



**Ministry of Education
Republic of Yemen**



**School Construction Costs in Yemen
Cross-Sector and Multi-Institutional Assessment Study
SEF 1992 70 182**

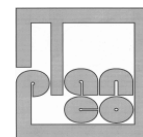
DRAFT REPORT ON FINDINGS

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Table of Contents

1	Synopsis	7
2	Executive Summary	8
3	Introduction	11
4	Background	12
5	Study Approach	14
5.1	Study Objectives	14
5.2	The Study Concept	14
5.3	Concepts, Models & Definitions	16
5.3.1	FFS – The Fully Functional School Concept	17
5.3.2	LCC – The Lifecycle Cost Model	19
5.3.3	BLS – The Cost Optimised Baseline School Model	20
5.3.4	UCI – The standardised Unified Cost Indicator	21
6	Summary of Findings	23
6.1	Planning & Design	25
6.1.1	Needs assessment, school mapping and programming	25
6.1.2	Site selection	25
6.1.3	Standard designs, master planning and adaptation	26
6.2	Durability and Feasibility	29
6.2.1	Design and Maintenance	29
6.2.2	Operation and Maintenance	29
6.3	Community Participation	31
6.4	Implementation Framework	33
6.4.1	Tendering and selection of contractors	33
6.4.2	Legal framework	36
6.4.3	Supervision and quality control	37
6.5	Economic & Administrative Framework	38
6.5.1	Macro- and microeconomic factors	38
6.5.2	Institutional Capacity	40
6.5.3	Political decisions pending	45
6.5.4	Budgeting mechanisms and donor delivery systems	46
7	Conclusion: Improvement potentials	48
7.1	Research challenges	48
7.2	Short-term improvement potential	48
7.3	Long-term improvement potential	50
8	Next Steps	51

Tables & Charts

Table 1: Report Structure	11
Table 2: Study Conception	15
Figure 3: FFS- Concept in the regional context	17
Table 4: LCC Model Cost Distribution	19
Table 5: Costs of the 6-classroom Baseline School US\$	20
Table 6: UCI Sample Calculations for the 6CLR-Size BLS US\$ '000	21
Chart 7: Spider Web Chart of Cost Influencing Clusters	23
Chart 8: School Construction Project Planning Concept	28
Chart 9: Maintenance Cost Comparison	30
Chart 10: Importance of Community involvement	33
Chart 11: Evaluation of procurement systems	35
Table 12: Construction Materials Costs in USD 2000 - 2007	39
Table 13: Development on Unskilled Labour wages in USD/day 2000 - 2007	40
Table 14: Construction Volume Education Sector	41
Chart 15: Accumulated Cost saving potential	49
Table 16: Study Team Members and Authors	51

Annexes

		Page
ANNEX I	Draft Report on Findings - Architectural/Technical Sector	A1-1
ANNEX II	Draft Report on Findings - Economic Sector	A2-1
ANNEX III	Draft Report on Findings - Sociological Sector	A3-1
ANNEX IV	Draft Report on Findings - Procurement Sector	A4-1
ANNEX V	Terms of Reference	A5-1
ANNEX VI	Detailed Study Methodology	A6-1
ANNEX VII	Time Schedule	A7-1
ANNEX VIII	Research Formats	A8-1
ANNEX IX	Target Schools	A9-1
ANNEX X	Contact Matrix	A10-1
ANNEX XI	Regional & Institutional Web-Chart on cost influencing factors	A11-1
ANNEX XII	FFS Facility Matrix	A12-1
ANNEX XIII	Cost Comparison Structure and Materials	A13-1
ANNEX XIV	Bibliography	A14-1

Abbreviations

Abbreviation	Meaning
BEDP	Basic Education Development Project
BEDS	Basic Education Development Strategy
BEEP	Basic Education Expansion Project
BEIP	Basic Education Improvement Programme
BLS	Cost optimised Baseline School Model
EFA	Education For All
FTI	Fast Track Initiative
GoY	Government of Yemen
FFS	Fully Functional School Concept
KfW	Kreditanstalt für Wiederaufbau
LCC	Lifecycle Cost Model
LTE	Long-term Expert(s)
MoE	Ministry of Education of GoY
IDA	International Development Association
GEO	Governorate Education Office
MDG	Millennium Development Goals
MIS	Management Information System
MoE	Ministry of Education
MoLA	Ministry of Local Administration
MTE	Medium-term Expert(s)
NOL	No Objection Letter Procedure
PAU	Programme Administration Unit
PDD	Project Design Directorate
PWP	Public Works Project
SFD	Social Fund for Development
SMD	School Mapping Directorate
STE	Short-term Expert(s)
TA	Technical Assistance
ToR	Terms of Reference
UNICEF	United Nation Children Fond
USAID	US-Agency of International Development
WB	World Bank

1 Synopsis

Project Title	School Construction Costs in Yemen Cross-Sector and Multi-Institutional Assessment Study
Project Number	SEF 1992 70 182 - (553596)
Country	Yemen
Project Duration	08/2007 - 04/2008
Overall Objective	The assignment is to serve as a basis for the ongoing process of revising existing and issuing new national regulations with regard to the procedures and designs applied in school construction in Yemen and as a benchmark for the required trade-off between 'durability-at-high-cost' and 'number of pupils who can be served' in order to support the Government of Yemen and the donor community in achieving the UN MDG of universal primary education and Yemen's EFA-FTI pilot role.
Project Objective	To identify solutions for school construction which are better in terms of educational requirements and cost effectiveness, including maintenance, on the basis of a cross-sector and multi-institutional assessment.
Project Results	<p>Analysis of the following influencing factors:</p> <ul style="list-style-type: none"> External macro-economic and fiscal policy issues Capacity and interest of Yemen's construction sector in remote locations Potentials for improved site selection procedure regarding the guidelines and principals for an optimised site selection in the selected target area Potential for community contracting (savings and ownership) Design and material choices vis-à-vis resulting lifetime and maintenance efforts Impact of components of physical environment on learning results Benchmarking for rehabilitation efforts (what is acceptable at what cost) Potentials for very low-cost core schools in specific areas based on the FFS concept and a clearly defined unit cost indicator Potentials for improvement of project planning and tendering cycles Donor imposed delivery systems (tendering, consultants, design etc) Potentials for a comprehensive cost monitoring system
Project Outputs	<p>Inception Report – completed January 2008</p> <p>Draft Report on Findings – completed in April 2008</p> <p>Draft Final Report – June 2008</p> <p>Final Report – July 2008</p>

2 Executive Summary

1. The school construction sector in Yemen is currently characterized by rapid changes due to a number of loans and grants for educational reform which have to be executed in time. The process is to a large extent donor driven by the MDG challenges to provide access to basic education to all Yemeni citizens by 2015. All stakeholders involved, donors, ministries and implementing agencies at present suffer from a lack of coordination and communication, and a multitude of different implementation methods and strategies. The study aims to gather information on **school construction, concentrating on cost effectiveness**, on the basis of a cross-sector and multi-institutional assessment. Moreover, the study should search for cost reduction potentials and thus serve as a basis for revising existing and issuing new national regulations related to school construction.

2. In order to find a common understanding of the species of cost (short-term – long-term) and to make the multitude of school constructions by different implementing agencies measurable, **four concepts and models** have been developed to serve as basic assumptions:

- ▶▶ FFS Concept: “Fully Functional School”
- ▶▶ LCC Model: “Life-cycle Costs” (30 years)
- ▶▶ BLS Model: “Cost optimised base-line school”
- ▶▶ UCI Concept: “Unified Cost Indicator”

These concepts have been scrutinized for the development of one sample school type 6-classroom size with an optimised design, to serve as a benchmark for the comparison of the investigated schools and implementation systems, and as a guideline for the development of cost reducing proposals in the next step.

The study has been undertaken as empirical research by four teams: architecture, economics, procurement and sociology, based on cluster research in four target Governorates.

3. The **technical and architectural research** findings show a significant potential for cost savings. Most of them can be realised as short-term measures. More adequate site selection, appropriate master plans and adapted, but modest standard designs with maintenance-friendly materials can lead to cost reductions of 20% and more from current levels.

Another important cost saving factor is construction site supervision. Competent site supervision securing quality control saves about 10% in maintenance, based on the lifecycle costs model.

Operations and maintenance (O&M) can be identified as the most important saving factor in a long-term perspective of school construction costs. This factor sums up to 40% of a lifecycle of 30 years. As long as no O&M-budgets are foreseen, only very short life spans of schools or extremely high maintenance or rehabilitation costs (up to 190% of the ideal lifecycle costs in a 30-year time frame) are likely.

4. The **procurement and disbursement procedures** vary according to the administrative capacity and efficiency of the implementing agencies. Although MoE/PAU have improved their capacities, because of improved MIS and M&E

systems the parastatals PWP and SFD are performing more efficiently. This, for example is also the perception of the construction business presenting higher bids to MoE/PAU than to PWP and SFD for the same type of school construction project. Security margins of around 20% and more in the bids to protect them against deficient procurement procedures and delayed disbursements have been the result. Administrative reforms have therefore the potential for substantial savings.

An additional factor identified is the lack of capacity of the contractors in the construction business. This factor needs strong attention in order to reduce the costs of school construction in the long term, as all technical improvements in the planning and procurement processes must be realised by the contractors. They currently lack the capacity to do so, and their lack of trust in their own cost calculations additionally leads to unnecessary unit rate increases.

Another area requiring a strong involvement in capacity building has evolved out of the recent decentralization efforts. Particularly in regard to procurement and supervision, decentralised project management units in the Governorates and the local communities are usually overburdened by their new tasks and responsibilities. Structures are not yet fully functioning and expertise is still missing as the pool of available experts is limited and the available budget for adequate professionals is low.

5. The **economic and legal framework** in which school construction is embedded has a strong influence on the cost factors as identified in the LCC. The world market prices of construction materials (concrete, iron /steel and fuels) have caused costs to skyrocket and induced inflation which has had an overall impact on the price and wage level in the country. Unfortunately, the potential for cost savings here is very limited since prices of imported materials can hardly be influenced. If at all, cost reduction can be reached through optimised designs, since the use of local materials does not fulfil the requirements of the quality of execution in the cost-intensive material requirements and could also lead to delayed cost increases in the maintenance budgets.

Economically, another cost saving factor could be seen in market competition, which functions imperfectly since the above-mentioned divergent administrative structures lead to a distortion of the market. Improvements could be achieved through public service reforms.

6. Empirical research on **community participation** has shown that communities are interested in education but that, they do not significantly contribute to cost savings in school construction. There is hardly any realistic contribution to be expected over and above the officially expected 5%, and it is questionable if such an approach is actually cost reducing, as the required organisational and project preparation efforts are usually very time and manpower intensive. The field survey shows that “community participation” is often an artificial construct and the expected contributions are just shifted to the responsibility of the contractor as a precondition before starting the construction works.

Community involvement should therefore play a role in projects which aim to develop and strengthen communities and their capacity to manage projects with well-budgeted timeframes and manpower. In this context a stronger involvement

of the community could be beneficial and cost saving both for the planning process and also for O&M due to community support and experiences in optimising BSL concepts and master plans as well as life-cycle thinking, but not under the primary concept of cost efficiency in school construction projects.

7. The aspect of **institutional capacity** reveals two general findings, which should be addressed in view of long-term improvement measures:
 - a. Reducing the number of implementing agencies, as proposed by government circles, in spite of increasing demand in school construction, in order to reach the MDGs may turn out to be counterproductive as the remaining agencies (PWP and SFD) are becoming too big and too dominant. Even if the parastatal organisations could be comparatively more efficient at present, by transcending their optimal size they may become less efficient and less effective because of the oligopolistic structure on the demand side. It is therefore advisable to apply a twofold strategy which aims at increasing the efficiency of existing implementation agencies like PAU, while also promoting the agencies which already operate with high efficiency.
 - b. The lack of transparency and coordination in the process of school construction, in particular project planning, approval and execution, requires a new approach which supports the introduction, application, and monitoring of the of the above-mentioned basic models and concepts. An independent institution which integrates school mapping, application, supervision, and continuous revision of the FFS, LCC, BLS and UCI concepts is urgently required. This institution should be the focal point for all agencies involved in school construction, ensuring adequate planning procedures and quality of execution in accordance with the guidelines. Moreover, this institution has to provide a statistical database allowing comprehensive annual review reports and reviews of the basic concepts and models.

Summing up, the technical sector has an overall potential for cost reductions of up to 25% compared to current practises, combining a series of short-term improvements with a set of long-term capacity building measures. Moreover, capacity building within the implementing agencies and better coordination and cooperation between them through improved standards and unified regulations can lead to further cost reductions of more than 10% based on the current costs, given a generally positive attitude towards reform.

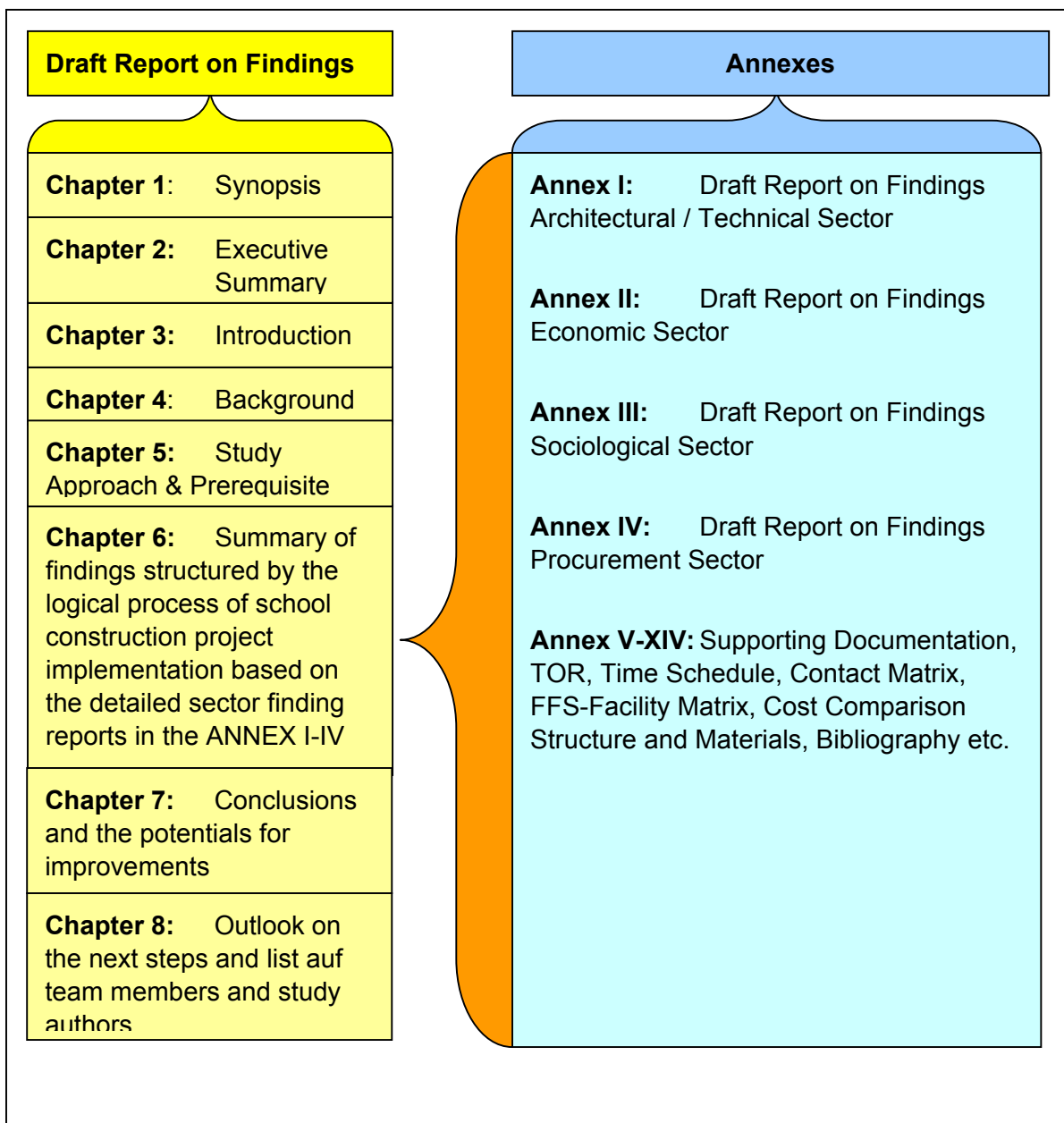
More detailed proposals for new regulations and reforms will be provided at the planned proposal workshop.

3 Introduction

This draft report summarizes the results of the assessment phase of the Cross-Sector and Multi-Institutional Assessment Study on School Construction Costs in Yemen. As it is supposed to serve as a basis for the development of short and long-term proposals, it is divided into two parts: (i) A Summary Report focussing on the main findings and conclusions, which, in turn, are based on the (ii) comprehensive research report in the Annex I-XII.

This approach permits a comprehensive view of the entire process, backed up by the detailed research analysis of the four research sectors. The following chart displays the report structure and contents:

Table 1: Report Structure



4 Background

During the last ten years Yemen has expanded educational opportunities for boys and girls going to primary school: boys by 15% and girls by 38%. In 2002 the GoY developed and formally adopted the Basic Education Development Strategy (BEDS), which aims to reform the education system. In 2005 the public expenditure share in the education sector was 21.2%.

In 2006 a number of important policy measures were undertaken:

- ▶▶ Draft Medium Term Results Framework (MTRF) presented by the MoE in the second Joint Annual Review (JAR) in May 2006.
- ▶▶ As part of the MTRF, the MoE presented its first comprehensive annual work plan for 2007 for basic education.
- ▶▶ School fees for girls from grade 1-6 and boys from grade 1-3 were abolished.
- ▶▶ Teacher posts are now linked to schools
- ▶▶ Schools are asked to support parents' participation through the organisation of parents' councils (Mothers' and Fathers' Councils).

The strong focus on educational development within the framework of the EFA initiative in Yemen has increased the focus on school construction as a means of providing equal access to education for all children. While schools definitely provide access as required by the BEDS, they also have to satisfy BEDS's call for quality and equity in education. Furthermore, Yemen is committed to opening participation opportunities for parents and communities in the educational planning process.

Further to budgetary constraints just as in many other developing countries, Yemen faces the need for a cost-effective school construction solution. But cost-efficiency often conflicts with other considerations, such as quality, and has a tendency to disregard the complexity of the general framework in which school construction efforts take place.

The high need to expand access to basic education in order to achieve the MDGs and the rising construction costs require a review and comparison of the existing implementation systems and procedure concerning their efficiency and ability to increase their capacity.

Yemen qualified for funding under Education for All (EFA) and the Fast Track Initiative (FTI) in order to reach the Millennium Development Goals (MDGs) for education in 2015. At present the Yemeni Government has committed itself to reaching the MDGs in education, focussing on:

- ▶▶ Providing primary education for all Yemeni citizens by 2015;
- ▶▶ Achieving gender equity in primary and secondary education.

The corresponding challenge and demand for investment in school infrastructure remains great in terms of:

- ▶▶ Unaffordable funding requests and
- ▶▶ Weak coping-capacity of Yemen's construction sector. Therefore there is a common understanding of the urgent need to target and harmonize school construction in Yemen, especially in relation to construction and life-cycle costs.

If construction of new classrooms and facilities does not gain serious momentum, it seems unlikely that Yemen will succeed in matching the Millennium Development Goals 2 and 3: "ensure all boys and girls complete a full course of primary education by 2015" (MDGR Yemen, 2005). According to that target, approximately 11,800 classrooms and 950 other school facilities would have to be added annually, an increase of 49% of current classroom production per year. To achieve this, improvements in the following sectors are significant:

- ▶ Increase of capacities in Planning, Procurement and Administration Departments of the related Ministries and Implementation Units and considerations of increasing the outsourcing of planning activities to boost design and implementation output
- ▶ Improvements in administrative and procurement procedures and organisational efficiency within respective Ministries and Implementation Units to reduce time of project cycles
- ▶ Streamlining activities among different Implementation Units and strengthening alignment and cooperation with line ministries
- ▶ Timely disbursement of allocated funding to avoid financial bottlenecks and to assure on-time payment of Contractors
- ▶ Improved site supervision and quality control, including capacity building at GEO (Governorate Education Office) level for technical staff and, where applicable, training of participating communities to ensure work programme adherence
- ▶ Capacity building and training for local contractors and consulting firms, to improve efficiency of implementation.

Against this background, the first step for improvement was taken by MoE with the support of KfW by developing the Terms of Reference for the cross-sector and multi-institutional assessment study on school construction costs in Yemen. The study should support all stakeholders in identifying areas of improvement in the school construction sector, based on a holistic situational analysis of all sectors involved in the process.

5 Study Approach

5.1 Study Objectives

According to the TOR the objectives of the study are:

- ▶ To identify solutions for school construction which are better in terms of educational requirements and cost effectiveness, including maintenance, on the basis of a cross-sector and multi-institutional assessment.
- ▶ To serve as a basis for the ongoing process of revision of existing and issuing of new national regulations with regard to the procedures and designs applied in school construction in Yemen.

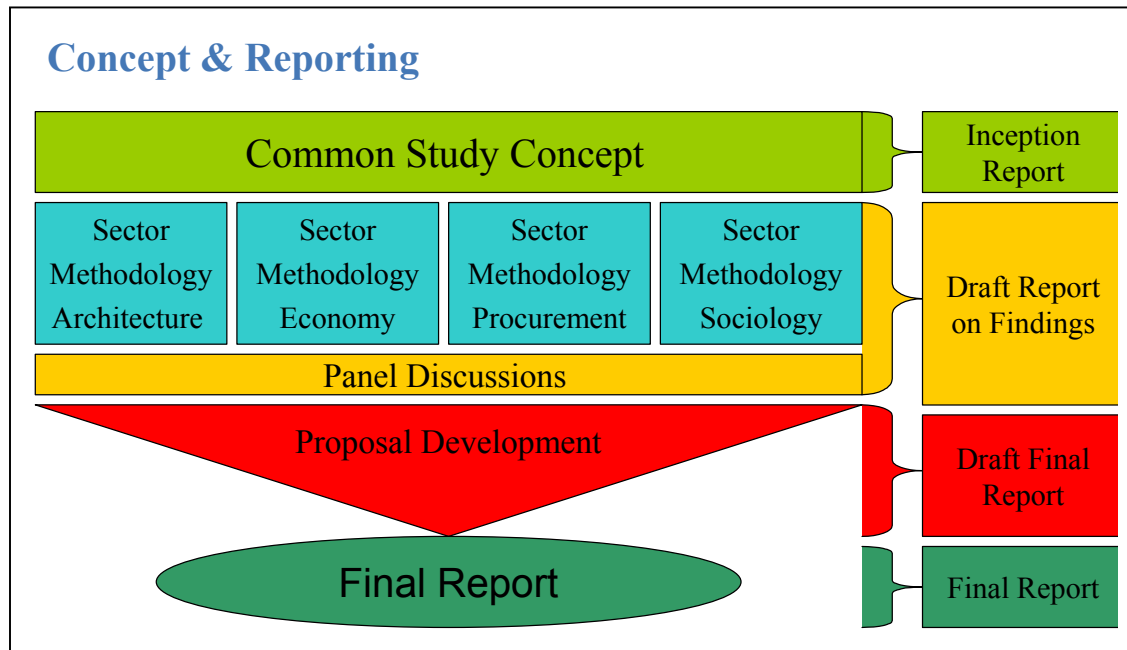
5.2 The Study Concept

Table 2 displays the study concept, which is based on a compulsory methodology applied in all four different “sectors” which includes (i) setting a baseline for result comparison through desk research analysis, (ii) data collection based on the original project plans of the identified target schools (“As-Planned”) and (iii) field research and data collection of the actual situation (“As-Built”). The findings were then presented, discussed and completed by the panel discussions at the expert level in order to ensure the comprehensiveness of the researched list of influencing cost factors.

All research has been focussed on the following guiding questions:

- ▶ “Which are the main cost factors in the respective sector?”
- ▶ “To what extend do these cost factors contribute to the overall lifecycle costs of a school in Yemen?”
- ▶ “For which of these factors does the specific local and regional environment provide potential for improvement?”
- ▶ “To what extend can the identified cost factor be influenced, based on the analysis of already existing experiences of the stakeholders and the identified ‘realities’ in the field versus the original project plans?”
- ▶ “Is the optimised cost factor contributing to or contradicting the aim of satisfying the MDG’s or the BEDS or the defined models/concepts as FFS, LCC and BLS?”

Table 2: Study Conception



The panel discussions took place in January and February 2008, followed by a preliminary presentation of findings in Sana'a on March 4, 2008.

The results of the discussions with the stakeholders on the findings will then be summarised in the "final" Draft Report on Findings and distributed to all stakeholders, including KFW and MOE, to serve as the basis for the development of proposals.

Two sets of proposals for short-term and long-term implementation will be presented and discussed in a comprehensive workshop including all stakeholders at the end of the proposal development phase.

It is crucial for the success of this study that the cycle of research, assessment, presentation, and discussion phases permits maximum participation of all involved parties. In any case, this will increase the likelihood of implementing the proposals elaborated and is therefore considered as a measure of capacity building in itself.

5.3 Concepts, Models & Definitions

As already stated in the Terms of Reference for this assessment, cost comparison between different school types erected by the various implementation agencies is currently difficult and sometimes even impossible. Some reasons related to design and construction costs are:

- ▶ Variety of different school types (1, 3, 6, 9, 12 classroom schools; satellite and cluster schools; single, double and multi-storey constructions)
- ▶ Variety of construction activities for schools (new schools, additions, extensions, rehabilitations and mixed activities)
- ▶ Different classroom sizes and m²/student basis, varying from less than 22m² (BEIP/divided classroom) to over 50m² (BEDP) gross area per classroom, and 1.67m²/student (FTI, 3-classroom school) to 3.14 m²/student (BEDP, large schools) for gross surface area of the entire school
- ▶ Inclusion or exclusion of school facilities (administration rooms, boundary wall, extra-curricular rooms etc.) and of furniture in the school design and their different quantitative impact on overall school cost
- ▶ Usage of different parameters for calculations of total m², distorting cost/m² figures, e.g. inclusion or exclusion of paved areas, flat roof areas etc. and use of different currencies and varying exchange rates
- ▶ Different structural systems, specifications and material selection, resulting in different quality standards
- ▶ Constant revision of standard school types, making cost comparisons difficult even within one organisation
- ▶ Significant devaluation of the Yemeni rial and material cost increase complicating cost comparisons for schools constructed in different years
- ▶ Remoteness of construction sites and difficulty of access, creating base cost variations of up to 40%
- ▶ Exclusion of administrative, planning, supervision and maintenance costs in overall school cost
- ▶ Different amounts and types of community contributions for local school constructions

In order to ensure the data integrity leading to fully comparable analysis results of the four sectors, four crucial concept models adapted to the Yemeni environment were defined and represent the backbone structure of this study:

- ▶▶ FFS Concept – The Fully Functional School Concept
- ▶▶ LCC Model – The Lifecycle Cost Model
- ▶▶ BLS Model – Cost Optimised Baseline School Model
- ▶▶ UCI – Unified Cost Indicator Concept

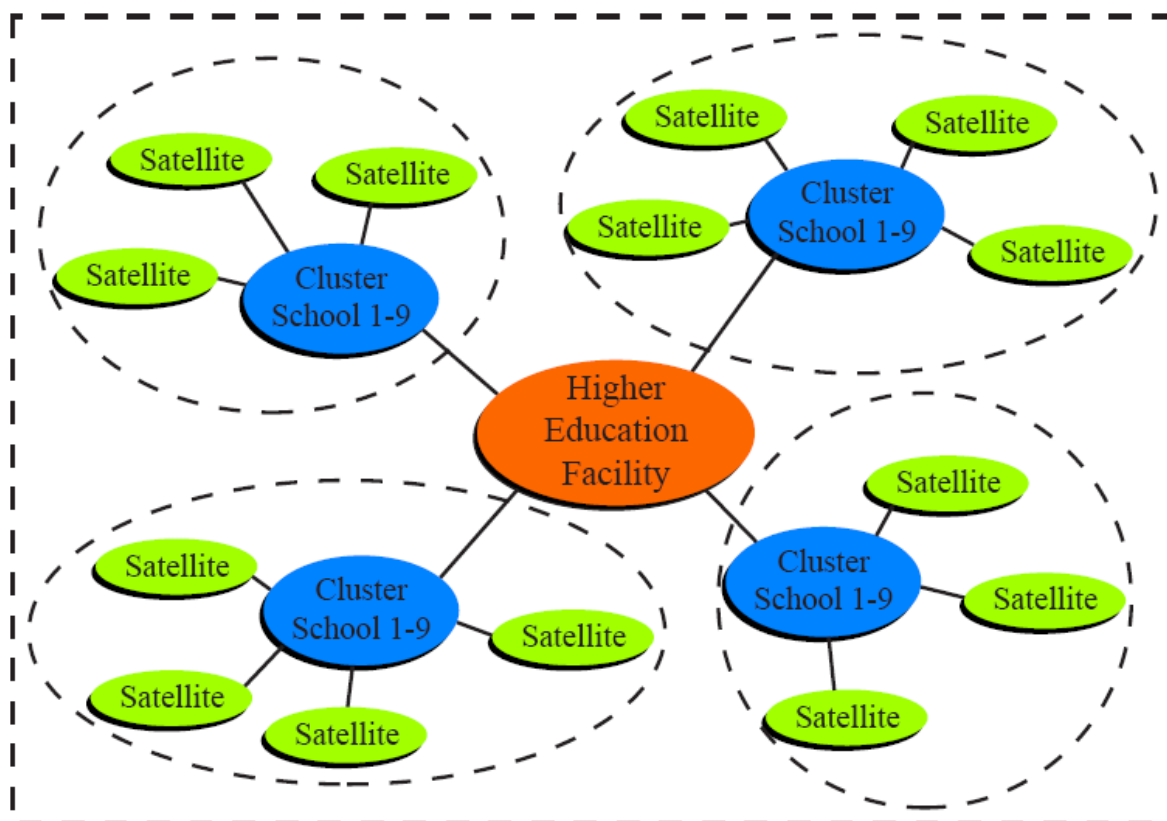
All findings refer to these four models/concepts, and any further discussions on proposals for cost optimisation and improvements should be based on the mutual acceptance of these definitions.

5.3.1 FFS – The Fully Functional School Concept

The first step required to investigate cost efficient solutions for a construction project is to define precisely the desired outputs. Usually the final definition of an infrastructure facility is based on the construction standards, the technical drawings, and the bill of quantities. As the schools are build in very different environments, with highly divergent physical requirements, a general guideline needs to be developed, supporting the responsible engineers in designing the school according to the environmental and educational requirements, and the Yemeni culture.

According to the research results discussed in Annex IV, there should be minimum requirements set for a school to be regarded as being “fully functional”. For this purpose, a “Fully Functional School Requirement”-Matrix was created (see Annex XII – FFS-Facility Matrix). The requirement matrix is based on a regional context approach, which considers different facilities as mandatory depending on the function, the location and the size of the school as displayed in figure 3 below.

Figure 3: FFS- Concept in the regional context



As an example, a “fully functional” 6-classroom Rural Cluster School should have the following items and facilities in place to fulfil the proposed FFS-Concept standards:

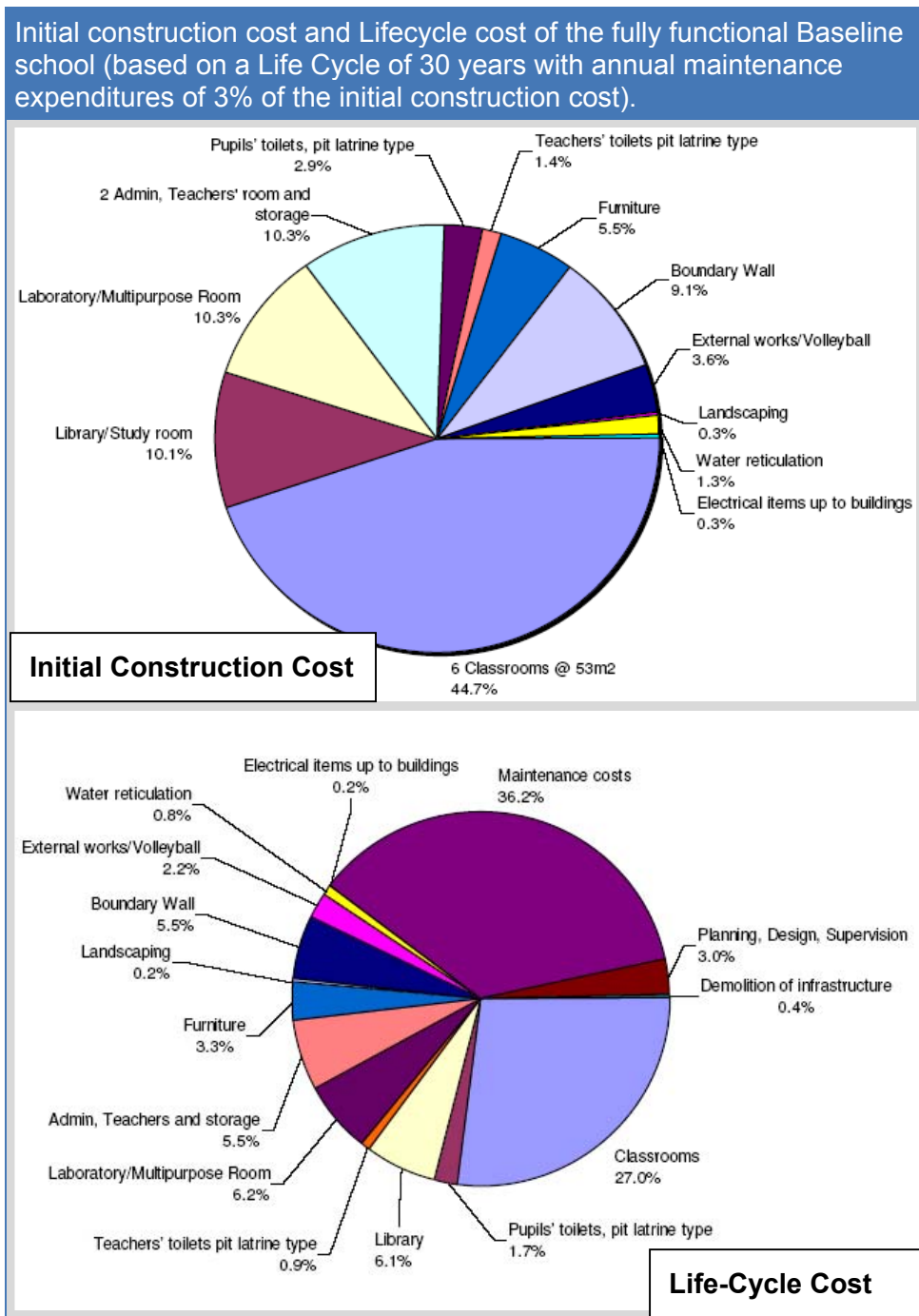
- School yard with min 6m² per student and not smaller than 1000m²
- Classroom size of 53 m² gross floor area or 47.6m² net floor (1.0m² for 48 pupils)
- 1No. Administration Room
- 1No. Teacher’s Room
- 1No. Headmaster’s Room
- 1No. Storage room
- 1No. Laboratory Room with laboratory worktop and storage facilities
- 1No. Library Room and Book Store Room
- 1No. Multipurpose Room
- 8No. toilet cubicles for pupils, preferably pit latrine type
- 2No. toilet cubicles for teachers, preferably pit latrine type
- 1No. sheltered drinking water point, near to admin unit including separate soak away pit (If fresh water available, alternatively a well)
- Furniture: 108No. pupils desks with attached bench and 6 teachers desks
- Fresh Water and electricity supply (If available)
- Boundary wall with foundations and columns (Height should not exceed 1.4m)
- External Works, e.g. continuous paving around buildings, parking area with well compacted soil, litter bins, stairs (where necessary), paved areas, canopies, benches, 1No. flag pole, Volleyball pitch, school garden, entrance gate
- Landscaping with indigenous shade trees and shrubs (If regional applicable)
- Minimum of 8No. Teachers
- Possibility of multi-grade teaching and of running two shifts, daily
- Maintenance for 30 years
- Maintenance kit provided at school

In addition to all listed requirements, there is still need for adequate staffing, operation and supervision, before the school can be considered to be fully functional.

5.3.2 LCC – The Lifecycle Cost Model

As a result of the detailed analysis described in Annex I-IV, the following LCC Model (Table 4) has been developed. The LCC includes all cost factors related to the infrastructure requirements based on the BLS model in accordance to the FFS concept. It clearly indicates the actual importance and impact of the cost factors on the total costs of a school throughout its life cycle. Cost reducing efforts should be focused accordingly.

Table 4: LCC Model Cost Distribution



5.3.3 BLS – The Cost Optimised Baseline School Model

As a benchmark for comparing the over 50 target schools in the four Governorates, a cost optimised model school has been defined. This Baseline School BLS is used by all research sectors for the calculation of cost factor impacts on the LCC.

Table 5 displays the costs of the BLS in various typical cost indicating formats. The following items have been included following the FFS Concept and the LCC Model:

- Master Planning and Design with option for extension in future with total school yard of 1500m²
- 6 No. Classroom school block with 1.33m² for 40 pupils for 53m² gross floor area / 48m² net floor area for each classroom
- 2No. Administration rooms, 1No. Teacher's Accommodation, storage room; 72m² net floor area total
- 1No. Laboratory room with 72m² floor area gross with storage facilities. Separate soak away pit, same size and proportion as 1Classroom
- 1No. Library room / Multipurpose room with 72 m² gross floor area
- 1No. Toilet unit for pupils, pit latrine type: 4No. squatting pans and 4No. wash hand basins (2 boys/2 girls each) with 20m² floor area gross; incl. soak away pit for wash hand basins
- 1No. toilet unit for teachers, pit latrine type: 2No. squatting pans and 2No. wash hand basins (1 gents/1 teachers each) with 10m² floor area gross; incl. soak away pit for wash hand basins
- 1No. sheltered drinking water point including separate soak away pit
- Furniture: 120 pupils desks with attached bench (double type), 6 teachers desks,
- 10 teachers chairs, 10 No.3m shelves, 50 chairs, 8 tables for the admin room and library, specialised worktop including equipment for Laboratory
- Fresh Water and electricity supply
- Boundary wall 160meters length with entrance gate (2x50+2x30metres)
- External Works (continuous paving around buildings, parking area with well-compacted soil, litter bins, stairs, paved areas, canopies, benches, 1No. flag pole, Volleyball pitch, guard house, planters and entrance gate)
- Landscaping with indigenous shade trees and shrubs
- Maintenance for 30 years
- Demolition of buildings after usage

Total: 240 pupils (1No. shift) in 6 Classrooms, i.e. 2.54m² / student (for 609 m² gross building), 1.33m²/student with 40 Students / Classroom

Table 5: Costs of the 6-classroom Baseline School US\$

Item	Total cost	Cost /M2	Cost / stud	Cost / Cl. R	% of total
		609 M2*	240 Stud.	6 Cl.R	
Construction cost	159 525	262	665	26 588	60,61
Planning, design, supervision	7 976	13	33	1 329	3,03
Maintenance over 30 years	95 715	157	399	15 953	36,36
Sub total Service cost	103 691	170	432	17 282	39,39
Total cost	263 216	432	1097	43 869	100,00

* M2 gross area

All figures in this study are based on the calculation of this cost-optimised BLS Model.

5.3.4 UCI – The standardised Unified Cost Indicator

Construction business is often associated with engineering, mathematical calculations and therefore precise figures. This should lead more or less to a database of comprehensive information on costs, rates, budgets and allow a detailed comparison of the various construction projects concerning their cost, quality and time efficiency. Unfortunately this is not the case, as a multitude of interpretations on how to calculate these basic figures may lead to the exact opposite of the assumed accuracy.

The first step to actually allow direct and precise analysis of costs is to agree on a standard for the calculation of rates. This process of standardisation is essential in order to develop appropriate and effective tools to streamline the processes and to increase overall cost-effectiveness, quality and timeliness in the school construction sector.

A feasible standard UCI describes the life cycle costs per square meter gross building identified in the LCC model in Chapter 5.3.2 for a school fulfilling the FFS concept conditions for a sample BLS as described above. All facilities mentioned in the LCC can then be described "in a ratio system" of the UCI and separately discussed and improved without disregarding the other essential cost factors that are required to actually achieve the desired result of a "fully functional school". This approach requires a separate UCI calculation for each school type and guarantees a realistic comparison of data, taking the scale and complexity of the project types into account.

Table 6: UCI Sample Calculations for the 6CLR-Size BLS US\$ '000

Item	Cost US\$	UCI (%)
Buildings	129,72	48,89%
External works	21,50	8,10%
Utilities supply	2,60	0,98%
Demolition works	2,33	0,88%
Sub total Civil Works	156,15	58,86%
Maintenance (30 years)	94,14	35,48%
Planning / programming	2,50	0,94%
Design / supervision	12,51	4,72%
Sub total services	109,15	41,14%
Total cost	265,30	100,00%
Facility		
	Cost US\$	UCI (%)
Cost for the 6 Classrooms	71,63	27,0%
Laboratory / Multipurpose Room	16,45	6,2%
Library	16,18	6,1%
Pupil Toilets	4,51	1,7%
Boundary Wall	14,59	5,5%
Landscaping	0,53	0,2%
THIS FIGURES ARE BASED ON THE BLS model		

Table 6 displays a few sample UCI factors for budgeting purposes. Thirteen sample cost factors of the LCC model are displayed with their respective UCI factor.

For example the calculation of the pure construction costs for a single classroom without any other facilities and disregarding the lifecycle cost, as a budgeting figure for tender evaluation, would lead to the following result:

- ▶▶ 'Cost for Classroom factor' with 27% of UCI equals for the BLS 6CLR school: **27% of USD 434/m² = USD 117.18/m².**
- ▶▶ Depending on the classroom size (BLS: 1.33m² for 40 pupils = 53m²) the UCI per classroom (classroom only) would equal:
USD 117,18/m² x 53m² = USD 6210.54/CLR (Construction Costs only).

The most important understanding on the proposed UCI factor system is, that the school is only fully functional once the sum of all UCI factors equals 100%, which includes the entire LCC of the specific school.

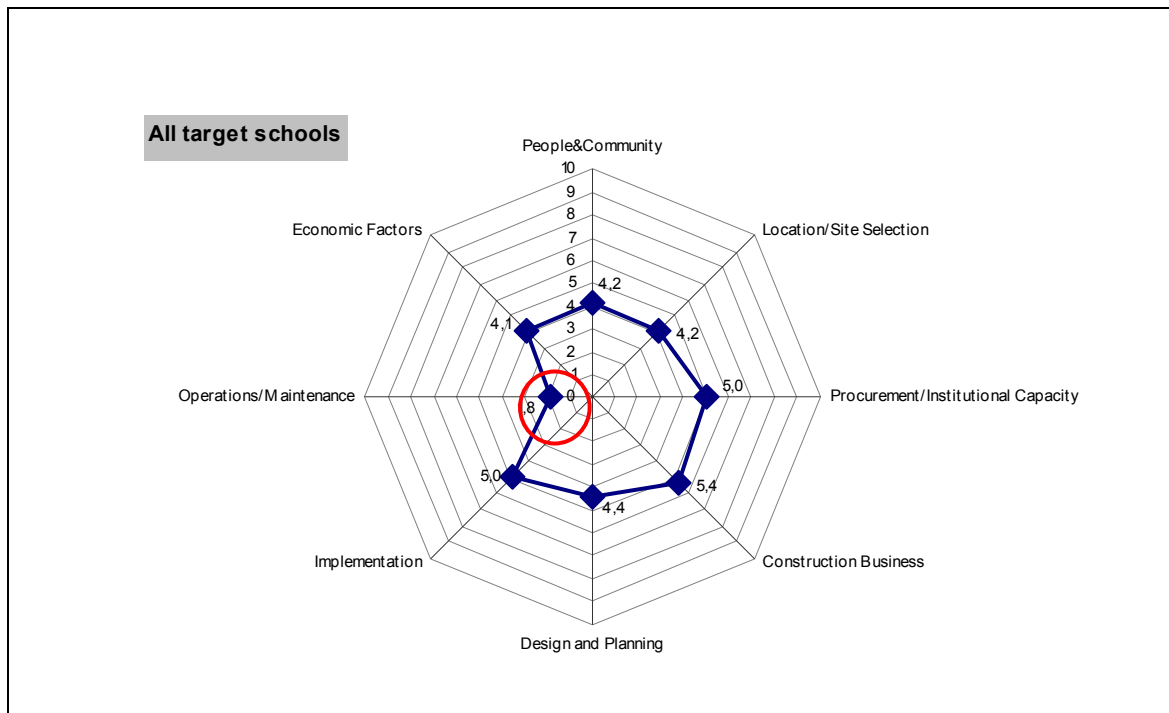
The value of the UCI for the different FFS school types vary according to their specific requirements. This approach permits a adequate and precise forecast for each FFS school type, preventing underestimations of the actual scope and budget of school construction projects.

6 Summary of Findings

The following sub-chapters describe the current situation in the respective areas and the major identified cost factors and potentials for improvement. The chapters are subdivided in order to outline the general process order of the actual project cycle, including planning, design, community involvement, tendering and implementation. The following subchapters discuss the environmental situation, such as the legal and administrative environment and the macro and micro economic background. The findings summary concludes with the general analysis of the issues durability, monitoring and the current institutional capacity concerning the actual number of school constructed per year versus the set goals.

Within a multi-institutional assessment study dealing with a highly complex topic, it is crucial to reveal dependencies and interrelations among different sectors, in order to focus the attention for improvement efforts. The Spider Web Chart below combines direct and indirect sub-factors influencing the various costs of the LCC model into 8 clusters. The sub-values were given individual weight ratings, ranking them according to their influence on the parent item. A diagram was prepared for each school visited by all sector teams and these were combined into an overall diagram to highlight the most important issues. This Web Chart is a combination of several assessments made in the targeted regions and has been developed in cooperation with the major implementing organizations. It summarizes the research findings with the practical implementation experiences of the implementing agencies, the contractors, and the beneficiaries.

Chart 7: Spider Web Chart of Cost Influencing Clusters



Explanation of the Web-Diagram (chart 7):

The diagram shows how strong 8 selected parent-items (clusters) are developed concerning school construction cost in Yemen. A high figure always shows a positive contribution towards low school construction cost and suitable educational environment, with 10 being the highest figure and 0 the lowest, respectively. A diagram of this nature was prepared for most of the schools visited and the above diagram shows the average of the individual one's. The figures for the parent-items were derived from a catalogue of sub-items, of which there are 77 in total. Each sub-item itself received a figure between 0 and 10 and a percentage to mark its importance in comparison to other sub-items of the same parent-item (the parent item being 100%).

Although there is a lot of room for improvement in all the clusters, the following findings are of particular significance for school construction costs:

- ▶ Maintenance is the weakest factor, though very significant for keeping lifecycle costs low.
- ▶ Implementation quality is ranked as a fairly strong factor. Nevertheless, site supervision and quality control is one of the five most influential potential cost reduction factors due to the potential to reduce construction costs on site and future maintenance costs through higher output quality and therefore more durable buildings
- ▶ Well performing Implementation Agencies generally show above average Planning and Design performance and adequate implementation quality, which, in turn, keeps maintenance costs low
- ▶ Efficient Implementation Agencies with fast disbursement procedures encourage contractors to offer real cost unit rates without unnecessary security margins for payment delays. This translates into lower overall costs without compromising quality
- ▶ Remote construction sites which are difficult to access influence implementation quality, as fewer suitable contractors are available, Site Supervision is usually less frequent and adequate locally available materials and resources are scarce.

This Web Chart cannot fully display the divergent regional situations, but it is a very useful tool for directing improvement efforts to the most potential clusters. A detailed list of the developed Web Charts for the different regions and organisations can be found in the ANNEX XI Regional & Institutional Web Chart of cost influencing factors.

Those factors with the strongest impact and highest potential for improvement are described in the following chapters and shown in the “Cost Saving Chart” (Chart 12, Chapter 7.2).

6.1 Planning & Design

6.1.1 Needs assessment, school mapping and programming

The School Mapping Directorate in the MoE, together with the GEOs, decides on priority areas and new school construction on grounds of a ranking methodology based on defined criteria and indicators. The size and facilities to be included are based on demographic data and the available budget. It is essential that these data are collected accurately and forwarded to the decision-making authorities. Overcrowding leads to increased cost due to subsequent interventions, and under-utilisation of schools increases the cost per student. 70% of schools visited were overcrowded and 55% required additional sanitary facilities. Especially problematic is the use of divided classrooms, preventing multi-grade teaching, which is often the only solution if there is a shortage of staff.

Overcrowded classrooms



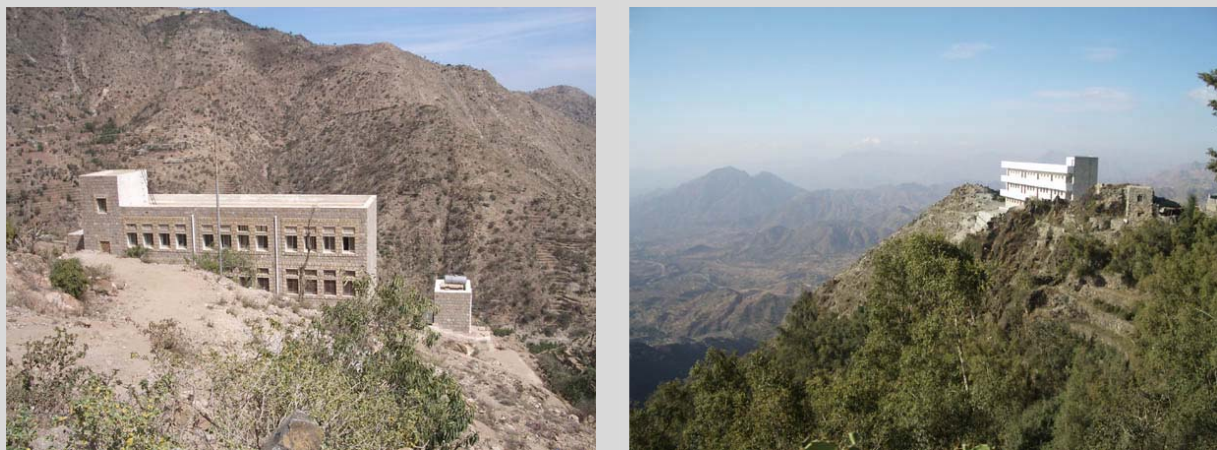
6.1.2 Site selection

Once the general location (village) has been identified via the school-mapping system, the next step is to identify a suitable plot of land for construction. Land is a valuable asset and carefully guarded in Yemen. Provision of land for public use is therefore always a sensitive issue and often regarded as a sacrifice, especially if the involved communities are not sufficiently consulted on land issues and the benefits for the community are not clearly apparent to them. Despite the shortage of available land, conflicts caused by provision of sites for school construction are fairly uncommon. However, according to the field research data, the sites selected for the schools are often inadequate, due to steep slopes, difficult access, poor soil conditions and exposed settings. A different site selection procedure in these cases would lead to a substantial improvement in the following cost factors:

- ▶ Less costly civil works to prepare the site, e.g. no major levelling and retention walls required, which account for up to 15% of total construction cost
- ▶ Lower cost for transporting materials to site
- ▶ Lower cost for optimised structures
- ▶ Lower wear and tear / maintenance cost
- ▶ Easily accessible sites encourage competition, hence lead to potentially lower unit rates
- ▶ Simplified site supervision due to easy access increases durability and quality, and reduces maintenance cost

Naturally extreme locations will always confront the engineers and project managers with situations that require unusual solutions that may not fit the ideal site selection criteria. Applying just the basic guidelines on best practise site selection procedures could reduce costs in more than 90% of the school construction projects.

Poorly selected sites, difficult to access



6.1.3 Standard designs, master planning and adaptation

The field visits have confirmed the opinion of several international experts that off-the-shelf standard designs for schools generally do not have advantages over individual designs customized for site conditions. However, the use of approved standard details and standard units complying with agreed norms and regulations have advantages regarding reduction of design cost and time and implementation quality.

Basically all implementing agencies in the school construction sector in Yemen favour the use of standard school types. Generally, there are standard types for coastal, mountainous and desert areas for 3, 6, 9 and 12 classroom satellite and cluster schools and for a variety of different building materials. Moreover, these standard designs are subject to frequent amendments due to changes in nationally accepted standards and in educational concepts. This has led to a multitude of different standard designs. However,

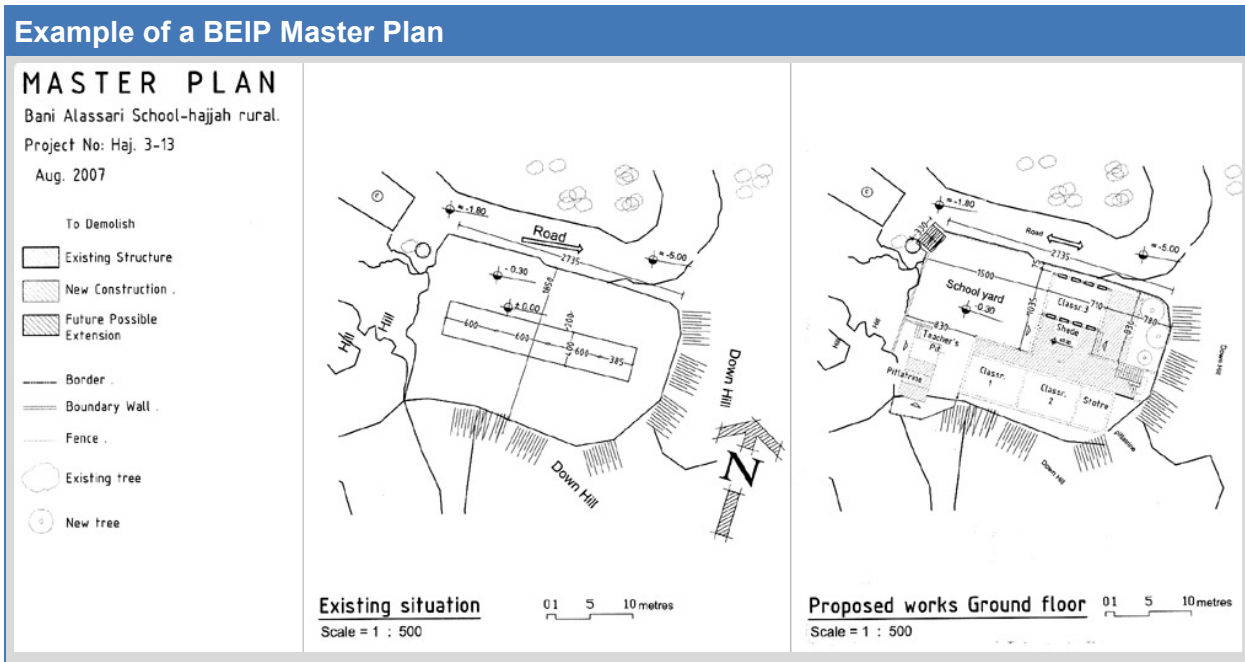
most GEOs do not have full, up-to-date sets of standard drawings for the different implementation agencies, and in most cases only a small selection of school types is actually used, even if more appropriate types are available for specific site conditions. The right choice of the appropriate standard design has the following advantages:

- ▶ Modest architectural standards and clear, efficient structure, saving implementation time and up to 19% of the LCC
- ▶ Less adaptation to site conditions required.
- ▶ Simple detailing, facilitating high quality of execution and thus assuring durability
- ▶ Compliance to national standards and regulations with adequate room sizes and proportions, ensuring good functionality and reducing likelihood of changes at a later stage
- ▶ Use of appropriate facilities such as dry latrines save valuable resources, reduce operational costs and dependence on external service supplies and ensure continued functionality of sanitary facilities
- ▶ Appropriate choice of material and fittings improves durability and reduces maintenance costs
- ▶ Use of maintenance-friendly designs, reducing maintenance costs

According to the analysis of the design documentation of the researched target schools, more modest standards and optimised designs could save approximately 8% of LCC costs. (See Annex XII – Cost Comparison Structure and Material for further details)

Master Planning, used only in some BEIP school construction, and accurate Layout drawings should be an essential part of the Planning Process, even if standard school types are used. Site investigations, including at least topographical surveys and beaconing are a prerequisite. The advantages of Master Planning and Layout drawings are:

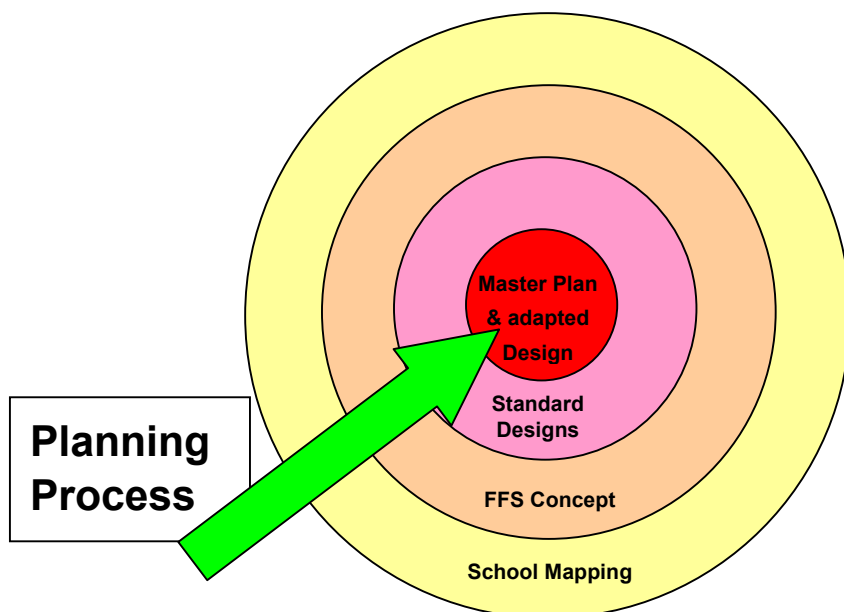
- ▶ Control of storm water discharge on the premises and beyond, preventing costly repairs of erosion damage
- ▶ Inclusion of landscaping, vegetation and shaded areas, thereby creating a healthy and friendly environment less prone to vandalism and soil erosion, thus reducing future maintenance cost.
- ▶ Clarification on exact location and height of boundary and retention walls; the latter are especially important on sloping sites
- ▶ Efficient use of land and inclusion of possible future expansion options
- ▶ Control of access to school and neighbouring premises, reducing risk of future disputes
- ▶ Integration of school into surroundings



Standards and guidelines have been developed, but have not been implemented in an integrated approach. Hence, a different system is needed. It is apparent that the lack of a structured approach to the entire planning process has led to numerous inconsistencies that have prevented an effective and cost optimised country wide approach for school project planning, design and implementation.

School mapping, master planning, standard design, and adaptation process should ideally follow the sequences laid out in Chart 7. The outer circles represent the required environment of concepts and guidelines, the inner circles target the individual school and the processes for a cost optimised approach. The planning process should follow a single directive approach as displayed in Chart 8 below, which should be executed and supervised by only one authority to guarantee the appropriate application of the holistic concepts: FFS, BLS, LCC and UCI.

Chart 8: School Construction Project Planning Concept



6.2 Durability and Feasibility

6.2.1 Design and Maintenance

As maintenance accounts for approximately 36% of the LCC, designs that facilitate and reduce the amount of maintenance are required. Simple methods, e.g. doorstoppers, kick plates on doors and protection strips decrease wear and tear, reducing the amount of costly recurrent remedial works. Suitable materials and appliances, which can be sourced locally if replacement is needed, facilitate maintenance activities. Adequate and environmentally friendly sanitary systems are commonly cheaper to install and to operate and more durable, due to absence of fragile mechanisms. Maintenance friendly designs can reduce less annual maintenance costs by up to 0.5%, producing LCC savings of more than 9%. Environments personalised by the students, e.g. choice of colours, materials and accessories, increase acceptance of the facilities and have a positive impact on learning results, thus reducing the cost of repairing damage caused by vandalism.

6.2.2 Operation and Maintenance

At over 50% of schools visited no or only very little maintenance work had been carried out since the facilities were handed over. At over 40% of inspected schools the buildings and premises are not cleaned regularly, increasing risk of vermin accumulation. 70% of students' sanitary facilities were locked and over 60% of flush toilet systems were not functional when inspected due to water shortage or cut supply lines.

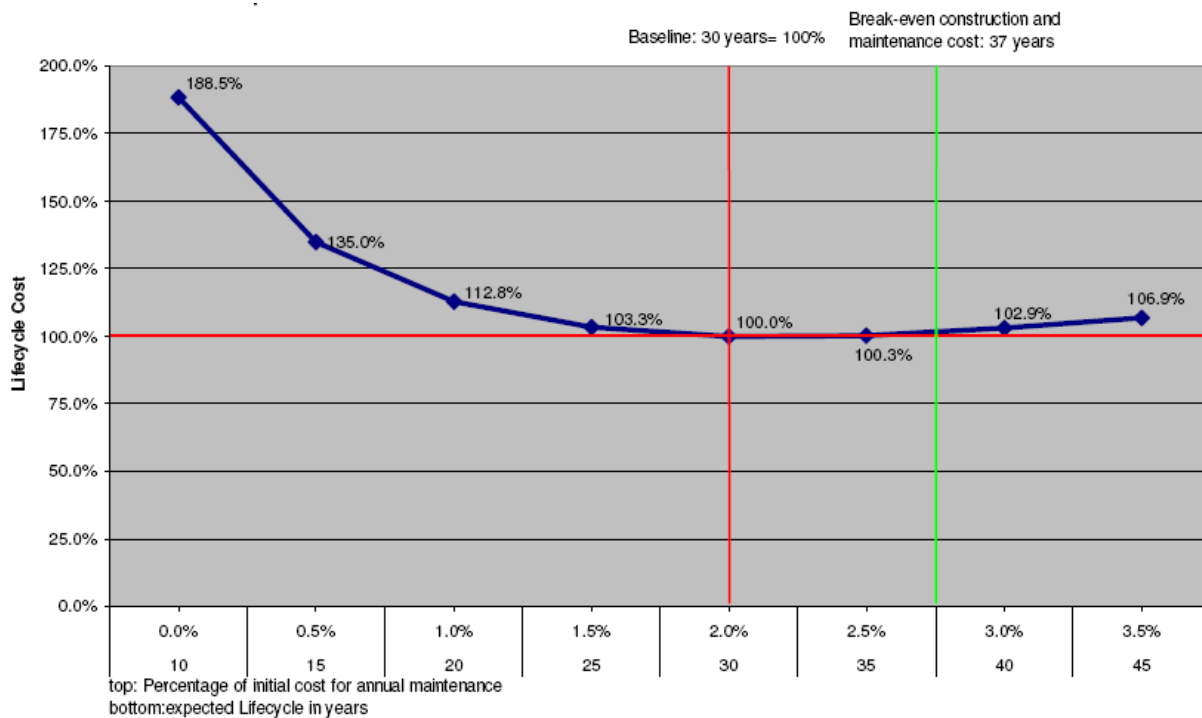
The major reasons for lack of maintenance are:

- ▶ Absence of a meaningful budget for O&M activities, leading to rapid decline within short period of time and creating a need for major rehabilitation works or construction of new schools far sooner than anticipated
- ▶ Relegation of maintenance in favour of prestigious new school construction activities
- ▶ Inefficient maintenance programmes with complicated procedures and manuals, which, even if distributed, are largely ignored

69% of schools visited required urgent remedial works in order to prevent more costly remedial works in future. About 10% of the inspected schools, all built after 2002, showed serious signs of deterioration and are in need of rehabilitation.

If a school ceases operations within 10 years of construction, necessitating major rehabilitation or replacement, the LCC increases by 188%. Maintenance is, by far, the most influential LCC factor. Many new schools are actually replacements for existing schools that failed to reach the end of their planned lifecycle due to low quality and lack of maintenance.

Chart 9: Maintenance Cost Comparison



Investing 2.2% of the initial construction cost annually in maintenance and assuming a total maintenance cost equal to 70% of the initial construction cost, the optimal school life expectancy is 32 years. Raising annual maintenance expenditures to increase the life expectancy of a school beyond 45 years is not feasible.

Lack of maintenance is the most common reason for shortage of school furniture. Piles of abandoned school benches, so called furniture graveyards, are common. Although it is easy and cheap to fix, little effort is made to maintain furniture.

Community involvement in maintenance is very poor, ranking as the second lowest community participation factor. The best maintained schools are the ones where the community voluntarily contributes financially or in kind (e.g. water for flush toilets) to operation and maintenance and responsibilities for recurrent tasks are allocated.

Currently, BEIP has a pilot school maintenance component as part of its school construction programme, and a similar component is envisaged for BEDP. Delays in implementing maintenance programmes reinforce people's belief that maintenance deserves a low priority.

USAID's EQUIP 1 is piloting a successful Mobile Repair Unit project in 4 Governorates. Each unit consists of a qualified two-man team responsible for a pick-up and tools that is paid directly by the programme.

Appeal for use of litter bins (left) and a typical furniture graveyards



6.3 Community Participation

It should be stated at the outset, that while the conclusions of this study are not comprehensive in terms of all Yemen schools, they give a profound picture of how school communities themselves perceive their involvement in school construction. It is important to keep in mind that community participation in order to reduce costs of buildings in the short or long term, does not give a full picture of the value of community participation in regard to the success of schooling. Community participation is more often linked to the outcomes of education, i.e., enrolment, attendance of students and teachers, completion of a full school cycle, and learning achievement. The mandate of this study, however, was to focus specifically on community involvement and cost reduction in the construction process.

The term 'community participation' in connection with school construction in Yemen appears to be somewhat of a misnomer. Here it is not a broad-based or egalitarian platform for change where decisions are led and made by the whole community (unlike a number of African and Asian countries). Participation in the context of school construction is less about empowerment of communities and more about a desire on the part of some implementers, that communities adopt an ownership role.

The degree of community involvement in planning varies but is mainly limited to following up community requests and is not significant overall. It is common for an influential person or persons within the community (e.g., local sheikh) or outside the actual community (e.g., Local Council, politician or wealthy businessman) to make initial contact with the implementing agency and to pay all or some of the required 'community contributions' on behalf of the community. This tends to determine the amount of overall involvement in cost reduction and maintenance.

Though there were exceptions, land is not generally considered as part of the required community contribution of costs (required by some implementers). Land is not

compensated financially though sometimes donors are rewarded through family career-appointments once the school is established.

Community structures are established by some implementing agencies for signing agreements on behalf of the community. Members sometimes 'supervise' but their role is administrative and facilitating rather than empowering the community.

Where contributions given by or on behalf of the community are required, *in kind* rather than cash contributions (of 5%) were most common, with *in kind* contributions mentioned almost twice as often in Focus Group Discussions as cash contributions. There are many other informal contributions provided voluntarily by communities which contribute to cost reduction during the construction phase (e.g., water provision, levelling land, providing food, giving information on source of materials, convincing neighbouring communities to share materials, helping to pour cement). These are more often than not, ignored in terms of the financial contribution of communities and are rarely, if ever, documented, though they actually *do* help reduce costs.

"This school was built by the MOE and we didn't give any contribution. The new building from BEDP asked for 5% contribution and we paid through selling the remains of the old building to the contractor" (FC member Lahj).

There was almost no 'community-contracting' done by school-communities in this study, and where it occurred, communities themselves, with the school head-teacher as the contractor, had been hired for labouring work that meant that communities benefited financially. In these cases, the attitude towards maintenance was more positive. With building-expertise reported within the community, there was no reliance on training from an outside engineer, often mentioned as a requirement in literature on this subject.

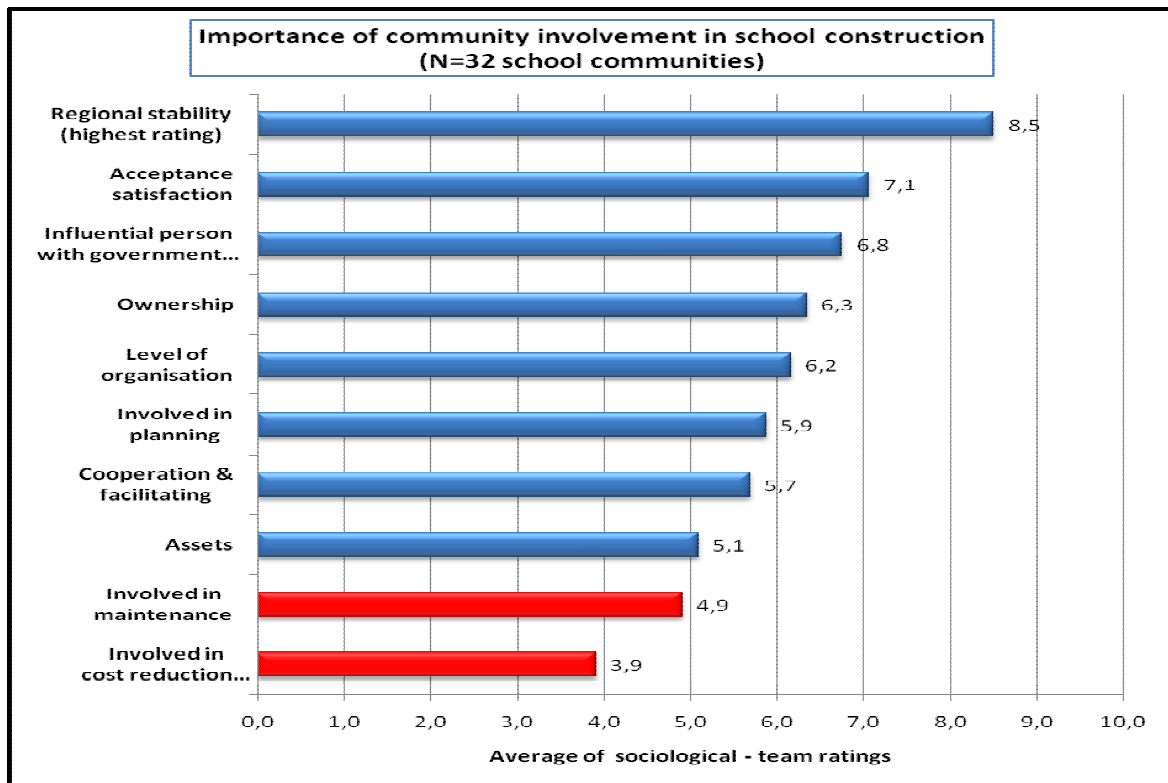
No generalisations can be made about this however, because many schools built by communities more than a decade ago were found to be below standard and there were many reports of demolition of community school buildings. While these buildings lacked scientific and standard specifications and had shorter life cycles, on the other hand it was constantly reported that ownership and community spirit was strong. Neglecting what communities did and can do will have a negative impact if communities perceive their efforts as second-rate.

Finally, though maintenance has been described as the single most cost-effective investment a country can make in regard to the life cycle of a school building (World Bank 2005¹), it has not figured greatly in Yemen. Here even minor maintenance depends as much on head-teachers/staff (in maintenance committees) as it does on Fathers'/Mothers' Councils (community) but in any case, is not yet part of a cost reduction lifecycle in schools.

¹ World Bank (2005) *Education for All: Building the schools*, Washington, D.C., World Bank, pp. 1-2

What this study has shown overwhelmingly is that there is no blueprint or 'one size fits all' when it comes to designing a model of community participation in school construction. In conclusion, following figures (chart 10) sums up findings that involvement in cost reduction is the least significant aspect of community participation in the context of school building. The figures have been derived from the team analysis of the data collected within the Focus Group Discussion in 32 school communities, with 0 equalling lowest priority to 10 maximum priority from the community perspective concerning the respective discussion item.

Chart 10: Importance of Community involvement



6.4 Implementation Framework

6.4.1 Tendering and selection of contractors

Delays in implementation are often caused by differences in procurement procedures specified in project and donor agreements, the need for approval by donors for several procurement processes, the special account arrangements and the associated substitute arrangements.

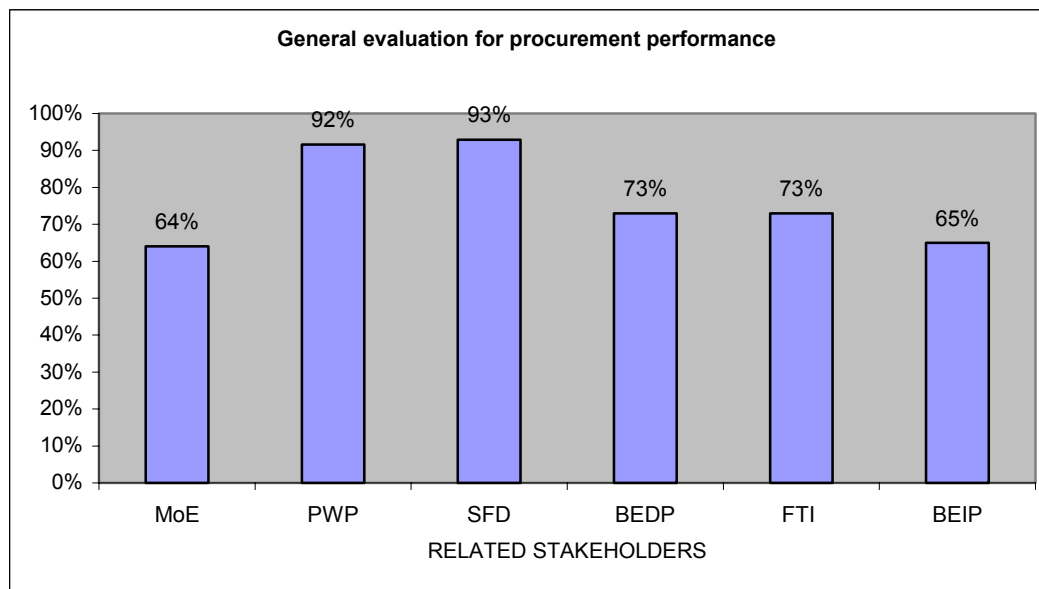
A few tender systems are more simplified than the standard national procurement systems. This permits, for example, companies from remote areas with limited experience in national tendering to participate in these tenders. The offers provided by local bidders

are often not compliant, despite their ability to provide cost-efficient quality services. They even lack the capacity to fulfil the minimum tender requirements. Currently the Procurement Cycle (PC) and Procurement Planning (PP) are not applied in the construction sector in Yemen. This led to the Procurement Capacity Assessment (PCA) as one of the main training tools to improve procedures at district, Governorate and National level. With reference to the project tender cycle the following findings have been made:

- **Procurement planning:** The annual planning as well as project-based (e.g. BEIP) planning of works for school constructions are generally carried out in time and plans developed at early stages. Due to the SFDs MIS and PWPs MIS, their planning and implementation status can easily be accessed (SFD even in the branch offices) and allow planning at an early stage and therefore reduce the costs.
- **Document preparation:** The finalization of tender documents is generally prepared by standardised bidding documents and approved designs and BOQ (e.g. BEDP, PWP and SFD have generally agreed with MoE on specific standard designs). These standard documents as well as simplified tender publications (90% of all school construction projects are tendered without pre-qualification by the National Competitive Bidding, NCB) are published in local newspapers.
- **Evaluation and contracting:** Each entity carries out the tender evaluation according to their own legal framework. They follow similar evaluation procedures and after approving the administrative compliance the financial offer is evaluated and the lowest evaluated offer is awarded the contract. The evaluation reports especially provided by MoE are usually not accessible. The tender process up to this stage is usually carried out in the required time frame has only very limited impact on the overall cost of school construction.
- **Contract administration and implementation:** The contracting and the implementation process is supervised and followed up by each entity differently. After assessing the various procurement applications, it is obvious that payment procedures and complex approval procedures, especially for BEDP, FTI, BEEP and MoE, strongly influence the overall project administration costs – as for example the offers prepared by contractors who include these delays in payments in their offer through a security margin of up to 30%. Further costs are incurred by the required approval and NOL-procedures (No Objection Letters) by external decision makers and legal entities. Payment and approval procedures are the main influencing factors on the administrative project costs.
- **Record Keeping:** Only the SFD and the PWP have a sufficient and transparent system for record keeping. Especially with focus on the follow-up of the construction process, the MIS allows them to overview the project status at any time. This reduces costs and allows quick and suitable disbursement of invoices provided by constructors.

Chart 11 provides an overview of results from the interviews and questionnaires. According to the analysis, the procurement procedures carried out by the SFD and the PWP are currently the most accurate of the involved organisations.

Chart 11: Evaluation of procurement systems



The slightly better performance of the SFD results in the decentralised implementation structure with their supporting local branches. These branches are actually well-equipped and have well-trained supervisors and procurement specialists.

BEDP and FTI are also performing quite well, although improvements in record keeping are possible. Moreover, they face bottlenecks with respect to the approval and submission of invoices via the Ministry of Finance.

The decentralised system of the MoE, where most decision making is carried out in the GEO, has the slowest performance due to inadequate planning structures and delays in approval procedures for funds by the MoF.

Up to now, the bidding processes and bills' disbursements to contractors take a very long time. They are not transparent and contractors are consistently late in delivering projects.

Concerning bidding procedures at the Governorate level, a functional framework has not yet been established. The governor heads the tender evaluation committee but the elected members usually lack experience in tender evaluation. In many Governorates, there are not sufficient trained engineers to provide advice to the committee. Standard designs are lacking, and if found, they are rigid and not tailored to the environment.

Record keeping is poor and there is no archiving of projects. Finally, there is no expertise at Governorate or district level for assessing projects (feasibility studies).

Generally it can be summarized that i) missing standards as well as ii) missing capacities are the main reasons for a delayed and insufficient procurement planning and tender implementation in the governorates and local councils.

Summing up, the following findings are of significance for school construction costs:

- ▶ Need for a transparent and appropriate legal framework for all procurement procedures. Nevertheless, the potential for cost reduction within the range of procurement procedures through a clear and nation wide legal framework is relatively limited.
- ▶ Closer coordination with MoE and the school mapping department
- ▶ Appropriate planning and coordination of construction projects as well as the harmonization of planning procedures and stronger supervision and cooperation by MoE can reduce the pre-construction costs and can potentially reduce costs in the long term by up to 6.3%.
- ▶ Timeliness in the implementation of work contracts has also a significant potential to reduce costs: up to 3 %. In most cases the contracted time periods are exceeded. This causes prolongation costs as well as additional costs for supervisors. Often a contract addendum has to be negotiated. More realistic planning and better supervision can reduce costs significantly.
- ▶ Considerable cost saving can be realised by improvements in the payment cycle and transparent administration in MoE/PAU administered projects. More timeliness and more transparency can lead to less overpricing by contractors and to more adequate bids.

6.4.2 Legal framework

The legal framework that regulates public procurement in Yemen was first established under law No.3 and the decree No.234 of 1997. This law was updated in 2006 and officially approved by the Government in 2007 (Law No. 23, 2007 on tendering, bidding and public storehouses). The new law is a significant improvement on the earlier regulatory framework applicable for public procurement. Moreover, the preparation of a comprehensive National Procurement Manual (NPM) is being finalised, under the supervision of the Supreme Authority for Tender and Bids Control (SATBC). The documents are now applicable for all Government entities carrying out procurement.

In April 2006, the cabinet approved the draft National Procurement Manual (NPM). The Standard Bidding Documents (SDBs) have been developed and distributed among all public procuring entities.

A revised procurement law has been drafted and was approved by Parliament in 2007. The revised law follows the examples of international procurement procedures (e.g. manuals, guidelines, etc.), giving a high priority to transparency and accountability, which is supposed to be guaranteed through the following public authorities:

- ▶ High Authority for Controlling of Tenders (new authority) – an independent entity which is also included in a comprehensive Capacity Building programme.
- ▶ Central Organisation for Controlling Auditing (COCA), controlling all auditing.
- ▶ High National Authority for Anti-Corruption includes 10 members, out of which 3 are from civil society. It may control any Government official and reacts on complaints. It is independent and not connected to the cabinet.

The implementation of projects is still pending due to the lack of efficient capacity building programmes that could guarantee understanding and ensure adaptability of employees to the current governmental procedures in Yemen. The next step for school construction in Yemen will be the enforcement of the new public procurement law. This will be supported and guided by the reformed Supreme Authority for Tender and Bids Control (SATBC).

Implementation procedures vary between donors and governmental institutions. Moreover, the involvement of three Ministries (MoE, MOPIC and MoF) in the approval system causes delays in the planning, procurement and implementation phases. This refers particularly to the approval of contracts and payments as well as to handing over of premises.

- ▶ The current legal framework (procurement laws) and rules are not applied by the authorities with the necessary degree of commitment to reduce the prevalent risk of inefficient and uneconomic procurement, thus often resulting in higher costs.

6.4.3 Supervision and quality control

Most school construction projects are implemented as planned, following a relatively small variety of standard designs. Most changes to the design are made to adapt standard school designs to the specific site and to construction details, often due to contractors' efforts to save own expenses, inexperienced labourers and use of locally known construction details. As provided technical drawings usually lack details, many construction details are left to the contractor and Site Supervisors. This seriously affects the quality of execution, causing a multitude of commonly observed defects and shortcomings, which in turn reduce durability and increase future maintenance costs. Good Site Supervision has been identified as one of the five most important cost reduction factors, offering potential LCC savings of up to 4.5%.

Reasons for this generally poor site supervision are:

- ▶ Low salaries for Site Supervisors, especially in GEOs, causing high absenteeism and lack of commitment;
- ▶ Difficulties in recruiting qualified engineers for Site Supervision due to unattractive packages;
- ▶ Dependency of many Site Supervisors on Contractor's transport, communication and subsistence, causing conflicts of interest.

Material testing in qualified laboratories to determine adequate quality of materials and mixtures used on site for construction is uncommon, resulting in sub-standard quality, compromising durability and, in 20% of schools visited, a lack of structural soundness of the buildings. Remedial measures, especially for structural components, are costly and maintenance costs for poorly erected and finished buildings are significantly higher.

Use of sub-standard materials and poor execution on site



6.5 Economic & Administrative Framework

6.5.1 Macro- and microeconomic factors

The detailed analysis of the macro- and microeconomic factors concerning their impact on costs as described in the LCC model, while maintaining the technical standards of school buildings as defined in the FFS concept, reveals the following:

- ▶ **Macroeconomic conditions:** Yemen as one of the poorest countries in the world is very much dependent on imports, and therefore strongly affected by global economic developments. This is also reflected in the construction sector, since costs – at least for modern concrete buildings – are very much dependent on world market prices.
- ▶ **Prices of imported materials:** As the Yemeni government has decided to build schools according to modern international standards, there is a necessity to import those building materials which are not sufficiently produced in the country (i.e. cement, steel, etc.). This is also true for imported fuel affecting transportation costs. Since the 1980s construction costs have soared and since the year 2000 prices of imported construction material have at least doubled on the world market (see table 12 below). Given the high share of imported materials (cement, iron, steel, aluminium and electrical equipment), these price increases explain about 50% of cost increases over the last decade. These materials can only be substituted to a very limited degree by Yemeni building materials.

Table 12: Construction Materials Costs in USD 2000 - 2007

Year	School Construction Cost	Exchange rate	Cement	Ready mixed Concrete	Reinforcement steel	Hollow cement block
	\$/m2	vs. US\$	\$/tons	\$/m3	\$/ton	\$/1000
2000	123.60	164.59	73.00	45.57	285.56	27.34
2001	129.50	166.17	78.23	47.8	270.81	59.50
2002	129.50	175.62	79.72	52.00	370.12	62.30
2003	151.00	183.45	93.00	62.87	479.70	187.00
2004	160.00	184.78	97.41	65.56	514.13	231.54
2005	187.75	191.42	104.48	71.11	585.10	278.54
2006	207.50	197.05	111.65	75.8	629.28	304.50
2007	199.50	199.3	120.42	84.3	736.84	376.32

Ref.: CSO 2004 and field analysis

- ▶ **Exchange rate:** For about a decade the Yemeni rial has been freely convertible. Nevertheless, through foreign exchange transactions the Central Bank of Yemen (CBY) has managed a slow depreciation by linking the YER closely to the USD (on average about 3 % per year since 2000, 2006 less than 2% and 2007 only 1%). Thus, the depreciation of the relatively overvalued YER has not substantially affected developments in construction prices in recent years.
- ▶ **Inflation:** A relatively high inflation rate, which oscillated between 12 and 20% in recent years, was partly due to international price increases and has undoubtedly affected the overall price level. The Yemeni government and the CBY remain committed to price stability and have undertaken major attempts to tighten monetary policies. But they could not fully alleviate the inflationary pressures. Moreover, construction costs are also affected by domestic inflationary factors. Consequently, a reduction of the inflation cannot be expected.
- ▶ **Import duties and taxes:** Yemen has applied for WTO membership and has opted for a liberal economic policy. Thus, tariff increases on imports are not likely to be realised. On the contrary, customs duties were substantially reduced in 2006. Nowadays, most imports are subject to a 5% import tariff, while the highest rate is (in exceptional cases) 25%. Generous tax exemptions remain. Anyhow, taking the modest import duties and taxes into account, the impact on construction costs is negligible.
- ▶ **Wages:** The rising inflation rate has influenced wage rates in Yemen. In 2005, the government raised wages for public employees by almost 60 %. This has had an effect on wages in the private sector as well. For construction companies the majority of labour is part-time and mostly unskilled. Nevertheless wages are going up every year following to the price increases on the consumer market. Although there are no active trade unions in the construction sector, the average pay raise for hired unskilled and semi-skilled labour is 3% annually according to contractors.

Table 13: Development on Unskilled Labour wages in USD/day 2000 - 2007

Year	2000	2001	2002	2003	2004	2005	2006	2007
Unskilled labour USD/day	3.65	4.12	4.20	4.25	4.33	6.8	7.11	7.53

Ref.: CSO 2004 and field analysis

- ▶ **Market structure:** Market competition operates in a weak institutional framework. The Yemeni construction sector is characterised by a multitude of construction companies with broadly varying capacities and capabilities. In 2006, 904 construction companies existed; presently there might be well over 1000. The Ministry of Public Works and Highways has classified the companies in different categories (From “first class” for highly capable and financially strong companies down to the “sixth class” for weak companies with low qualifications). This classification is meant to be relevant for the bidding and selection processes, but it seems not to play a decisive role. Though the market is relatively competitive, structural differences between the implementing agencies exert distorting effects. Complex approval procedures and delayed disbursement processes, influenced by over-bureaucratic procedures particularly in government institutions, have led – according to repeated information of entrepreneurs – to security calculations and overpricing of up to 30%. In contrast, the parastatal agencies (e.g. PWP and SFD) receive more cost-adequate offers from the construction companies. Hence, it is obvious that the procurement and disbursement procedures play a major role in price calculations and that not only macroeconomic and technical factors are decisive for cost increases in school construction.

Summing up, the following findings are of significance for school construction costs:

- ▶ Prices of imported building materials and fuel will further increase. Yemen as a country with a weak currency has very limited influence on world market prices.
- ▶ Similarly, looking at the trade balance and the balance of payment an inflation rate under 10% for the coming years is not realistic.
- ▶ Cost savings can only be reached by using more local construction materials and by designs which use imported materials very economically (see 6.1.3).
- ▶ In the view of LCC the use of durable materials (concrete etc.) makes sense since higher durability reduces rehabilitation costs, which will also rise in future.
- ▶ The main cost saving potential lies in the demand structure of the implementing agencies influenced by donor structures. Until to date PAU-institutions built schools with higher administrative costs (procurement and disbursement) than the parastatals. Costs can be reduced by at least 20% if administrative structures become more efficient.

6.5.2 Institutional Capacity

MOE is the major body responsible for school construction in Yemen. MOE is exclusively responsible for approving school models, standards and specifications, carrying out supervision and final approvals. Several regulations apply regarding, designs,

construction materials, manufacturers as well as construction specifications. Based on this there are a number of implementing agencies engaged in school construction, all of which show a certain degree of autonomy and have to some extent their own rules and regulations. This relative degree of autonomy is either due to donor influence or to relationships to other Ministries (e.g. MoPIC) or even due to the fact under the new policy of decentralisation the MoE has delegated many responsibilities to its GEOs and DEOs, which, together with the communities, more have greater influence on school construction projects.

Table 14: Construction Volume Education Sector

Agency	No. of CR built or planned	No. of rehab. or planned	Implementation period***	ØCR p.a. (new + reh.)
PWP*	8.500	940	1997-2007	950
SFD**	16.070	3.260	1998-2007	2.150
CRES/BEIP (MoE)	1.500	1.600	1998-2009	360
Jica (Sana'a)	160	-	2007-2009	50
USAID	75	370	2005-2008	150
BEEP (MoE/PAU)	2.961	915	2001-2007	645
ESIP(MoE/PAU)	300	-	2001-2002	150
FTI I-II (MoE/PAU)	773	526	2005-2007	435
BEDP (MoE/PAU)	1.451	2.126	2005-2008	895
MoE (own funds)	NA	NA		
Local Authorities	NA	NA		
Communities	NA	NA		
NGOs	NA	NA		
Total	31.790	9.737		5.785
*rehab. share estimated **14.840 CR handed over to MoE end 2006				
***incl. project preparation phases (other rooms and facilities ignored due to variations)				

The available data on school construction costs (WB, own research) indicate that there have been and still are differences in performance between the implementing agencies. These differences can be mainly attributed to the institutional capacity of the stakeholders, particularly regarding administrative structures and processes. It seems that the two parastatal agencies SFD and PWP are performing better – and the differences might be overcome in the foreseeable future.

- ▶ PAU (Project Administration Unit) is administering BEEP, BEDP, and FTI as an implementing agency of MoE. The Ministry has promoted reform policies based on the “Organizational Structure Project” of 2001, which led to a significant efforts in updating capacity building and has established structures to monitor the quality and efficiency of service delivery. This reform strategy, approved and supported by the international community, aims at improving implementation capacity in a decentralized ministry, a process which is still going on but not yet concluded.

- ▶ PWP and SDF can be described as parastatal institutions that are financially and administratively autonomous for the assigned operations. They are engaged in all types of civil works with a majority of educational projects. The organization of PWP is governed by the Project Steering Committee (PSC), which is chaired by the Minister for Planning and International Cooperation. PWP's budget has to be approved by MOPIIC and the concerned financing partners. Different from SFD, which has been founded by statute, PWP with its PMU was established through a project agreement and was conceived of as temporary. But since there is a great need for public works projects, its contract was renewed, and the government has decided that the legal status of PWP should be reviewed to provide it with a permanent institutional set-up.

Studies by WB, MoPIC, and KfW have shown that the two agencies PWP and SFD have a good reputation with contractors as reliable contract partners with streamlined processing of decisions and – most important – fast payment cycles on delivered works. This gives PWP and SFD a comparative advantage to realise very competitive prices and conditions. Moreover, both implementers have a good command on the management of the construction business. PWP, for example, has access to an extended network of consultant architects and civil engineers and, unlike MoE, is not bound to pay scales of civil servants. This gives PWP a high degree of flexibility to adjust the contracted manpower in a very cost-effective way to changing demands. SFD on the other hand has a huge staff well distributed in many branches all over the country.

In comparison, the overall performance of PAU in the mentioned projects might have been poorer because of its bureaucratic procedures, but as the Multi-donor Supervision Mission has underlined in July 2007 MoE/PAU is making considerable implementation progress. Similarly, the FTI-Catalytic Fund Progress Report of November 2007 acknowledges successful completion of phase I and good performance of phase II, which led to the grant of an extra USD 10 million for the third tranche. But the Multi-donor Supervision Mission in particular underlined also very clearly the administrative shortcomings that need to be overcome. These shortcomings, which were also expressed in the focus interviews during the field visits of this study, explain the remaining differences in performance between MoE/PAU and the two parastatals.

Regarding school construction costs, substantial savings can be realised by administrative improvements in the following fields:

- ▶ **Management information System (MIS):** The management of complex projects with such a great number of school buildings - each one with an individual project cycle - is only possible with a well-designed MIS.
 - SFD as well as PWP have established a well functioning MIS, which is the technical backbone of the two agencies, providing the necessary exchange of data, information, and communication between the different units and business partners without delay all over the country.
 - The MIS General Directorate for MoE started already in 1988 and became properly structured after the framework reform of MoE in 1997. The policy

vision is to ensure effective coordination and transformation of educational data and information within the country through electronic network. But although the structures are in place and considerable progress has been made, the system is still struggling. Regarding e.g. the data base: the method used for the Comprehensive School Survey (CSS) is not compatible with the one for the Annual Education Survey (AES). The problems will be overcome, but there are still shortcomings to the disadvantage of MoE.

▶ **Monitoring & Evaluation (M&E):** As controlling instrument and as an analytical tool, M&E has been established in all relevant implementing institutions. Adequate statistics and meaningful indicators are the basis for a functioning M&E system.

- Here again, M&E is working satisfactorily in PWP and even better in SFD. Discussions with the respective departments and reports published by the two agencies disclose that an M&E system, well established and intensively used, leads to positive results regarding quality and cost and time efficiency. M&E guarantees intensive supervision, particularly in regard to the outsourced services. The ex-post performance assessment is strict and leads to a black list of all bad performers – a procedure that contributes to good performance in a medium-term perspective.
- In MoE provisions for M&E have been made and personnel appointed, but much still needs to be improved. Under the general direction of the MoE, the Directorate of Statistics and Planning is responsible for M&E in order to assist and cooperate with all other departments of MOEs, GEOs and DEOs. Especially the regional offices, given the background of the recent decentralization efforts, still require strong support for their M&E procedures. The main problem seems to be that supervision – one of the most important cost saving factor – is insufficient. Particularly the rural areas suffer from too few supervisors. They lack transport and the current monthly salary including travel expenses provides insufficient motivation to intensify the supervision. The recommendation of the Multi-donor Supervision Mission points out: “The MoE should follow through the earlier decision to earmark 2% instead of 1% of the contract amount to cover supervision activities and the remaining 1% to cover management costs at the GEO and central MoE level without further delay, as the quality and costs of school construction under the project could be exposed to an unacceptable level of risk”.

▶ **Decentralisation:** MOE is the major body responsible for school construction in Yemen. MOE is exclusively responsible for deciding and approving school models, standards and specifications, select building materials, do tendering and contracting for projects, carry out supervision and final approvals. In spite of these strict regulations, political decentralization has been introduced. The competency of GOEs should be strengthened and the cooperation between parents, teachers, and members of the community intensified in order to allow for

more community participation and encourage individual and voluntary contributions. Community participation and shifting decision-making and administrative decentralization to lower levels in the hierarchy is extremely important.

- A joint working group has been formed between MoLA (Ministry of Local Administration) and MOE. It meets regularly to develop joint strategies on issues. It also has the function of raising awareness of decentralisation in MoE.
- To reach appropriate results, the MoE-DoE and local communities should get involved in planning and implementation on a systematic basis, including site identification and school design. Communities should be encouraged to get involved in needs assessment and site selection procedures through PRA (Participatory Rapid Assessment) designed for decision-making in Community Education.
- But it has also to be stated that decentralization in the education sector is still not a clear concept for all actors involved since conflicts and contradictions between GEOs/DEOs and the central authorities of the MoE on certain issues still exist. Moreover, the strong tradition of centralization implies that the principle of decentralisation is often ignored. Indicators of centralization are manifold. But in spite of those imperfections in both the conceptualisation and implementation of decentralisation, there has been a massive transfer since 2000 of routine decisions regarding staffing, financial management and many other issues. The remaining problems have to be overcome by administrative reforms and intensified training.

► **Administrative Reform and in-service training:** Institutionally, the government is undergoing a long-term reform strategy approved and supported by the international community. Supporting efficient management and strengthening the capacity of the MOE are important issues. Capacity has to be improved at (i) the central level for policy, strategic planning, monitoring and evaluation, implementation in curriculum review, and teacher development; and at (ii) the governorate and district levels to implement education programs, manage and account for resources, monitor and evaluate the impact at school levels, and support schools in their planning and budgeting processes. But the objectives are not very realistic:

- A look at the education management structures at national, governorate and district levels shows that there are enormous constraints on an appropriate functioning of the system. In spite of well-developed organizational charts with people of all specializations on the payroll at all levels, there are many shortcomings: performance is poor and there is a lack of trained people and sufficient means to fully exercise functions such as teaching, supervision, monitoring, training etc. Many administrators are idle or involved in other activities outside the office. Manifold evidence for those shortcomings was given by the focus-interviews in the course of this study.

- Many of the common causes of dissatisfaction that were cited during the field visits could be addressed through better management of limited resources, adequate funding for operations and maintenance, more careful attention to local needs in the planning process, and services provided by appropriately motivated, accountable civil servants and/or through an effective partnership with private sector service providers.
- Particularly the qualifications of staff and their salaries have an impact on the administrative procedures and their capacities and capabilities for record keeping and financial administration. The timeframe for planning, contracting and implementation is the most influential factor with reference to the costs of administrative procedures. This is especially visible in the different procurement systems and the estimated time from planning to final handover.
- Here again, some differences between MoE/PAU and the parastatals can be found, e.g. with respect to qualification, training or staff remuneration, which might play an important role for job motivation. On the other hand, it is would be incorrect to generalise these issues to the advantage of the one or other agency.

6.5.3 Political decisions pending

In 2007 the GoY established a new “Civil works delivery system” defining that civil works will no longer be implemented by the respective line ministries, but by PWP as a GoY-PIU. The line ministries, e.g. MoE, should focus on their core competencies, such as the development of policies, strategies, regulations, monitoring, and assessment of programmes, and move the implementation of civil works (e.g. construction of schools) to specialised and qualified institutions such as PWP and SFD. This decision would give PWP and indirectly also SFD a dominant role for civil works in education. But the implementation of this decision is still pending. Transitional arrangements do not exist yet.

Regarding the transfer of civil works from MOE to PWP, development partners of BEDP (WB, KfW) raised concerns that the transfer to PWP at the advanced stage of BEDP implementation could lead to disruption, delays and inefficiencies. The management of PWP itself expressed concern that the transfer of (sub) projects to them should not apply to ongoing construction projects that are already processed or committed by MOE or other agencies. Presently, such an abrupt transfer process would create unnecessary interference, delay, complications and, therefore, additional costs. The Multi-donor Supervision Mission also put forward serious concerns about an early transfer. “The recommended change in the implementation arrangements ... from MoE to the PWP will derail the progress made to date and should not be pursued.”

Despite PWP's experiences, capacity and potential for school construction projects, the transfer of responsibility for school construction so far implemented by MOE's project and equipment sector requires careful preparation and planning by PWP and MOE, which both agencies have to develop together in close coordination. This process would have to

commence with a clearly defined new mandate for PWP concerning the type of school construction it would be in charge of and when the transfer of implementation responsibility should be applied. Most important, PWP would need sufficient time to enlarge its manpower capacity at the central and particular at the regional the level. In contrast, SFD works already with huge, well-trained staff and would be better prepared to increase its portfolio.

In view of the enormous tasks of school construction needs ahead (meeting the set targets of the MDGs), the question has to be raised whether a concentration on one or two implementation agencies only is really desirable. As mentioned above, there might be advantages in administrative performance and cost-effectiveness, but it also has to be mentioned that according to observations during the field visits in the framework of this study and the numerous opinions put forward in rural communities, PWP- and SFD-schools do not have a strong technical advantage.

- ▶ **In other words: Reducing the number of implementing agencies**, while doubling the budget of one entity will most likely not produce the desired cost-effective increase in classroom constructions at a national level. On the contrary, monopolistic or oligopolistic structures tend to raise rather than reduce costs and may distort competition. Thus, expected cost savings should be set against potential cost increases due to increased transaction expenditures in an oligopolistic market.

6.5.4 Budgeting mechanisms and donor delivery systems

Most donors prefer to build their own separate frameworks for intervention in the country. The complexity of the different procurement modes and project agreements has resulted in a lack of transparency and many delays because disbursement flows are not aligned with government planning. But donors have started now to conduct a policy dialogue to try to harmonise and streamline their respective delivery systems. The new procurement law helps to improve transparency.

The donors of the BEDP-basket, administered by PAU, hold regular meetings each month to exchange experiences and new information. Every 3 months there is a plenary session of all donors and the representatives of the ministries involved to link and organise current activities, thereby guaranteeing a high degree of coordination and flexibility. Moreover, annual planning of the activities is coordinated with the MoE. Implementation is well organised in accordance with operation manuals. Procurement rules do correspond to IDA-regulations. There seem to be only minor implementation difficulties. A second basket of funding for secondary education will be introduced soon.

The budgeting process is based on cooperation with the MOF and MOPIC and the donors. A financing and cash flow plan enables MOF and agencies to agree on the disbursement schedule in line with the implementation plan. MOE proposes with MOF and BEDS partners an accountability system with appropriate financial and disbursement controls and implementation management systems that will enable all agencies to regularly report on the use of the funding as part of implementation.

Some fundamental challenges are visible which affect various costs factors:

- ▶ Given the background of the technical requirements (FFS Concept and BLS Model) and the numbers of schools and classrooms to be built, in the current situation the quantitative goal cannot be reached, because of the lack of funds, and insufficient delivery systems.
- ▶ An important issue of adequate budgeting is the question of maintenance and the use of the LCC model. According to the Lifecycle Cost Model, provision for regular and sufficient (e.g. 2%) maintenance for all school buildings has to be budgeted for in the national or provincial and local accounts. The implementation of maintenance accounts will only function, if the necessary laws and regulations and permanent control and supervision (M&E) are in place.

Regarding the life cycle idea and its socio-economic consequences, there is a fundamental problem: The implementing agencies are not fully aware of this concept and do not think in long-term cost dimensions. After construction the school is handed over to the MoE (e.g. by PWP or SFD). Maintenance itself is included in the tasks of the agencies. But awareness of the life cycle of a building should already influence the design, the supervision and the budgeting of each school. Only if the long-term perspective is accepted, can cost-effective construction of school buildings be expected. If rehabilitation costs are budgeted completely separately the discussion about cost-savings does not make much sense.

In short, the budgeting and financing structures of the international donors function satisfactorily. Nevertheless, the delivery systems are only partly aligned. Transparency has not yet been achieved. Among others things, the issue of maintenance-costs linked to the life-cycle concept of school buildings is not taken into account sufficiently. The awareness of sustainability by introducing structural provisions for supervision and maintenance has to be stressed and requested, no matter how and by whom the funding is administered, monitored and controlled. In the long run (life-cycle) there is room for cost savings. Only if the strict international funding and management regulations are transferred, can a well-functioning administration develop which will think in long-term life-cycle perspectives.

7 Conclusion: Improvement potentials

7.1 Research challenges

Taking account of the objectives of the study and the guiding questions of the research (5.1 and 5.2) there is potential for improving the cost-effectiveness of school construction without reducing the quality of educational requirements. The findings are divided into separate sets for short-term and long-term perspectives. Bearing in mind that it is an empirical study based on field visits, individual and group interviews, and data and reports provided by stakeholders in Yemen and experts from the donor community, the results must be seen against the background of limited resources and the actual circumstances in Yemen.

The following limitations apply:

- ▶ A sample of some 50 schools was visited and only a limited number of representatives of the respective communities were interviewed.
- ▶ The collection of information was hampered by a lack of accessible data.
- ▶ Sites and sizes of schools in the country vary greatly.
- ▶ Interpretations of the conceptual definitions (FFS, LCC, BLS and UCI) vary.
- ▶ The implementation approaches of the main stakeholders vary considerably.

Despite these limitations, the study produces answers to the research questions and makes recommendations for improvements.

7.2 Short-term improvement potential

Summing up, the most influential cost factors:

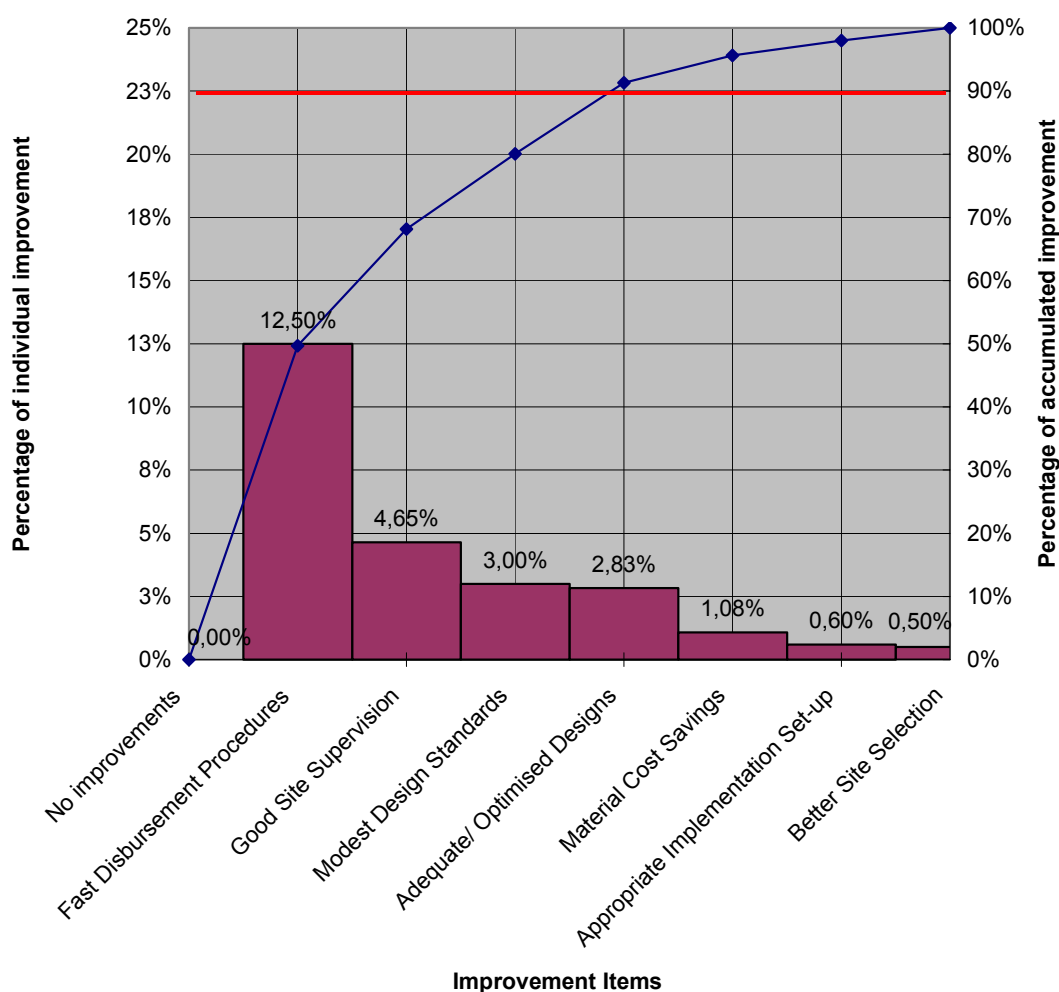
- ▶ **Site selection:** more adequate selection and less preparatory civil work (no major levelling, lower wear and tear, more easily accessible) could save up to 15%
- ▶ **Design Suitability and Standards :** Optimised designs (master planning and adaptation processes) may save up to 11.8%, introducing more modest architectural standards (appropriate facilities and maintenance-friendly designs and materials) could save an additional 22%
- ▶ **Procurement and Disbursement procedures:** depending on the administrative capacity of implementers: causes variations of up to 20% on unit rates in bids
- ▶ **Site Supervision and Quality Control:** improves durability, safety and maintenance friendliness, ensuring a longer lifecycle, allowing lifecycle cost savings of up to 9%.
- ▶ **Material cost saving:** very limited since prices of imported materials can hardly be influenced. Using more local materials is largely incompatible with prescribed standard designs and increases maintenance and even rehabilitation costs.

- ▶ **Budgets for O&M:** adequate maintenance can prevent rapid deterioration and delay need for rehabilitation
- ▶ **Community involvement** can play an important role in maintenance (ownership), less in cost reduction

It must be mentioned that the potential to influence cost influencing factors varies considerably. As has been pointed out, one of the most important cost factors, prices of imported construction materials, can hardly be influenced because of internationally determined macroeconomic conditions. Similarly, politically or culturally determined circumstances cannot easily be influenced by administrative procedures. The potential for cost saving in each case has to be viewed in terms of opportunity costs and not all opportunity costs can be calculated in precise figures. The advantages or disadvantages can often only be roughly estimated.

Chart 15 provides an overview of the proportions of accumulated cost saving potentials.

Chart 15: Accumulated Cost saving potential



7.3 Long-term improvement potential

Institutional changes normally take a long time. Administrative innovations, political decisions and social adaptation and capacity development processes have to be seen in a longer time perspective. Institutional changes and social adaptation are also necessary to secure long-term improvements in the education and particularly in the school construction sector.

- Establishment of a unified authority with executive and supervision authority, including all steps of the holistic planning process as displayed in Chart 7, page 25.
- Capacity Development in Planning & Design, i.e. M&E, School Mapping, Technical Supervision Teams
- Capacity Development for Contractors
- Improved Procurement Planning procedures
- Accountability and Transparency
- Laws and regulations influencing school construction costs

The elaboration of the potential long-term improvements and the required pre-studies will be discussed in detail in the Draft Final Report (Chapter 8: Next Steps), which includes the description of the proposed long-term measurements.

8 Next Steps

Based on the completed and commented findings of this Draft Report on Findings, the draft proposals will be developed by the study team. The proposals will be presented and discussed on the draft proposal workshop in April 2008. Invited to participate in this workshop are all stakeholders of the school construction sector in Yemen. Their contribution and support for the development of effective improvement measures may help to ensure the required commitment of all parties to successfully implement the agreed proposals.

After a short introduction, the participants at the Proposal Workshop will divide into two expert groups (i) Economy – Sociology and (ii) Architecture to discuss the detailed proposals. Each forum will discuss and prepare the final proposal based on the draft proposals developed in the Draft Final Report.

Finally, the result of the proposal workshop and the comments of the stakeholders on the Draft Final Report will be incorporated and summarized in the Final Report about four weeks after the Proposal Workshop.

Estimated Time Schedule for the next steps:

- | | |
|---|------------|
| ▶ Distribution of the Draft Report on Findings | April 2008 |
| ▶ Proposal development and completion of the Draft Final Report | May 2008 |
| ▶ Proposal Workshop | June 2008 |
| ▶ Completion of Final Report | July 2008 |

Table 16: Study Team Members and Authors

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