water**
- **Improvement of access roads to construction sites where necessary**
- **Landscaping and planting of vegetation where necessary**

2.2.4.4 Consultant Supervision

(1) Basic Concept and Important Points of Implementation Design and Supervision

The consultant, which will carry out the design of Project facilities and equipment, shall be selected by MOE from Japanese consultants that have ample experience of designing and planning education facilities and taking part in grant aid projects and have the capacity to execute the Project work. Based on the purport of the Basic Design, the Consultant shall hold consultations with the Government of Yemen, carry out detailed design of the Project facilities and equipment, and prepare the necessary tender documentation. In the supervision stage of construction works, permanent supervisors shall be dispatched to offer guidance to the local subcontractors and liaise with MOE, GOEs of Taiz and Ibb, district education offices, school councils or construction committees, etc. The specific work contents of the Consultant are as follows:

Detailed design

Design in detail and prepare tender documentation (specifications, detailed design drawings) for the construction works and furniture and equipment.

Promotion of tender and contract

Carry out decision-making on the construction contract concept, preparation of the draft contract, internal inspection for the itemized breakdown of works, and selection of the nominated contractors (announcement of tender, pre-qualification, tender assessment and witnessing of the contract signing).

Inspection and approval of working drawings, etc.

Carry out inspection and check of the working drawings, construction execution plans, materials, finished samples, and equipment presented by the contractor.

Works guidance

Examine the works plans and works schedules and provide guidance to the contractor.

Report of works progress

Report on the progress of works to the related parties and agencies and manage monthly meetings of representatives of the Yemeni Government and the contractors.

Cooperation with payment approval procedures

Examine the contents and cooperate with procedures of bills for payment of works charges to be paid during and after the works.

Witnessing of inspections

Carry out inspections of progress and quality during construction from start to end.

(2) Supervision Setup

In order to offer proper guidance and realize sufficient coordination with related agencies when managing the quality, schedules and safety, etc. of works in widely scattered sites, and in order to ensure smooth progress of works and timely completion of the Project facilities based on the design drawings, one Japanese architect and one local engineer shall be permanently dispatched to act as resident architect and assistant supervisor respectively. Also, at the time of the starting inspection and completion inspection, specialist engineers (project manager, architectural engineer) shall be dispatched from Japan.

(3) Project Promotion Setup

The following diagram shows the relationship between each agency and the works promotion setup during the implementation stage.

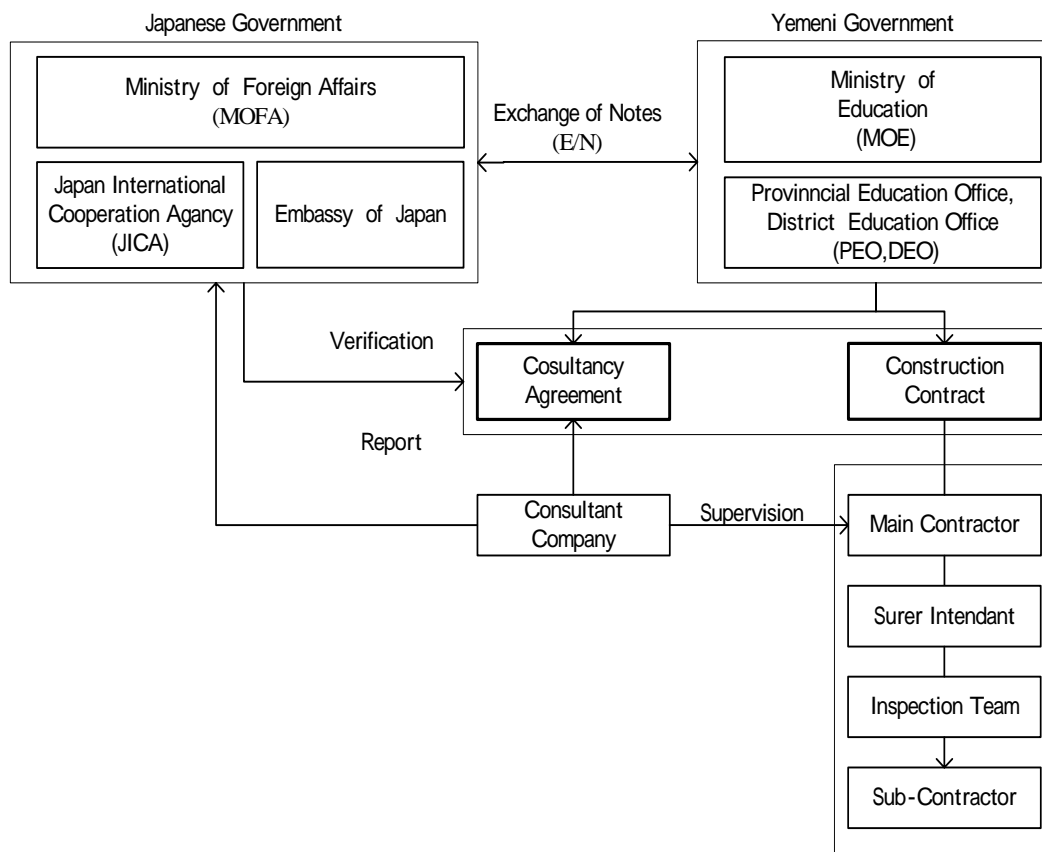


Figure 2-2 Project Implementation Flow

(4) Works Supervision Setup

The Japanese contractor shall employ several local subcontractors in order to execute the works. In consideration of the geographical distribution of sites and execution capacity of subcontractors, each subcontractor shall be responsible for a works section consisting of

five or six sites. In order to ensure uniform execution technology and quality control between the subcontractors, the Japanese contractor will need to make appropriate personnel arrangements and promote works under a proper setup. Accordingly, works control bases shall be established in the center of Taiz Governorate in the first stage and Ibb Governorate in the second stage, and the contractor shall supervise each works section from these bases.

2.2.4.5 Quality Control Plan

(1) Confirmation of Soil Bearing Capacity

During the Basic Design Study, ground conditions on all sites were confirmed by visual inspection. As a result, all sites were deemed to have good ground with some differences in geological conditions. However, before starting work, slab load testing or soil bearing capacity testing shall be carried out on all sites in order to make sure that the ground has the soil bearing capacity needed for design.

(2) Confirmation of Site Conditions and Territory

Through comparing with survey drawings, overall confirmation shall be carried out on site perimeters, conditions of existing structures and underground objects, in-site drainage routes, treatment methods of miscellaneous water and sanitary sewage, etc., site gradients, existing trees and vegetation, conditions of power and water supply line installation, and so on. Upon doing this, lines shall be drawn or territory marked using slaked lime powder, and positions of the Project buildings shall be confirmed and adjusted in the presence of the designers and management personnel on the Yemen side. It is judged that the sites generally possess good ground conditions with soil bearing capacity of 10 t/m² or more, but carrying out simple load testing during works execution shall carry out confirmation.

- Benchmarking

Benchmarks show the height of existing structures and new piles, etc., and these shall be enclosed by curing fences to prevent movement.

- Batter boards and setting-out

Since batter boards and setting-out are important for securing work accuracy, the correct usage of surveying instruments (auto levels, theodolite, etc.) shall be thoroughly ensured and Japanese engineers and supervisors shall carry out final confirmation.

(3) Scaffolding

Care shall be shown when selecting logs and steel scaffolding materials, etc. in order to secure work precision and safety. Any scaffolding materials that are badly damaged, deformed, corroded, or have serious cracks, knots, slanting grain and bending, etc. that affects strength shall not be utilized.

(4) Foundation work

Foundation work shall be carried out on rough concrete slab cast over crushed stone pitching for the purpose of setting-out. Polyethylene film shall be laid underneath the slab for damp proofing.

- Excavation and backfilling

Excavation shall be carried out over an area 200 mm larger than the foundation width in order to allow work to be carried out easily and accurately formwork. Excavation shall be carried out both mechanically and manually. Concerning flooring, a work manual that assumes deep excavation and rock exposure shall be prepared and concrete measures shall be examined in advance. Backfilling shall basically use the excavated earth, however, earth having a small content of black soil and clay soil shall be used. Compaction shall be carried out every 30 cm when backfilling and additional piling shall be carried out in consideration of sinkage (depending on the soil quality). Remaining soil shall be evenly spread on sites.

- Banking and cutting

There is no need to carry out banking and cutting at any of the Project sites, however, clearing and root removal, etc. shall be carried out over a range of 5 m, which is the minimum requirement for facilities construction, around buildings.

(5) Reinforcing Bar Works

For round bars, deformed bars and reinforcing mesh, local products that conform to specifications in advanced countries shall be adopted, and these products shall as a rule be procured from one supplier for each area. Quality confirmation shall be based on test result sheets from the manufacturers' association, however, if such documents cannot be obtained, tensile testing shall be carried out to confirm materials quality every time a batch of reinforcing materials is carried on to site. Moreover, concerning test methods, storage, processing, tool and joint specifications, set length, hook shape, covering depth and spacers, etc., a work manual shall be prepared and confirmation performed based on this.

(6) Formwork

Plank wood is generally adopted for formwork in Yemen, however, in the Project, this shall be combined with plywood for easier workability on large area sections. Form working, ample care shall be taken not to cause poor hardening of surface concrete, and necessary curing shall be carried out in accordance with the climate. When executing formwork, a work manual shall be prepared in advance and quality secured by carrying out ample confirmation.

(7) Concrete Works

Locally produced cement, aggregate and sand shall be procured based on advanced country specifications. When mixing concrete, common buckets shall be established and setups established to ensure that a set quality level is secured irrespective of the skill level of operators. Small mixers shall be used to perform concrete mixing on sites,

separate mix plans shall be prepared for each area, and trial mixing shall be carried out first. Cement shall be stored storage with roof temporarily constructed on each site in order to offer protection against the weather and theft. A work manual covering storage methods, storage periods and aggregate size control, etc. shall be compiled to enable operators to easily understand the work process from mixing and kneading to curing, and work shall be executed upon conducting sufficient examination and confirmation.

Concrete quality control shall be implemented by carrying out slump testing and sampling test pieces. A standard number of three test pieces shall be sampled to confirm the one-week and four-week strength and the designated strength shall be confirmed via compression destruction testing implemented by an authorized agency.

(8) Masonry

Factory-made concrete blocks procured at authorized factories in the Governorates shall be used. Concrete blocks shall be used for partitioning, and in addition to confirmation of strength based on plant test results reports, destructive tests shall be carried out at laboratories of the Ministry of Construction. External wall stones shall be checked for uneven color, infiltration by impurities and cracking, etc. Concerning sand for packing mortar, priority shall be given to river sand, however, when using mountain sand, it shall first be checked to ensure that mud and organic content is appropriate. Normal Portland cement shall be used and the cement to sand mixing ratio shall be 1 : 2.5. When carrying out masonry work, work procedures for all tasks including reinforcement methods shall be compiled into a work manual to be fully examined and confirmed prior to execution.

(9) Plasterwork

The Project facilities shall mostly be finished using mortar. Mortar quality and precision greatly affect the final appearance of buildings. Concerning sand, priority shall be given to river sand, however, when using mountain sand, it shall first be checked to ensure that mud and organic content is appropriate. Concerning particle size, Class A sand shall be used for under-wall and floor plastering, and Class B for wall plastering. Normal Portland cement shall be used and mixed according to the following proportions. Mortar mixing shall basically be performed one site by mixer, and work procedures for all tasks shall be compiled into a work manual to be fully examined and confirmed prior to execution.

Table 2-32 Mortar Mixing Table (cement: sand)

	Place	Undercoat (A)	Final coat (B)
Concrete	Floor	-	1 :3.0
	Ceiling	1 :2.5	1 :3.0
Concrete Block	Inside Wall	1 :2.5	1 :4.0
	Outside Wall	1 :2.5	1 :4.0

(10) Roof and rainwater drainage works

Concrete flat roofs shall be adopted with asphalt waterproofing. After applying asphalt waterproofing, restraining cement tiles (200 x 200 mm) shall be rest and appropriate water gradient secured.

(11) Fittings

Windows shall be steel ready-made frames, and steel fittings shall be steel frames and doors. These products shall be procured from local plants.

(12) Painting Works

Outdoor paint possessing good weatherability shall be used on external parts, and ordinary emulsion paint shall be used indoors. When carrying out painting, ample time shall be allowed for base treatment, inspection, and drying and curing after application. The quality control plan for the main work areas is shown below.

Table 2-33 Quality Control Plan

	Works	Q.C. Item	Method
Structure Work	Concrete	Mixing	Mixing Ratio, Slump, Air Volume, Temperature, Sulphate Contents
		Strength	Compression Test
	Reinforcement	Steel Bars	Tentil Test, Mil-sheets confirmation
		Reinforce	Reinforcement Site Examination (pitch, lenght of lap,thickness of cover)
Finish Work	Roof	Asphalt	Observation, Water Spray Test
	Stone	Workmanship	Observation, Material/Joint Check
	Tile	Workmanship	Observation, Adhesion & Cruck Check
	Mortar	Workmanship	Observation, Adhesion & Cruck Check
	Door & Windows	Manufacturing	Manufacture Examination
		Fixing	Observation, size, incline, function
Painting	Workmanship	Color uniformity, adhesion check	
Water& Drainage Work	Water Supply	Leakage	Dropage, water pressure test
	Drainage	Drain Slope	Slope, Water Test
	Water Tank	Leakage	Fill-up test

2.2.4.6 Procurement Plan

(1) Procurement Concept

The basic condition for selecting construction equipment and materials shall be that procurement of items for maintenance and repair is possible after the handing-over of facilities. All major construction equipment and materials can be procured in Taiz and Ibb area and the basic principle shall be local procurement. Having said that, in cases where it is deemed necessary judging from quality, cost and supply capacity, etc., consideration shall also be given to procurement from large urban areas.

When selecting suppliers, careful consideration shall be given to supply capacity, quality and durability, and as a rule multiple supply sources shall be secured in order to achieve supply stability. The procurement plan for major equipment and materials is shown below.

Framework

- Cement: local BS-conforming products shall be adopted.
- Reinforcement: ASTM-conforming products made in Turkey shall be

- Procured in local market.
- Aggregate: this can be procured locally.
 - Concrete: concrete shall be made using concrete mixers at each site. Concerning mixing proportions (cement: gravel: sand: water), volume ratios shall be indicated and the amount of cement used shall be confirmed. Casting shall be carried out using wheelbarrow or concrete bucket.
 - Formwork: plank wood and plywood forms, which are commonly used locally, shall be adopted.
 - Concrete blocks: local products (factory produced products) conforming to the German standard shall be procured.

Finishing and fitting works

- Tiles: products available on local markets shall be procured.
- Plaster: cement mortar shall be mixed on sites.
- Paint: products available on local markets shall be procured.
- Glass: products available on local markets shall be procured.
- Steel fittings: products available on local markets shall be procured.
- Hardware for fittings: products available on local markets shall be procured.
- Roof waterproofing: products available on local markets shall be procured.

Sanitation equipment

- Piping: products available on local markets shall be procured.
- Sanitary ware: products available on local markets shall be procured.

Electric equipment works

- Wiring: products available on local markets shall be procured.

Furniture and fittings

- Furniture: products available on local markets shall be procured.

2.2.4.7 Implementation Schedule

In the event where the Project is implemented under the Grant Aid Scheme of the Government of Japan, following the exchange of notes (E/N), the consultant supervision contract shall be concluded between the Government of Yemen and the consultant, and then the implementation design documents and tender documents shall be prepared based on this.

After these stages, preliminary qualification (P/Q) and tender shall be implemented, and the construction company that is selected as a result shall conclude a building contract with MOE and implement the construction works.

(1) Detailed Design Work

The consultant shall prepare the detailed design and tender documents based on the contents of the basic design. These documents consist of detailed design drawings, specifications and calculation sheets. Close consultations shall be held with related agencies on the Yemeni side at the start, during and at the end of the implementation design, and work on the tender shall only start after approval is obtained for the final output.

(2) Tender Work

Following completion of the implementation design work, the consultant, acting on behalf of MOE of Yemen (implementing agency), shall announce the works tender preliminary qualification (P/Q) in Japan and report the results of this to MOE for their approval.

After this, those construction companies that passed the preliminary qualification shall take part in a competitive tender in the presence of the related parties. The bidder that presents the lowest price shall be selected providing that the contents of its bid are deemed appropriate, and it shall conclude the building contract with MOE. The building contract shall become effective upon verification by the Government of Japan.

The amount of time required from the consultant contract through the detailed design work, tender and works contract is roughly 5 months.

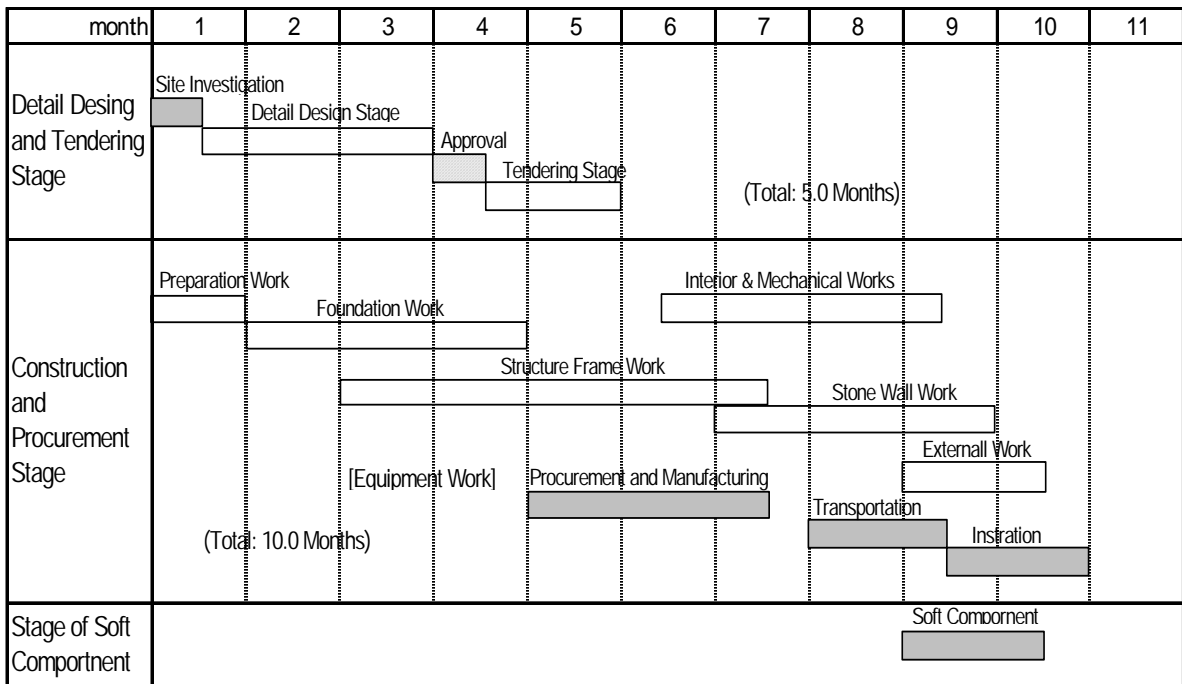
(3) Construction Works

The construction work shall commence following certification of the works contract by the Government of Japan. The estimated construction period per site is approximately 9 months for two-story buildings and 6 months for toilet buildings. Judging from the execution capacity of local subcontractors, the number of laborers on hand, and the amount of owned construction machinery; it is appropriate to implement the Project works over two phases.

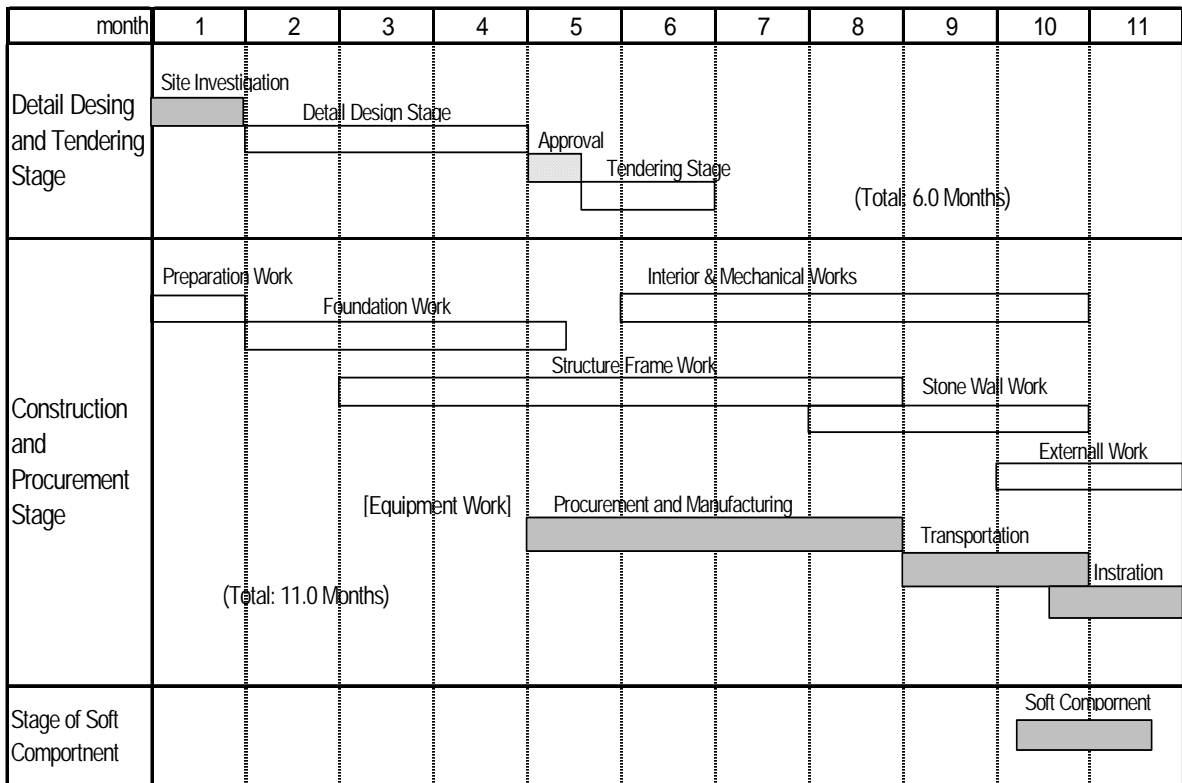
First phase works	13 schools in Taiz Governorate
Second phase works	5 schools in Taiz Governorate 12 schools in Ibb Governorate

Figure 2-3 Project Implementation Schedule

PHASE-I WORKS



PHASE-II WORKS



2.3 Obligations of Recipient Country

(1) Work to be borne by the Yemen Side

The items of work to be borne by the Yemen side as confirmed in the Basic Design Study are as follows.

Prepare sites for construction of the Project facilities, and where necessary dismantle and remove existing structures and carry out site leveling.

Prepare the access roads needed for the construction works where necessary.

Construct perimeter fences and gates

Concerning sites where it is possible to supply water and drainage lines, carry out extension and connection works. In addition, carry out any other incidental works that are required.

Secure the budget and teaching staff required to properly and efficiently operate and maintain the facilities, equipment and materials that are supplied under the Grant Aid.

Concerning the provision of equipment, materials and services based on the certified contracts, provide conveniences as required by Japanese personnel or Japanese corporate persons engaged in the Project for their entry to Yemen and stay therein.

Concerning the provision of equipment, materials and services based on the certified contracts, exempt Japanese personnel or Japanese corporate persons engaged in the Project from tariffs and domestic taxes including value-added tax that may otherwise be levied in Yemen.

Fees for advice concerning authorization to pay (A/P) and payment commission fees based on the banking arrangement agreed with a Japanese bank.

Pay all costs that are required for implementation of the Project but are not covered by the Grant Aid loan.

Taxes shall basically be exempted from equipment, materials and services provided in the Project, however, in cases where this principle cannot be applied, refunding shall be sought and the procedures for this shall be implemented without delay.

(2) Contents of Works to be borne by the Yemen Side

Out of the items to be borne by the Yemen side, the items related to construction are shown for each site in Table 2-2-4. All the sites are more or less leveled, however, cutting and banking are required on some parts if not flat. Concerning access roads, roads before sites are generally steep and improvements to enable passage by works vehicles are required on some sites. At sites where local water supply can be obtained, connection works shall be carried out at the expense of schools. Also, it is desirable to clean and paint existing school buildings and install perimeter fences and gates and provide furniture.

(refer to 5.2 and 3) Works anticipated from the Yemen Side)

Table 2-34 Cost Estimation of Yemeni Side Works

(1) Planned School Sites in TAIZ Governorate

School Code	Before Construction						Before Completion				Works for Existing Premises			
	Land Clearance and Reclamation		Removal of Existing Structures		Renovation of Access Road		Connection of Water Supply		Connection of Electricity		Painting of Classroom Building		Construction of Fence Wall	
	Qty (m3)	Cost(\$)	Qty	Cost(\$)	Qty(m)	Cost(\$)	Qty(m)	Cost(\$)	Qty	Cost(\$)	Qty (m ²)	Cost	Qty (m)	Cost
TZ-01	22m3()	110	—	—	15m	3000	Well 0.5km	—	E.P 0.2km	—	18CR*	4680	120m	7200
TZ-02	—	—	—	—	—	—	Well 0.5km	—	E.P 7.0km	—	5CR	1300	120m	7200
TZ-03	—	—	—	—	—	—	50m	500	E.P 3.0km	—	2CR	520	57m	3420
TZ-04	—	—	—	—	—	—	10m	100	E.P 1.0km	—	6CR*	1560	120m	7200
TZ-05	—	—	—	—	—	—	Well 0.2km	—	E.P 2.0km	—	6CR*	1560	120m	7200
TZ-06	150m3()	750	—	—	—	—	Well 0.3km	—	E.P 5.0km	—	0	0	105m	6300
TZ-08	—	—	—	—	—	—	Well 0.2km	—	E.P 7.0km	—	9CR*	2340	80m	4800
TZ-09	—	—	—	—	10m	2000	Well 0.5km	—	E.P 3.0km	—	2CR	520	N.A.	—
TZ-10	850m3()	4250	—	—	—	—	80m	800	E.P 1.0km	—	12CR*	3120	120m	7200
TZ-12	—	—	—	—	—	—	Well 0.5km	—	E.P 13km	—	6CR	1560	90m	5400
TZ-13	—	—	—	—	—	—	Well 2.0km	—	Connected	0	14CR	3640	Existing	0
TZ-14	—	—	—	—	—	—	Well 0.5km	—	E.P 10km	—	5CR	1300	120m	7200
TZ-15	80m3(+)	400	Elec. Line	400	—	—	70m	700	20m	200	10CR*	2600	110m	6600
TZ-16	—	—	2 Sheds	500	—	—	Connected	0	Connected	0	11CR*	2860	Existing	0
TZ-17	—	—	—	—	20m	4000	Well 0.6km	—	E.P 10km	—	7CR*	1820	95m	5700
TZ-18	—	—	—	—	—	—	20m	200	E.P 0.3km	—	3CR	780	60m	3600
TZ-19	—	—	—	—	—	—	Well 0.15km	—	E.P 5.0km	—	8CR*	2080	120m	7200
TZ-20	150m3()	750	—	—	20m	4000	20m	200	Connected	0	6CR*	1560	75m	4500
TAIZ sub-total		6,260	900		13,000		2,500		200		33,800		90,720	

(2) Planned School Sites in IBB Governorate

School Code	Before Construction						Before Completion				Works for Existing Premises			
	Land Clearance and Reclamation		Removal of Existing Structures		Renovation of Access Road		Connection of Water Supply		Connection of Electricity		Painting of Classroom Building		Construction of Fence Wall	
	Qty (m3)	Cost(\$)	Qty	Cost(\$)	Qty(m)	Cost(\$)	Qty(m)	Cost(\$)	Qty	Cost(\$)	Qty (m ²)	Cost	Qty (m)	Cost
IB-01	200m3(+)	1000	—	—	—	—	Well 0.3km	—	30m	250	3CR	780	Existing	0
IB-02	180m3(-)	900	1 house	200	—	—	Well 0.8km	—	E.P 0.2km	—	0	0	100m	6000
IB-03	—	—	4 Sheds	600	—	—	Connected	0	80m	500	13CR*	3380	60m	3600
IB-05	—	—	—	—	—	—	70m	700	10m	150	0	0	380m	22800
IB-06	50m3(+)	250	—	—	—	—	10m	100	30m	250	5CR*	1300	100m	6000
IB-08	—	—	—	—	—	—	50m	500	E.P 0.2km	—	4CR*	1040	100m	6000
IB-09	—	—	—	—	—	—	Connected	0	Connected	0	18CR*	4680	210m	12600
IB-10	—	—	Elec Line	400	—	—	10m	100	10m	150	0	0	N.A.	—
IB-13	—	—	Drainage	500	—	—	10m	100	10m	150	8CR*	2080	120m	7200
IB-16	—	—	2 Buildg	2000	—	—	Well 5.0km	—	Generator	0	6CR	1560	200m	12000
IB-17	—	—	—	—	—	—	10m	100	E.P. 1.5km	—	5CR	1300	125m	7500
IB-19	—	—	1 House	800	20m	4000	Connected	0	Connected	0	4CR*	1040	N.A.	—
IBB sub-total		2,150	4,500		4,000		1,600		1,450		17,160		83,700	
Grand Total		8,410	5,400		17,000		4,100		1,650		50,960		174,420	

Note: (-) shows cut soil, (+) shows filled soil.

Well 0.5km shows a distance to community well.
E.P 7.0km shows a distance to nearest Elec. Pole.

3CR* shows 3 Classrooms at separate site

2.4 Project Operation Plan

2.4.1 Facility Operations and Maintenance Plan

The Project implementing agency is the Planning Department of the Ministry of Education (MOE), and the Governorate Education Offices (GEO) act on the school level with responsibility. Officers in district education offices supervise school maintenance, however, they are not able to travel around every school because of lack of human resources and transportation. Moreover, although education budgets are allocated in single payments by the Governorates, since personnel expenses account for more than 90% of costs, only limited funds are available for facilities maintenance and repair.

Against this background, local parent’s councils are counted on to help with the maintenance of school facilities. However, because of the need to enroll rapidly increasing numbers of students, the role of parent’s councils is largely concerned with expanding facilities through building temporary classrooms and arranging rented classrooms. Therefore, no attention is paid to the maintenance of school facilities either from district education offices or parent’s councils, and this issue is left completely unattended in many schools. Meanwhile, some schools are kept clean and have well-trimmed plantation as a result of school environment beautification campaigns implemented by GTZ, etc. In particular, girls’ schools having female principals are very clean, put up various notices in classrooms, and generally appear willing to maintain pleasant learning environments.

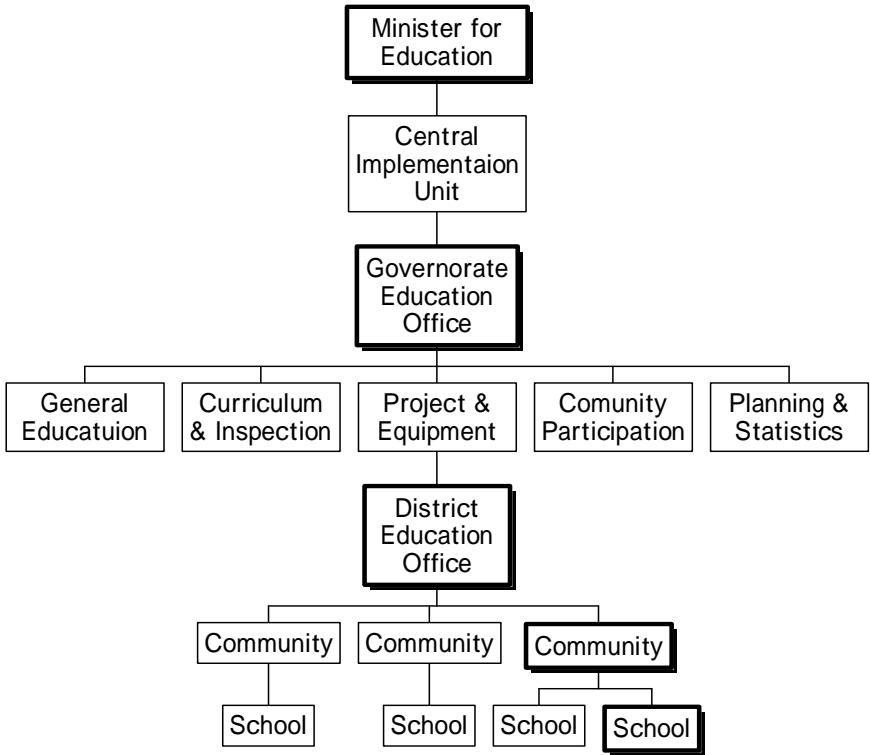


Figure 2-4 Regional Education Administration Systems in Yemen

Concerning the education budget of Governorates level, looking at the case of Taiz Governorate as shown in the following table, the budget increased by more than 22% from 5.2 billion YR (approximately US \$ 34 million) in 1999 to 9.0 billion YR (approximately US \$ 53 million) in 2001. However, taking a look at the budget breakdown in 2001 shows that 97.0% is recurrent expenditure with 85.9% being spent on personnel expenses and a mere 0.1% (7 million YR) allocated to facilities maintenance. Moreover, capital expenditure allocated to school facilities is 3.0% (271 million YR) and overseas assistance is relied on to construct the classrooms that are lacking.

Table 2-35 Governorates Education Budget (Units : million YR, US\$)

A: TAIZ Governorate

Items	1999	2000	2001	Component Ratio
I . Recurrent Expenditure	4,947	6,964	8,787	97.0%
1. Personnel	4,782	6,174	7,778	(85.9)
2. Goods & Services	15	6	10	(0.1)
3. Repair & Renovation	N.A.	2	7	(0.1)
4. Transfer & Subsidy	N.A.	N.A.	N.A.	N.A.
Capital Expenditure (Construction)	275	84	271	3.0%
Total Expenditure(+)	5,222	7,049	9,059	
In US\$	34	44	53	

B: IBB Governorate

Items	1999	2000	2001	Component Ratio
I . Recurrent Expenditure	3,227	4,671	5,996	94.1%
1. Personnel	3,202	4,124	5,294	(83.1)
2. Goods & Services	8	7	8	(0.1)
3. Repair & Renovation	6	8	7	(0.1)
4. Transfer & Subsidy	111	532	686	(10.8)
Capital Expenditure (Construction)	398	265	373	5.9%
Total Expenditure(+)	3,625	4,936	6,368	
In US\$	23	31	37	

Source: Local Government

Schools also collect school fees from students, and 30% of an annual fee of 150-250 YR is allocated to school activity expenses. Of the remaining 70%, the Governorates use 50% to cover maintenance costs, and MOE collects the remaining 20%.

Accordingly, if an annual fee of 200 YR is collected from every student in a classroom of 40, 30% or 2,400 YR will be used to cover school activity expenses, and 50% or 4,000 YR will be pooled by GEO to cover maintenance costs.

Similarly, as presented on next table, looking at the Project schools by Governorate, the appropriated maintenance budget in Taiz Governorate is 1,430,000 YR and that in Ibb Governorate is 960,000 YR.

Table 2-36 Breakdown of School Fees (200 YR/student) at the Project Target Schools

	School Activities Fund (30%)	Governorate Maintenance Fund (50%)	Ministry Fund (20%)	Total Amount (100%)
TAIZ: 18 Schools (14,300 students)	858,000YR	1,430,000YR	572,000YR	2,860,000YR
IBB: 12 Schools (9,600 students)	576,000YR	960,000YR	324,000YR	1920,000YR

In addition, parent’s councils sometimes collect contributions from members and prominent persons and use these funds to construct temporary school buildings. Accordingly, it is necessary to build a setup in which local residents cooperate with everyday maintenance and teachers and students encourage cleaning and strive to improve the beauty of school environments. GTZ has formed father & mother’s councils in each school in Ibb Governorate and has achieved some degree of success through constructing setups that are based on public participation.

Therefore, this Project will assist to set up school beauty and everyday maintenance, as the soft components.

2.4.2 Maintenance Plan and Costs

(1) Maintenance Plan

School operating councils consisting of school principals, teachers and parents shall be organized under the maintenance officers of district education offices, and these bodies shall be responsible for the maintenance of facilities and equipment. On the everyday level, principals and teachers will look after facilities, furniture and equipment, however, in specific terms, cleaning and maintenance shall be carried out with the cooperation of local inhabitants working through parent’s councils and students’ councils.

It is particularly necessary to carry out cleaning and water supply management on the daily basis in order to maintain toilet functions and sanitary conditions. Toilets at the Project facilities adopt the sanitary sewage percolation method of treatment using simple purification tanks and soak pits. If the water supply flow is small, bacteria decomposition will be slowed and frequency of sludge removal will increase. Moreover, at ‘double shift’ schools that have frequent toilet use by students, since it is possible that collected sanitary sewage will exceed percolation capacity, it will be necessary to clean out purification tanks around two times every year.

In the long term, furniture repairs (desks, tables) and painting of building interiors, etc. need to be carried out. These items are manufactured from locally procurable materials and can be handled with the technical levels of local inhabitants.

(2) Maintenance Cost

1) Personnel Expenses

In order to calculate additionally required personnel expenses, the cost of making up teacher shortages is given capacity of 40 students in order to improve the learning environment, the required number of classrooms works out s 565.

Table 2-37 Number of Classrooms and Teachers

	No. of Classroom						No. of Teacher		
	Necessary	Existing	Usable	For Secondary	Calculated	Results	Necessary	Existing	Results
TAIZ: 18 schools	334	215	130	21	189	154	585	544	-41
IBB: 12 schools	231	99	66	22	176	117	413	284	-137
Total	565	314	196	43	365	271	998	828	-178

Note: Individual values except for totals are obtained by summing figures from each school.

Concerning the number of teachers, there are sufficient number of teachers because 828 teachers exist for 565 necessary classrooms if one teacher for one classroom. As per MEO recommendation that one class teacher is assigned per class for G1 to G3, and 2 field teachers are assigned for each of 7 subjects (14 teachers) for G4 to G9 (total 17 teachers), it works out that 929 teachers in total will be required as shown in the table. If the current number of 828 is deducted, the shortage of teachers works out as 41 in Ibb and 137 in Taiz, making 178 in total.

If this shortage is newly recruited, assuming an average monthly salary of 20,000 YR, an additional budget of 3,560,000 YR (approximately 2,500,000 yen) will be required from year 2006 when all G7 to G9 class are operated

<Additional personnel expenses>

178 persons x 20,000 YR/month = 3,560,000 YR (approx. 2,500,000 yen/month)

Annual cost = 42,000,000 YR (approx. 30,000,000 yen)

2) Facilities Maintenance Costs

The two central points in maintaining school facilities are 1) implementation of everyday cleaning, and 2) repair of damage and deterioration. The encouragement of daily cleaning has a good effect on the students and encourages them to be aware of their own school and to look after facilities and equipment. Moreover, cleaning makes it possible to quickly discover damaged or broken areas and to implement preventive maintenance. This will lead to longer service life of plumbing facilities in the case of toilets. Concerning repairs,

these will consist of the repair and touching up of interior and exterior finishing (which protects structural bodies), fittings and furniture. Moreover, concerning handling in response to changes in the number of students per classroom and in the number of teachers, rather than using partitions, furniture shall be moved between classrooms.

Detailed items of periodic inspections and repairs, which affect the service life of schools, shall be presented by works contractors in the form of maintenance manuals at the time of handing over, at which time explanations will be provided on inspection methods and periodic cleaning methods. These contents are generally summarized as follows.

Table 2-38 Outlines of Building Periodic Inspections

	Check Points and manor	Check periods
Exterior	<ul style="list-style-type: none"> • Repair, Repaint of External Wall • Check and Repair for Roof Water Proofing • Periodical Cleaning of Downspout and Drain • Re-painting of Steel Doors & Windows • Periodical Check and Cleaning of Drainage pipe and Manhole • Cleaning and removal of Sludge 	Once / 5 years Every year, Repair/ 5 year Twice / month Once / 5 year Every year Several times/ year
Interior	<ul style="list-style-type: none"> • Repair and re-paint of Partition Wall • Change of Ironmongery for Doors and Windows • Operation Adjustment for Doors and Windows • Repair and RE-paint of Furniture 	Once / 10 years Once / 5 years Anytime Anytime, Once / 5 years

The annual maintenance cost incurred in operation of the Project facilities and implementation of the above daily inspections and periodic repairs is estimated as shown in the following table.

Assuming the nine-classroom type school, water tariffs account for a large proportion of the maintenance cost at 250,000 YR and repair work is 27,300 YR. Therefore, the total maintenance cost comes to 277,000 YR (approximately 190,000 yen).

Table 2-39 Annual Maintenance Cost (9-classroom type, unit: YR)

	Items		Cost(YR)	Remarks
Operating expenses	Water cost	Water tariff / cost	25,000	100 YR/day, 250 days. In reality, carrying well water is expensive, but low water supply is free.
Repair funds (Depreciation Reserve)	Repair costs	Re-painting	7,500	Approximately 10% of the painting work cost once every five years.
		Furniture repairs	1,200	Approximately 3% of the fitting work cost once every five years.
		Water proofing	1,400	Approximately 10% of water -proofing work cost once every 10 years
		Soak pit	15,000	Three times/year
	Equipment cost	Furniture /Equipment	2,200	Approximately 3% of furniture works cost once every five years
	Sub-total		27,300	(approx. 19,000yen)
Total			52,300	(approx. 36,600yen)

In school buildings with nine classrooms, it is expected that 360 students will use facilities. If 50% or 27,000 YR of school fees (150 YR per year per student) are used to cover maintenance costs, it will be possible to carry out maintenance work for almost the same amount as the estimated amount here.

Concerning water tariffs, if the total cost is divided by the number of students (360), a charge of 7000 YR (490 yen) per student will be required. This charge will be even higher in areas where water has to be carried in by water truck, but it will be free in areas served by local water supply systems.

3) Works anticipated from the Yemen Side

In the Project, the Japanese Government shall construct new classrooms to make up the current shortages, however, concerning school buildings where existing facilities can continue to be used, and repainting is required. The cost of this shall be covered by Governorate facilities repair budgets.

Moreover, when preparing school environments, it is particularly desirable at girls' schools to install perimeter fences and entrance gates. When doing this, it is desirable to obtain the consent of school operating councils (parent's councils) and to secure participation by local residents. The scope of perimeter fences was calculated based on the length of fences when enclosing new and old school buildings and toilets. A summary of costs is given below.

Table 2-40 Repair and Installation Works Anticipated from the Yemen Side (US\$)

	Repainting of existing school building		Construction of boundary fence		Sub-total
Taiz	130 Classrooms	US\$33,800	1,512 m	Taiz	130 Classrooms
Ibb	66 Classrooms	US\$17,160	1,395 m	Ibb	66 Classrooms
Total	196 Classrooms	US\$50,960	2,907 m	Total	196 Classrooms
(J Yen)	Approx. 6 million Yen		Approx. 0.2 million Yen		Approx. 27 mil Yen

(3) Cost born by Yemeni Side

Regarding to the works to be borne by the Government of Yemen, which described in page 59, rough estimation shows in the following table.

Table 2-41 Cost to be borne by the Yemeni Government

Items of Expenses	Yemeni Rial	Japanese Yen
1) Cost for Constrictions	5,934,700 YR	4.15 mil.yen
Site Clearance and Reclamation	(1,429,700)	(1.00)
Demolition of Existing Shed、Electricity Lines	(918,000)	(0.64)
Repair of access Road	(2,890,000)	(2.02)
Connection of Water	(697,000)	(0.49)
2) Bank Arrangement Fee (0.1% of E/N amount)	1,430,000 YR	1.00 mil.Yen
3) Building Permission (16 sites)	160,000 YR	0.11 mil.Yen
Total	7,524,700 YR	5.26 mil.Yen

2.5 Soft Component Plan

The school built by the assist of Japan is made to root as "local asset", and the maintenance management system of the building which cooperated in both of school and the government as "soft component" is introduced in order to receive in using in the important. It is necessary that it cooperates with the Japan side, that it is introduced, and that the Yemen side becomes positively with the subject in order to succeed.

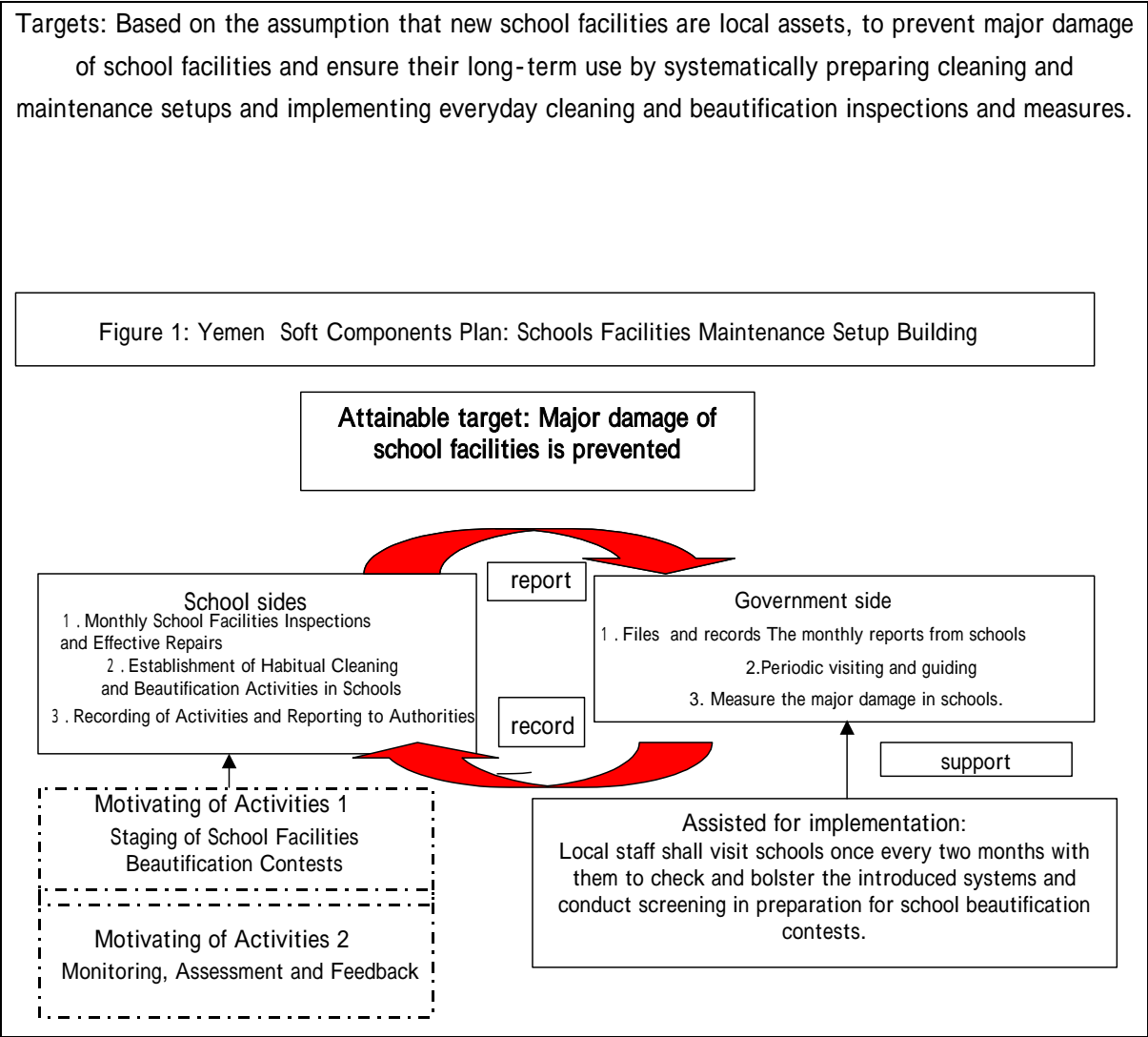


Figure 2-5 Flow Diagram of Soft Component

- (1) The completeness of the school facilities maintenance system.
 - 1) **The opening of the participative negotiation**
The opinion for "the system make" is drawn using the PCM technique.
 - 2) **Decision and mapping and manual preparation of the school facilities maintenance system**

The last decision of the each school commonness "the school maintenance system" the opinion that it is operable for the element and that the place piece spreads is carried out and is diagramed flow chart.

3) The execution of the flow of the systematic business along the graph

The graph is distributed in each school from the local government side, and Japanese specialist and field staff visit each school on following content, and they guide it.

i) School facilities inspection in the every month and effective repair

- Using the check sheet, man group (father and other man of the region) of the F&M council is in charge of the school facilities inspection in every month.
- How to cope, is all left for the record.
- These check sheet are reported in the local government side, and the dealing is confirmed and is reported.
- On large impossible previously preventing damage, it is decided on cost and dealing with the local government side consultation.

ii) The habit of cleaning and beautification activity in the school is given

Pupil he commands the being on duty of cleaning activity in everyday school, while it is discussed with representative and faculty member of the pupil, and it is assigned, and the control is made and is introduced. Female group (mother and other women of the region) of F&M council_helps these activities.

iii) Record in activity content in the school side and report to the administration side

- On the facilities repair: the correspondence for existence and date and time and staffs of the execution of inspection work in every month, content of the inspection, necessary of the repair the point, repair necessity point, etc.
- On the cleaning: being on duty table, existence of the execution of the cleaning, date and time, existence of the confirmation of the cleaning situation, etc.
- These are grasped in the government side, and the report in every month is confirmed and is filed. The progress situation of the repair is grasped, and it is complemented, if there is the necessity, and the repair finishes.

(2) The motivation of the activity

1) The opening of the school facilities beautification contest

The result of the examination (all 4 times) in the round guidance by the field staff that 1 time is done in 2 months is totaled. At the end in each stage, the

difference between the school facilities maintenance situation of the school, which becomes target of the soft component and school, which was not target, is compared.

2) Monitoring, evaluation and feedback.

- The monitoring of the once is carried out in the half year, and the feedback to each school is carried out, when the evaluation analysis was carried out.
- Simultaneously, the investigation of the school, which is not target of the soft component, also compares doings, the school that was target and difference between the school facilities maintenance situation at the end in each stage.

(3) Activities and Schedule

1) Activities (detail of soft component)

Project Area: 8 schools in Taiz Governorate (phase-I),
8 schools in Ibb Governorate (phase-II)

Stakeholders: In-charge from Governorate Health Office,
Teachers and staffs of targeted schools,
Pupils and Parents (F&M Council), others.

2) Items of Activities:

- to hold a participatory meeting and making flow chart of school maintenance system,
- to support introducing school maintenance system by tour instruction,
- to support promoting of participatory activities by F&M Council,
- to support local staff for periodical tour of instruction once a every 2 months,
- to hold contest for promoting motivation of school cleanness and maintenance.

Table 2-42 Schedule of Planned Activates

	Place	Week	1	2	3	4	5	6	7
Ph-I	Sanaa	Prep. of formation of school based maintenance system	■						
		Discussion with the Ministry							
	Ibb	Discussion with GTZ for cooperation and site tour	■	■					
		Taiz	Participatory meeting with Taiz Governorate and Schools			■			
			Support formation of Flow Chart				■		
		Distribution of Flow Chart to related schools					■		
		Inspection and instruction tour for related schools						■	
Sanaa	Recommendations of improvements to the Governorate							■	
	Place	Week	1	2	3	4	5	6	7
Ph-II	Sanaa, Ibb	Prep. of formation of school based maintenance system	■						
		Discussion with the Ministry							
		Discussion with GTZ for cooperation and site tour	■						
	Taiz	School tour of monitoring and contest prep on related schools		■					
	Ibb	Participatory meeting with Taiz Governorate and Schools			■				
		Support formation of Flow Chart				■			
		Distribution of Flow Chart to related schools					■		
		Inspection and instruction tour for related schools					■		
	Taiz	Award of school contest in Taiz Governorate						■	
Sanaa	Recommendations of improvements to the Governorate							■	

3) Detail of Input Plan

Phase-I:	Japanese Specialist (one)	2.08MM
	Local Partner (one)	1.27MM (Taiz)
Phase-II:	Japanese Specialist (one)	2.75MM
	Local Partner (one)	2.42MM (Ibb)

4) Out put (final Documents)

- Manual of School Building Maintenance
- Flow Chart of School Maintenance
- Record of Activities on School Cleanness and Inspection by F&M, Pupils and Teachers
- Record of school Inspection by Governorate
- Result of Monitoring
- Record of Contest
- Recommendations