Social Infrastructure Construction in the Sahel

Options for Improving Current Practices

Bernard Abeillé
Jean-Marie Lantran
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ACRONYMS AND ABBREVIATIONS

ADAUA Association pour le développement d'une architecture et d'un urbanisme africain
(Association for the Development of African Architecture and Urban Planning)
AFVP Association française des volontaires du progrès
(French Association of Volunteers for Progress)
AGETIP Agence d'exécution des travaux d'intérêt public et pour l'emploi
(Agency for the Implementation of Works of Public Interest and for Employment)
APE Association des parents d'élèves (Parents' Association)
BIES Bureau d'infrastructures et d'équipements scolaires (Niger)
(Office for School Infrastructure and Facilities)
BPE Bureau des projets éducation (Mali, Senegal, Burkina Faso)
(Education Projects Office)
BREDA Bureau régional pour l'éducation en Afrique
(Regional Office for Education in Africa)
CTA Centre de technologies adaptées (Center for Adapted Technologies - Bamako)
EDF European Development Fund
EEC European Economic Community
FAC Fonds d'aide et de coopération (France)
FAEF Fonds d'appui à l'enseignement de base
(Support Fund for Basic Education)
FEER Fonds de l'eau et de l'équipement rural (Burkina Faso)
(Water and Rural Infrastructure Fund)
IDA International Development Association
IsDB Islamic Development Bank
NGO Non-governmental organization
OECD Organization for Economic Cooperation and Development
OPEC Organization of Petroleum Exporting Countries
PMI Center for the Protection for Mothers and Infants
SME Small and Medium Enterprises
TDRL Taxe de développement régional et local (Mali)
(Local and Regional Development Tax)
UNESCO United Nations Educational, Scientific and Cultural Organization
USAID United States Agency for International Development
WHO World Health Organization

GLOSSARY

Contracting authority: maitre de l'ouvrage
Contractor: entrepreneur
Delegated Project Authority: délégation de maîtrise d'ouvrage
Delegated Project Authority Agreement: convention de délégation de maîtrise d'ouvrage
Design and Work Supervision Contract: contrat de maîtrise d'œuvre
Engineer: maître d'œuvre
Executing Agency: agent d'exécution
Framework Agreement: convention (entre AGETIP et le Gouvernement)
Owner: maître d'ouvrage
Owner's Delegate: maître d'ouvrage delegate
Project Manager: directeur du projet
Works Contact: contrat de travaux
ACKNOWLEDGEMENTS

The collection and processing of survey data were facilitated by the cooperation of the four national committees, the members of which are as follows:

Burkina Faso: Dominique Kaboré, consultant, Moussa Coulibaly, Souleymane Zerbo, Dominique Diendéré, Dr. Nebie, Maurice Ouedraogo, Dr. David Kylem, Justin Ouedraogo, Issa Joseph Diallo, Albert Ouedraogo, E. Heuqueville and L. Masthoff.


Senegal: Mnacké Niang, consultant, Mamadou Fadiga, Daniel Dupety, Momar Hane and Mahine Diop.

The survey personnel and the national committees met with many representatives of the public and private sectors, local authorities, NGOs and donors.
FOREWORD

As a group, the Sahelian countries have the least developed basic education and health systems in the world. In the absence of dramatic improvements in the coverage of these systems, the countries' prospect for economic and social development will remain bleak. To help promote such improvements, the World Bank's assistance for the development of the health and education sectors in Sahelian countries has increased sharply in recent years. An important part of this assistance has been devoted to the construction of primary school classrooms and rural health centers.

The experience with construction programs in the education and health sectors in the Sahel has been mixed. This study takes stock of this experience and presents recommendations for resolving some of the most acute problems impeding timely and cost-effective implementation of such programs. The study is based on a survey of social infrastructure construction practices in Burkina Faso, Mali, Niger and Senegal. Its principal finding is that the scope for efficiency gains and cost savings is crucially dependent on the Governments' ability to improve the overall management of the construction process. Based on "best practices" in the Sahel, the study identifies strategies that could assist countries in the much more efficient use of the resources made available by communities, governments, and external donors for the construction and maintenance of their education and health infrastructure.

In view of the urgent need for expansion of the social infrastructure in the Sahel, and the severe budgetary constraints faced by Sahelian countries, we believe the lessons presented in this study to be important and hope they will benefit the large share of the Sahelian population who currently does not have access to basic education and health services.

Katherine Marshall
Director
Sahelian Department
Africa Region
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Executive Summary

EFFICIENT CONSTRUCTION MANAGEMENT IS THE KEY TO SUCCESS IN EXPANDING SOCIAL INFRASTRUCTURE

Why was the study undertaken?

Governments in Africa accord a high priority to dramatically increasing the availability of social infrastructure—notably schools and health facilities—especially to the poorer communities in periurban areas or in areas far removed from major population centers. The results have, however, been meager. Examples abound of "crash construction programs" that manage to build no more than a handful of facilities per year. Why is this? What are the bottlenecks?

First, experience has shown that effective construction management capacity is a more serious constraint to expanding social infrastructure than finance. At present rates of construction, countries can barely build enough infrastructure to maintain the currently low coverage (because of rapid population growth). Major improvements in these rates would require radical improvements in present performance. For example, in the Sahel, raising primary school enrollment rates and health service coverage rates to a level of 60% would require—depending on the country—the provision of 500-1000 classrooms and 50-80 health facilities every year for ten years. This compares to an annual average of about 75 classrooms and 15 health centers presently constructed by governments.

Second, there is a clear need—on efficiency and equity grounds—to reassess the currently dominant role played by the government in the financing, construction and maintenance of social infrastructure. Regional authorities, local communities, and beneficiaries have been playing an increasingly important role that needs to be assessed and reinforced.

Third, over the last two decades, IDA and other donors have financed a multitude of pilot projects designed to develop low-cost construction methods and technologies adapted to the special circumstances of the Sahelian countries. Lessons from these experiences can now be put into practice.

This study was undertaken to examine what can be learnt from recent experiences and to try to suggest some improvements to the less than fully successful practices of the past. It is based on a survey of social infrastructure construction practices in four Sahelian countries—Burkina Faso, Mali, Niger and Senegal. The study has identified several future strategic policy and practical guidelines that could assist the Sahelian countries in dealing with the problems of planning, financing, and implementing social infrastructure construction and maintenance programs in such a way as to use the resources provided by communities, governments, and external donors as efficiently as possible.

What lessons can be drawn from the survey of planning and construction practices?

Poor planning and management of construction activities are the main cause of the failure to meet targets, even when sufficient financing is available. Because ministries in social sectors want to play a direct role, they insist on acting as both contract manager (maître d'ouvrage), designer and supervisor of works (maître d'oeuvre) and construction contractor. As a result, education and health ministries spread their meager resources over a number of different tasks—which they are ill-equipped to carry out—while neglecting their essential role: namely, to define standards and criteria by which priorities are to be set.

As a result, an enormous amount of time and money is wasted on unnecessary studies and on adhering to complicated procurement procedures. Poor works supervision leads to low quality construction and weak contract management capacity leads to
payment delays which, in turn, cause contractors to ask higher prices.

Because of these and other inefficiencies in government planning and management procedures, average construction costs are double what they would be if constructed efficiently by the private sector—CFAF 82,800 per m² for classrooms, compared with CFAF 46,800 per m², and CFAF 220,000 per m² for health facilities, compared with CFAF 121,000 per m².

Since social infrastructure construction needs will be increasingly concentrated in periurban and rural areas, where infrastructure is much less developed than in urban areas, this problem is likely to become more severe over time. The geographic dispersion of these programs over a large number of sites to which access is often difficult will make it increasingly difficult for central government agencies to operate as direct executing agencies.

Budgetary constraints lead to paradoxical quantity—quality tradeoffs. Due to severe budgetary constraints, governments have either to restrict their level of investment or to leave responsibility for these infrastructures entirely to regional authorities or to the local populations. Both of these approaches have proven problematic. Government-executed construction meets only one tenth of the required volume of infrastructure production at excessive costs. On the other hand, the survey shows that projects carried out by local populations usually result in substandard construction due to poor quality materials and workmanship.

Lack of quality control in the execution of works is evident everywhere, but particularly when the initiative and initial financing come from the local communities. Of the works constructed by regional authorities, local communities, or by the users themselves, 75% are substandard, resulting in a waste of resources. The lifetime of such infrastructure is five years or less, and the annual amortization cost is twice as high as that for a building lasting 25 years and costing twice as much.

Maintenance is not regarded as a priority either by users or by regional authorities. As a result, insufficient funding is allocated to maintenance activities.

Research in "appropriate construction technologies" and the use of local materials, promoted by donors over the past decade, is now at a point where conclusive results are available. The main lesson is that the scope for less costly and more efficient classroom and health facility construction will result from strengthening the capacity for managing the overall production process, rather than from any further research into such technologies. The number of possible designs should be kept to a minimum. If the range of possible models is too diverse, the likely result is confusion in the construction industry, increasing costs and construction delays without improving the quality of the final product. Priority should, therefore, be given to disseminating a limited variety of models of sound quality and moderate cost, allowing for large-volume production and utilizing the most widely available know-how.

Some promising experiences are emerging from partnerships between governments and local authorities, beneficiaries and NGOs. The basic principle underlying these arrangements—such as the Malian Fonds d'aide à l'enseignement fondamental (FAEF)—is that social infrastructure construction programs, planned without the active participation of beneficiaries will, at best, be treated with indifference. These programs are, in fact, a powerful instrument for promoting local initiatives and cost sharing. Under the FAEF program in Mali, a cost-sharing formula—75% Government/25% local—will help local authorities to rehabilitate 1,000 classrooms and construct another 400 over a four-year period using sound designs and efficient construction methods. The performance of the institutions responsible for managing these programs will, however, require careful monitoring.

Specialized contract management agencies could provide a powerful mechanism for relieving health and education ministries of the construction burden, while increasing the speed, efficiency and cost-effectiveness of social infrastructure programs.
What recommendations emerge from the study for improving strategies, policies and practices concerning social infrastructure construction?

**Recommendation #1** Increased production and increased productivity are both required to meet the growing challenge of meeting Africa's social infrastructure needs. It is unlikely that either will appear without fundamental changes in the way in which education and health ministries approach the social infrastructure construction process. Improved management of the overall production process, as the hoped-for cost savings and efficiency gains are critically dependent on this change in approach.

**Action Plan #1**

- redefine the role of education and health ministries so that they no longer have direct responsibility for executing infrastructure construction, but focus instead on defining priorities, programs and standards
- restructure central government directorates responsible for social infrastructure by limiting their role to planning, budgeting and monitoring functions

**Recommendation #2** Achieving efficiency gains and cost savings will be fundamentally dependent on governments' abilities to improve the management of the overall construction process. At best, this would involve transferring the execution of all or a large part of social infrastructure construction programs to the private sector.

The experience of specialized agencies, such as the Agence d'exécution des travaux d'intérêt public et contre le sous-emploi (AGETIP) in Senegal, demonstrates that substantial cost savings and efficiency gains can be achieved by contracting out not only construction, but also design and works supervision to private firms. Ministries of education and health would be well advised to also contract out the contract management function. To the extent that detailed planning of construction, rehabilitation and maintenance needs can be delegated to the regional level, the relevance of the programs to local needs is likely to be enhanced.

**Action Plan #2**

- delegate contracting authority and construction management to agencies capable of effectively carrying out these functions--reliable executing agencies, regional authorities, local authorities or users
- help regional-level agencies (i.e., directorates or inspectorates) to draw up inventories of premises and their physical condition and to prepare regional work programs including construction, rehabilitation and maintenance plans for each school or health facility
- select contract management agencies that use simplified and/or streamlined procurement and contract award procedures through the establishment of a classification of enterprises and the use of appropriate and simplified bidding documents and contracts
- select contract management agencies that have in place the timely payment procedures that are essential to the participation of small- and medium-sized contractors in the construction process
- establish a steady timetable of works that ensure market predictability and competition to achieve cost reductions without lowering quality
- improve quality by disseminating technical data sheets and simplified standards, and by helping the contracting authorities to select and pay competent technical supervisors

**Recommendation #3** In the light of the financial difficulties being faced by central governments, local governments and the local populations alike, there is an urgent need to be more creative in identifying diversified sources of financing for both construction and maintenance.
Initiatives by local authorities, associations and private groups, which are currently showing the most promise for increasing available resources and guaranteeing sustained interest in maintaining the facilities after construction should be encouraged, perhaps by using central government funds as matching grants in support of local fundraising.

Ensuring the appropriate balance between construction and maintenance will require improvements in the social infrastructure budgeting process. Consideration should be given to the possibility of consolidating all construction, rehabilitation and maintenance costs into a single budget, whether funded by local resources (regional or municipal taxes), central government allocations (subsidies or delegated capital or current budgets), loans, or external grant assistance.

**Action Plan #3**

♦ strengthen the budgeting capacity of central education and health planning units

♦ facilitate budget and program preparation by establishing a database providing up-to-date information on unit construction costs, space requirements and criteria for determining priorities

♦ at least for planning purposes, prepare a consolidated construction, rehabilitation and maintenance budget for each of the social sectors

♦ design matching grant programs that use scarce central government resources--and external funds--for priority support to local initiatives and fundraising

♦ design a social safety net program to ensure adequate coverage for the poorest communities

♦ organize information campaigns at the local level to increase the awareness of the importance of adequate building maintenance and the need to budget for this purpose

**Recommendation # 4** The results of recent regional and local research into appropriate construction designs, technologies, materials and methods should be incorporated into current and future social infrastructure construction programs. In order to facilitate the integration of the domestic construction industry into the sectors' construction programs, care should be taken to promote technologies and materials that are commonly used in the country.

**Action Plan #4**

♦ Select a limited number of good examples of prototypes that have given proven results in local tests and that incorporate technologies similar to those used in local housing construction

♦ support these initiatives with technical advice and monitoring so as to ensure an appropriate level of quality and durability

---

**What are the implications of these recommendations for the donor community?**

The most direct role for the donor community would be to assist governments in the implementation of the recommendations set out above. In order to do this, agreement would have to be reached among the donors and between the donors and the governments that the proposed changes would be beneficial and that they are implementable. Donors could then design their financial assistance programs in such a way as to support the introduction of the changes.
The priority recommendations emanating from the study that could be supported by the donor community are:

- the withdrawal of governments from the direct execution of social infrastructure construction programs;
- the establishment of efficient contract management procedures and capacities through the use, wherever possible, of specialized contract management agencies;
- the priority allocation of scarce budgetary and external resources to the support of local initiatives;
- the establishment of annual work programs and budgets that reflect the country's overall social sector construction, rehabilitation and maintenance needs; and
- the reduction of inequities through the establishment of social safety net programs targeting the poorest areas.

**What are the next steps?**

In the fall of 1993, the World Bank proposes to organize a regional seminar for representatives of the governments of all the Sahelian countries and interested donors to discuss the findings of this study in an effort to arrive at a consensus on the strategies to be adopted and on the principal measures necessary for their application. This regional seminar will be followed by sectoral meetings at the national level to prepare country-specific action plans.

The national seminars will follow the "Policy Action Planning" approach. Participants will be invited in inter-ministerial teams so that national planning, financial and fiscal issues can be brought into juxtaposition with technical sectoral issues. Participants will develop specific national policy action plans that will lay out the key policy and strategic guidelines for the sector, the principle changes required, the stakeholders who might support or oppose the changes and the steps to be followed to convert the identified desirable changes into political decisions.
I. INTRODUCTION

1. This study represents one element of the dialogue between the Sahelian countries and the donors. It was carried out in response to a request from the participants at the Conference of Education Ministers of Sahelian Countries held in Bamako in January 1990, in preparation for the Jomtien World Conference on Education for All held in March 1990. Following the Bamako conference it was decided that more attention should be given to implementation of low-cost construction programs.

2. Organization of the report. The report is divided into four volumes (of which only Volume 1 has been published), each of which is intended for different audiences, covering different issues:

   (a) This volume, Volume 1, is intended for decisionmakers and includes the findings of the survey (Chapter 2), recommendations and strategies (Chapter 3), and the implications for donors (Chapter 4).

   (b) Volume 2 (in French) is the first version of an implementation manual which will be finalized after discussion of the report at the regional seminar to be attended by representatives of the national authorities responsible for the sectors concerned.

   (c) Volume 3 (in French) contains the survey.

   (d) Volume 4 (in French) contains the individual records of all the projects studied.

3. Purpose and scope of the study. Based on the survey conducted in the four Sahelian countries considered (Burkina Faso, Mali, Niger and Senegal), the objective of the study is to help the Sahelian countries and the donor community to:

   (a) assess the efficiency of various approaches (standard plans, choice of construction technologies, modes of production) used in the four countries under review;

   (b) study the respective roles of the government, the local communities, the users, and the private sector in securing and utilizing resources; and

   (c) formulate strategies that will make it possible to mobilize the necessary resources and allocate them with maximum efficiency.

4. Present context given the magnitude of needs. This study takes as its starting point the inadequacy of present methods and means compared to the immense basic social infrastructure needs of the Sahelian countries. In fact:
The number of classrooms and primary health care (PHC) facilities is considerably lower than that which is needed to bring about an improvement in the extremely low enrollment and health coverage rates.

In the absence of government investment budgets, and under pressure from beneficiaries, different associations or political groups have taken the initiative of organizing community primary school and basic health center construction programs, which are playing a growing part in the development of these services.

This increasingly active participation on the part of local communities is well received and should be encouraged; however, their efforts tend to be somewhat weak and are often inadequate to effectively meet actual needs. Because of unfamiliarity with basic construction techniques and lack of maintenance, the buildings constructed by these groups deteriorate rapidly, and even those constructed only recently often require rehabilitation or replacement. As a result of these problems, facilities erected by the communities can only make a lasting contribution to the extent that assistance is made available to them.

For their part the governments, despite various attempts—including devising low-cost construction techniques—do not yet have sufficiently operational mechanisms which enable them to support community initiatives.

---

5. Increase in the number of facilities. The survey conducted in the four Sahelian countries shows that a marked increase in the number of facilities has been recorded over the past ten years. In the four countries concerned, which have the lowest school enrollment and primary health care (PHC) coverage rates in all of Africa and also the world (ranging from 30% to 55% for primary education and 15% to 49% for PHC services), the number of classrooms has increased over the last ten years by around 8% per year, except in Mali (see table below).

6. Magnitude of needs. By way of example, the number of new classrooms built each year should be somewhere between 240 and 425, depending on the country, if the enrollment rate is not to lose ground vis-à-vis the rapidly growing school-age population. The table below shows that if an enrollment rate of 60% were to be achieved, approximately 480 to 1,000 classrooms would have to be opened each year, depending on the country, although even this would not be sufficient to bring about "Education for All by the Year 2000" as was thought in the early 1980s. The new classrooms and PHC facilities to be built in the course of the decade ahead represent an annual investment for each country.

---

1 The number of PHC facilities to be built each year in each country does not exceed 50, i.e., generally one tenth of classroom needs. On the other hand, the volume of financing needed for development of the health sector is on the order of one half of that required for the education sector, taking into account the fact that the unit costs of each PHC facility represent about four classrooms. The difference between the education and health sectors is explained by the larger catchment areas of health centers as compared to schools. While three classrooms are needed for 1,200 inhabitants (about 1 m²/student/6 inhabitants), within a maximum radius of 5 km, a health center is justified in terms of cost-effectiveness of equipment and medical personnel (1 nurse and 1 midwife) for a population of 5,000 within a maximum radius of 15 km (about 1 m²/40 inhabitants). Information available on other social infrastructures (markets, youth groups, women's organizations, etc.) is much
of between US$2.7-$4.1 million to maintain present coverage rates, and between US$5.5-$11 million if these rates are to be increased to 60% by the year 2000.

7. The projections for the year 2000 presented in the table below are based on the following assumptions:

<table>
<thead>
<tr>
<th>Population (1,000s)</th>
<th>Coverage</th>
<th>Education</th>
<th>Health</th>
</tr>
</thead>
<tbody>
<tr>
<td>1990</td>
<td>2000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Burkina</td>
<td>9,016</td>
<td>12,054</td>
<td>Burkina 31%</td>
</tr>
<tr>
<td>Mali</td>
<td>8,461</td>
<td>11,427</td>
<td>Mali 31%</td>
</tr>
<tr>
<td>Niger</td>
<td>7,666</td>
<td>10,595</td>
<td>Niger 29%</td>
</tr>
<tr>
<td>Senegal</td>
<td>7,428</td>
<td>10,217</td>
<td>Senegal 56%</td>
</tr>
</tbody>
</table>

Hypothesis 1: maintenance of present rate:

<table>
<thead>
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<th>Population (1,000s)</th>
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<td>7,428</td>
<td>10,217</td>
<td>Senegal 56%</td>
</tr>
</tbody>
</table>

Hypothesis 2: 60% 60% |

Hypothesis 3: 100% 100%

GROWTH IN NUMBER OF FACILITIES

<table>
<thead>
<tr>
<th>No. of Classrooms</th>
<th>1975</th>
<th>1980</th>
<th>1985</th>
<th>1990</th>
<th>Hyp.1</th>
<th>Hyp.2</th>
<th>Hyp.3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Burkina Faso</td>
<td>2,500</td>
<td>3,000</td>
<td>4,900</td>
<td>7,300</td>
<td>9,700</td>
<td>18,900</td>
<td>31,500</td>
</tr>
<tr>
<td>Mali</td>
<td>5,600</td>
<td>6,620</td>
<td>7,380</td>
<td>7,670</td>
<td>10,400</td>
<td>17,900</td>
<td>29,800</td>
</tr>
<tr>
<td>Niger</td>
<td>2,860</td>
<td>4,830</td>
<td>6,620</td>
<td>7,780</td>
<td>10,750</td>
<td>16,600</td>
<td>27,700</td>
</tr>
<tr>
<td>Senegal</td>
<td>6,000</td>
<td>8,500</td>
<td>10,800</td>
<td>11,200</td>
<td>15,450</td>
<td>16,000</td>
<td>26,700</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>No. of health centers</th>
<th>1975</th>
<th>1980</th>
<th>1985</th>
<th>1990</th>
<th>Hyp.1</th>
<th>Hyp.2</th>
<th>Hyp.3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Burkina Faso</td>
<td>-</td>
<td>169</td>
<td>560</td>
<td>860</td>
<td>1,100</td>
<td>1,400</td>
<td>2,400</td>
</tr>
<tr>
<td>Mali</td>
<td>-</td>
<td>470</td>
<td>630</td>
<td>522</td>
<td>760</td>
<td>1,300</td>
<td>2,300</td>
</tr>
<tr>
<td>Niger</td>
<td>240</td>
<td>-</td>
<td>-</td>
<td>460</td>
<td>630</td>
<td>1,270</td>
<td>2,120</td>
</tr>
<tr>
<td>Senegal</td>
<td>430</td>
<td>470</td>
<td>560</td>
<td>690</td>
<td>900</td>
<td>1,200</td>
<td>2,000</td>
</tr>
</tbody>
</table>

more vague and such data are generally not included in national programs or agreed objectives.
8. **Attempts to reduce costs.** As the survey shows, construction costs in the Sahel range from US$120-$320 per m² for classrooms, and US$250-$750 per m² for PHC facilities. These costs are high compared with the averages for Africa, which are US$200 for education and US$360 for health. Over the past ten years the Sahelian Governments and the World Bank have made numerous attempts to find ways to reduce construction costs by developing appropriate techniques and harnessing community initiatives. Various techniques and approaches have been tried out, especially through UNESCO (BREDA in Dakar). The results of these pilots are variable and this study analyzes the impact of these experiments.

9. **Insufficient resources.** Since government budgets have not allowed for a significant level of participation in the financing of social sector construction programs, about 60% of the facilities built in the last 20 years have been financed by community initiatives. As a result, access to education and basic health care frequently depends on the capacity of local authorities and users to fund construction of the needed buildings. Although such grassroots initiatives are to be encouraged, the governments and donors need to study how best to set up a partnership between the government and the local authorities or regions in order to enhance their effectiveness (see text box below).

The Jomtien Conference of March 5-9, 1990 emphasized that among the reforms that could increase the sector's resources, the obtaining of additional resources from users—by means of registration fees, taxes, charges or other fiscal instruments—should play a major role. However, during the discussion on resource mobilization at the Conference, many participants voiced the opinion that parents and local communities were already so overburdened by fees and charges that there was little hope for raising more resources through increasing still further the contributions of families or communities. It was also pointed out that in the Sahel, in particular, many countries were still far from being able to guarantee a place in school for each schoolage child.

10. **Level of present knowledge.** In the past, extensive research has been done on the technical side but little has been done regarding the programming and organization of operations. Since the primary motivation has been to reduce foreign exchange costs, this research has focused essentially on production and techniques for utilizing durable construction materials in small-scale projects. Many organizations, such as UNESCO, UNDP and some NGOs, have done work on this particular aspect. With a view to presenting preliminary results, and at the initiative of the World Bank's Education Department, a report on intermediate construction technologies was prepared in 1987 by the ILO. This report was based on case studies in Senegal and Kenya and underscored the obstacles and limits to the introduction of new technologies in programs financed by governments and points out the very modest nature of the savings achieved. As regards statistical data on costs, practically no comparative analysis is available on overall construction costs. This study provides information hitherto lacking on the stages included in the overall construction process from programming to utilization of the facilities.

II. **SURVEY (FINDINGS)**

11. Following a brief summary of the methodology used for the survey, this chapter presents the findings of the study by considering each of the following stages in the construction process: (a) **during the preparation of operations:** (i) establishment of standards; (ii) programming; (iii) decision-making; (iv) financing mechanisms; (b) **during execution:** (i) organization of contracting authority; (ii) technological options; (iii) unit costs; (iv) project management; (v) contract management and
procurement procedures; (vi) organization and execution of works; and (c) during utilization of the facilities: (i) lack of maintenance and its consequences; and (ii) amortization costs.

A. Methodology

12. The survey covered social infrastructure construction programs in four Sahelian countries (Burkina Faso, Mali, Niger and Senegal) selected because of the special nature of the construction practices employed. About 12 projects per country were considered, comprising a total of 49 operations, 21 of which in health, 24 in education, and four in the miscellaneous social infrastructure category (day care facilities, vaccination centers, homes). The programs were chosen to provide a representative sample of operations carried out over the past eight years. The projects were selected so as to cover all the various financing sources involved—private sector, associations, government, local communities, donors, NGOs (either alone or in association). The results were then grouped by sector and by topic, for the region as a whole and for each of the countries. The data gathered relate to the nature and magnitude of the projects; source and type of financing used; organization and execution of works; technology used; contract award and payment procedures; results obtained regarding costs, construction times, and infrastructure quality; as well as the impact of the programs from the standpoint of their large-scale use. All the costs shown in the tables have been updated to April 1, 1991, including taxes to facilitate comparison.

13. National officials and representatives played a considerable role in the case studies. In each of the four countries involved, a local liaison committee was formed comprising representatives of the social sector ministries, the technical departments responsible for public works, users and local communities, together with the private sector, the principal donors, and NGOs. These committees, each assisted by a local consultant who acted as permanent secretary, played a decisive role in assembling the studies already carried out, selecting the projects, and organizing the gathering of data.

B. Programming

14. Inconsistency or absence of standards. The study distinguishes between government planning standards and technical standards. Planning standards are required to define the needs and functional specifications to be met by the facilities so that users can derive maximum benefit from them. Technical standards govern the technical characteristics to be met by the materials and their use. The study found that the standards are never written down, with the exception of Mali where the Government has assembled all the standards for primary classrooms into a single manual. For health facilities, in particular, the lack of standards can result in the construction of facilities which are too large, which has an impact on recurrent costs. However, sound programming standards should facilitate decisions on the points listed in the table below. In practice, since international technical standards are too complex for the classrooms and PHC facilities in question, they are essentially used only for reference purposes in drafting bid invitations and in the event of disputes during implementation.
15. **Inadequacy of planning.** Institutional strengthening in planning is still in its infancy. Individuals who have been trained and who have the necessary experience do not always remain in positions where their expertise could be used. Moreover, decisions are commonly taken in times of financial crises and emergency situations. These uncertainties and this lack of preparation form major obstacles to the implementation of important programs. For example, in Senegal a hundred classrooms had to be constructed in four months as a result of inaccurate information on classroom requirements for the introduction of double-shift teaching in the first four years of primary school. The capacity to manage available facilities, identify programs in time, and establish execution standards and criteria must therefore be strengthened.

16. **Insufficient documentation.** Too often, needed information is not available at the time of project preparation. As a result, those responsible for preparation are unaware of what has been learned from previous experience and thus start the design process from scratch. The most obvious manifestation of this problem is shown in the disparities between projects and sources of financing in terms of surface area to be constructed as well as the selection of technologies and implementation procedures.

17. **Limitations of school and health facility mapping exercises.** Although some progress has been made over recent years in most of the countries as regards school and health sector mapping, the data available on the actual state of the infrastructure are to a large extent unusable for good programming of rehabilitation, replacement, and construction needs. For the most part, data are aggregated by district thus not allowing for an estimation of needs by establishment. Even when, as is often the case, the data indicate the nature of the buildings (e.g., earth, permanent, semipermanent, straw, etc.), information on their actual state is rarely available or accurate when needed. Recently, the Sahelian countries—Senegal and Burkina Faso, in particular—have tried (on occasion successfully) to include data sheets in the questionnaires to be completed by school directors in an effort to improve data gathering in the field. These data are then processed by the regional teams responsible for statistics. The initial results must be processed at the central level by the planning and facilities services. Computerization has proven an invaluable tool for keeping the data up to date and processing them quickly. These approaches using the decentralized structures are the most efficient.

18. **Incomplete and unrealistic planning.** Only on rare occasions has centralized planning led to a timely consensus with regional authorities on priority programs to be budgeted for. Programs are still most often dependent on political pressures and the availability of financing from a variety of sources. Investments made by users and local communities are generally consistent with real priorities, but are limited since only those communities with sufficient funding already available can benefit from schools and PHC facilities provided in this way. Moreover, the facilities’ usage ratios are greatly...
exceeded in the more developed urban areas, while the reverse applies to rural areas; and access to services is very unequally distributed among different ethnic groups and economically underprivileged regions. Furthermore, the inadequacy of available data does not allow for the kind of planning process that would allow for increased awareness on the part of decisionmakers as regards priorities—awareness that would urge decisionmakers to allocate appropriately the necessary resources.

19. **Diversity in decisionmaking.** The pronounced diversity of construction initiatives provides motivation for finding out more about these initiatives with a view to integrating them into regional development plans. Various types of initiatives coexist:

(a) Grassroots initiatives (parents' associations, or health service user committees); the initiative and the financing come entirely from the communities, which then become the contracting authority.

(b) At a more organized level, programs undertaken by local authorities or, sometimes, as in Senegal and Mali, by regional development committees, under the supervision of regional authorities.

(c) At the central level, programs financed by external assistance granted directly to the governments concerned and which cannot be allocated directly to decentralized structures.

(d) National projects that draw on the participation of beneficiaries or local communities. In this case, the aim is to achieve a national school enrollment or health service coverage expansion objective; funding is primarily external and the beneficiaries are expected to complement it either by providing local materials or labor, or even by financial contributions of their own.

20. **Poor coordination of initiatives.** The juxtaposition of different initiatives tends to create undesirable situations that have a destabilizing impact on grassroots initiatives. On the one hand, the government intervenes on a considerable scale in certain areas, with the help of external financing, while elsewhere it leaves the entire responsibility for construction to the communities who put up the majority of the buildings (from 50%-60%, depending on the country) without any assistance or supervision. Under these conditions, the communities either wait passively for a project to be undertaken, which means they will not need to do anything, or else go ahead with short-term investments thinking that sooner or later the government will step in to rehabilitate or replace the makeshift buildings already constructed. In practice, information circulates poorly among the various parties (decisionmakers, regions, communes, associations, religious groups, and the private sector) who function separately. Central organizations intervene directly as executing agencies for operations for which they are responsible; since they do not possess the organizational flexibility necessary for the execution of works, they deploy all of their resources at the implementation level, preventing them from according priority to their essential functions which should be the creation of conditions favorable to judicious harnessing of all initiatives, and the provision of technical assistance and support. This lack of coordination among the different parties results in resource waste and even duplication of efforts due to lack of information.

21. **Nongovernmental Organizations (NGOs).** In the countries covered by the survey, NGOs have played and are continuing to play an important role in construction of infrastructure. Among other things, they help local communities to build and equip classrooms and health centers by providing financial and technical assistance and helping them to organize the startup and management of these
operations. The recent joint support programs for local communities instituted by the governments could offer NGOs the possibility to reinforce their overall capacity and enhance their impact. This is the case, for instance, in Mali, where the NGO Action Ecole assists villages by providing them with the additional funds needed to enable them to reach, along with resources from the regional development committee, the 25% contribution level needed to earn entitlement to a government subsidy. Arrangements of this type form the ideal partnership between the government, the region, the NGO, and users. However, during the preparation of projects the management and execution capacities of these NGOs should be assessed; they should be involved in preparation activities, and the legal framework governing their participation should be clearly defined. These precautions will make it possible to determine the limits of the NGOs’ organizational capacities and prevent disputes during implementation.

22. **Experiments in partnerships with communities.** In Senegal and Mali, new programs designed to intensify the partnership between the government, and the local authorities, beneficiaries and NGOs have been set up. These programs are based on the principle that technocratic centralism hinders the success of social projects and that social infrastructure facilities planned without the active participation of those they are intended to serve are met, at best, with indifference by the users. These programs aim to promote and spur initiatives. Subsidies are paid out as soon as sections or stages of works are actually completed and found to be in accordance with technical specifications agreed on in advance. This approach is particularly developed in Mali under the Fourth Education Project with the establishment of the Fonds d’aide à l’enseignement fondamental (FAEF)--or Basic Education Support Fund. The objective of the FAEF is to support the initiatives of APEs which receive a fixed-sum grant totalling as much as 75% of the estimated total cost of the works. In such cases, the APE is the contracting authority and is required to make arrangements (with the assistance, if necessary, of the local development committee or of an NGO) for fulfilling the eligibility requirements for the grant and for complying with the commitments involved. Grants from twinning arrangements, expatriate associations, and charity organizations can also help fund these initiatives.

23. These operations require the definition of statutes and operating rules and procedures of the institutions to be responsible for administering the funds, as well as the preparation of documents (notices, use of media, explanatory manuals to help would-be users understand the regulations) to convey information to users and raise their awareness. Agreements between the administration and the beneficiary local communities, defining their respective commitments, must be drawn up and signed. Technical construction and maintenance manuals have to be prepared, and teams of technicians have to be available in the regions or else be brought in temporarily to strengthen local entities not possessing this expertise. These technical assistance teams will, particularly in the initial stages, be made up of international volunteers and nationals contracted for the purpose and will work closely with the representatives of the sectors concerned. The regional technical services responsible for construction should be involved in these operations so that they will be able to familiarize themselves with the approaches employed and be able to apply them.

24. **Advantages and limitations of community participation.** The commitment of communities to managing and maintaining infrastructure is the obvious advantage of programs based on local community participation. About 50% of existing buildings were constructed by communities over the past 25 years. However, when the government seeks to encourage and assist these initiatives, experience has shown that it generally takes time to organize the communities, and that their financial capacity is very limited. When the construction standards adopted are such as to ensure a durable structure, construction costs exceed (by 30-100%) the sums customarily invested by communities. The Mali Project shows that communities can be mobilized when their contribution does not exceed 25% (i.e., the
This figure represents in this case the minimum investment for construction of a classroom using nondurable materials. Table 1 below provides an example of the breakdown of classroom construction costs and shows that exclusively local expenditures amount to 20% of the total, approximately the proportion that communities are normally in a position to contribute.

TABLE 1: Breakdown of Classroom Construction Costs  
(Built in Niger by a small contractor)

<table>
<thead>
<tr>
<th>Nature of works</th>
<th>Imported materials</th>
<th>Local materials</th>
<th>Unskilled labor</th>
<th>Skilled labor</th>
<th>Equipment + transport</th>
<th>Overhead</th>
<th>Total</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Earthmoving</td>
<td>0</td>
<td>0</td>
<td>23,711</td>
<td>11,374</td>
<td>1,754</td>
<td>3,684</td>
<td>40,523</td>
<td>1.3</td>
</tr>
<tr>
<td>Foundations</td>
<td>73,074</td>
<td>66,854</td>
<td>17,635</td>
<td>15,871</td>
<td>15,668</td>
<td>18,910</td>
<td>208,012</td>
<td>6.6</td>
</tr>
<tr>
<td>Subfoundation</td>
<td>21,970</td>
<td>32,955</td>
<td>38,836</td>
<td>10,347</td>
<td>16,236</td>
<td>178,598</td>
<td>5.6</td>
<td></td>
</tr>
<tr>
<td>Walls</td>
<td>66,130</td>
<td>264,518</td>
<td>96,614</td>
<td>23,654</td>
<td>48,789</td>
<td>536,683</td>
<td>16.9</td>
<td></td>
</tr>
<tr>
<td>Roof Woodwork</td>
<td>928,626</td>
<td>0</td>
<td>0</td>
<td>47,175</td>
<td>95,221</td>
<td>1,178,124</td>
<td>7.3</td>
<td></td>
</tr>
<tr>
<td>Finishings</td>
<td>101,101</td>
<td>0</td>
<td>0</td>
<td>47,175</td>
<td>12,469</td>
<td>176,819</td>
<td>5.6</td>
<td></td>
</tr>
<tr>
<td></td>
<td>435,521</td>
<td>0</td>
<td>109,320</td>
<td>163,980</td>
<td>52,217</td>
<td>842,562</td>
<td>26.6</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>1,626,422</td>
<td>364,327</td>
<td>284,115</td>
<td>367,482</td>
<td>231,655</td>
<td>287,400</td>
<td>3,161,400</td>
<td>100</td>
</tr>
<tr>
<td>Local part</td>
<td>0</td>
<td>364,327</td>
<td>284,115</td>
<td>0</td>
<td>0</td>
<td>648,442</td>
<td>20.5</td>
<td></td>
</tr>
</tbody>
</table>

25. **Advantages and limitations of tax-based approaches.** Under present conditions, governments do not consider themselves obligated to finance the full cost of social infrastructure construction and maintenance from national budgets. On the other hand, a clear trend is now emerging toward progressively using parafiscal revenues collected at region and/or commune level for this purpose—which would appear logical if the objective is to support the concept of regional responsibility. In rural areas the practice has mostly been for beneficiaries to make contributions in kind, while in urban areas (settlements with over 10,000 inhabitants) contributions are more likely to be of a financial nature. These contributions are based, in general, either on subscriptions from users, or on use of local resources (municipal revenues) or, occasionally, regional resources (regional capital budget, as in Senegal and Mali). Projects of this type face the following constraints:

(a) Rural communities can make only very limited financial contributions (20-25% of costs for construction of acceptable standards).

(b) Urban communities are unable to mobilize free labor.

(c) Taxes and/or charges are generally collected as they should be in rural areas, but in the big urban agglomerations local authority revenue collection is uneven (see text box below on the TDRL in Mali).

(d) Regional development funds, or funds furnished through government capital budgets, are reliable, thus they should be able to have a more significant impact provided, however, that steps are taken to avoid any systematic shift in resource allocations from rural to urban areas.
Traditionally in Mali, APEs were in charge of construction and maintenance of social infrastructure. In view of the rate of deterioration of facilities and having determined that the efforts required were beyond the capacity of the local communities, the Government decided to provide support to the communities in an effort to stimulate school enrollment. Following decisions taken at Gao in 1988 and the discontinuation of APEs collecting direct contributions from parents, a single tax—the Local and Regional Development Tax (TDRL)—was initiated to finance a regional development fund. To stimulate and support grassroots initiatives, the Government established a Basic Education Support Fund (FAEF). At the same time, a distribution guide for resource allocation among sectors has been developed to assist Regional Development Committees in the selection of programs. In order to protect the primary education sector, it will henceforth receive 30% of the regional budgets. Collection of the TDRL has proceeded efficiently in rural areas, but in the regional capitals the collection rate is very low and the responsible authorities have been able to do very little to improve the situation. As a result, the programs in rural areas are progressing more rapidly than originally envisaged, but those in the urban locations were not progressing at all. At the request of the APEs and regional authorities, the communal APEs returned to the former contribution system, and the FAEF contribution rate has been raised from 50% to 75%. The communal APEs are therefore once again in control of their financial resources and have regained a part of their autonomy which they had temporarily lost.

C. Organization of the Execution of Works

26. In the four countries studied, the bottlenecks that hold up implementation of construction programs derive from very similar sources: namely, a lack of organization in execution of operations, overcentralization of the contracting authority, inconsistent model design quality, cumbersome contract award procedures, slow payments, complex cofinancing arrangements, and unfamiliarity with the specific features of the project areas concerned.

27. Contracting authority. The governments consider contracting authority to be their special domain. The ministries concerned do not limit their role to determining needs and strategies, but also want to act as contracting authorities throughout the entire execution phase. Taking delays in completion of buildings entrusted to technical departments as a pretext, the Education Ministries and occasionally the Health Ministries (as in Mali) have seized the opportunity to set up Construction or Project Directorates that allow them to handle all phases of operation themselves, including invitations to bid and signature of contracts as contracting authorities (also responsible for carrying out studies and supervising works). In the four countries covered by the survey, the majority of works in the education sector were carried out under a form of force account, by purchasing the materials and having the work done by tâcherons (see Table 6 in paragraph 57). These Project Directorates have sometimes worked well for programs of limited scale and when considerable means were made available to them, but they

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2 This is the role assumed by the entity for whose account the works are executed and which gives the order for these works. This entity is also called the owner, or the employer in contractual language.
have not been able to maintain this level of efficiency once the projects were completed, if they were ever effective in the first place. In the last analysis, experience shows that these solutions have enabled the ministries to be more effective only when they delegated all or part of the contracting authority to specialized services or agencies. Most of the time, Project Directorates are ill-equipped to draft terms of reference, select competent consultants on schedule and in accordance with guidelines, and supervise the quality of studies and works. Implementation quality suffers as a result, which has an inevitable impact on the durability of the facilities constructed as well as on their cost.

28. **Delegated contracting authority.** Examples of delegated contracting authority are rare. On a small scale, regional coordinators receive delegated contracting authority for microprojects (e.g., 30 schools financed by the EC in Burkina Faso) forming part of integrated development programs. On a larger scale, the General Public Works and Employment Agency (*Agence générale de travaux d'intérêt public et contre le sous-emploi*—AGETIP), established in Senegal with IDA financing, has been delegated authority to manage for the government a project comprising a large number of contracts for studies, works and training. This formula, which is becoming quite popular in the Sahel, makes it possible to accelerate implementation. Its success has been due in particular to the contract award methods employed, which were simplified and codified before the financing became effective, freeing AGETIP from the obligation to refer to the National Tender Board. The only control applied is post facto in the form of an audit to verify compliance with the relevant agreements.

29. **Technological choices.** Numerous standard plans have given satisfactory results from the technical and cost standpoints when the construction techniques used were sufficiently tried and tested. Repetition of standard modules has made it possible to improve the quality of execution and the organization of works.

30. **Lack of sufficient numbers of similar works.** The survey shows that introducing new standard plans confuses the artisans and small contractors and causes a part of the expertise gained from earlier projects to be lost. This is even more the case when the innovation concerns not only the model to be constructed but also the construction method. For example, more than a dozen standard plans have been introduced in Burkina Faso and Senegal over the past seven years. However, only two or three of these models are still in use; their replication on a large scale has made it possible to improve them and to bring unit costs down. On the other hand, some protracted and costly studies could have been avoided or limited to a listing of good examples; cost amortization over short series of works is difficult.

31. **Advantages and limitations of prefabrication.** Judicious use of prefabrication can accelerate implementation and improve quality. However, the actual scope for its use is limited. Use of self-supporting roof sheets purchased in bulk makes it possible to dispense with frames and simplify roof work. From a technical standpoint, this approach has worked well in Burkina Faso. Use of steel frames in Senegal has made it possible to proceed by employing first a firm to put up the frame, then an artisan to do the walls. On the other hand, importation of complete classrooms totally prefabricated in modern board materials should not be considered; this option is too costly because of the high transportation costs, while the materials are too fragile and repairs are beyond the capabilities of local firms. Approaches along these lines have been proposed on occasion for major centralized programs, since they allow all elements to be covered by a single contract. These approaches have, however, been found unsuitable for projects financed by communities as the communities reject these types of structures and thus do not maintain them.
32. **Research for appropriate technologies.** In an initial phase, many countries launched pilot operations in the early 1980s with a view to promoting labor-intensive methods using local materials. The aim of these projects was to devise models adapted to the local context, while reducing unit costs and the foreign exchange component. The intention was also to generate employment and incomes in the areas concerned. Practically every sort of technique and approach was tried out in this field, using the services of designers from various sources. An international competition was held in Senegal, during which a design was selected in which stabilized earth arches and vaults replaced beams and metal frames. A Center for Adapted Technologies (the Centre de technologies adaptées--CTA--in Bamako) was created, while in Burkina Faso the University of Grenoble (Craterre) was associated with research on local materials (adobe, in particular). In Mali, an NGO (ADAUA) was awarded a contract to build health centers in stabilized earth and to train artisans to make the domes. Numerous organizations and NGOs assisted in devising and implementing these techniques. International experts from various sources (technical assistance officers working with bilateral cooperation agencies, UNESCO experts, and staff from international consulting firms) were financed to work on the different projects. This research very quickly reached its limits, running into difficulties in transferring the know-how to both the formal and informal construction sectors. National enterprises, seeing the prospect of a new market, invested in equipment (presses and brickmaking machinery). However, these techniques often proved too complex to master. They did not generate real savings for these enterprises, which switched back to conventional techniques that enabled them to guarantee price and quality. All of these actions, which entailed sustained investments, represent a pool of knowledge and expertise that must be utilized through identifying and publicizing good examples. On the other hand, it would be counterproductive to embark on new studies for future programs.

33. **Impact of technological choices on cost.** The study shows that introduction of technologies that were not widely used generated excessive supervision costs and slowed execution. For example, in Senegal, with EEC financing, 20 classrooms out of 100 were built at a total cost of CFAF 96,000/m²--28% of which was for studies, supervision and artisan training--while at the same time the economic cost was on the order of CFAF 52,000/m². In Mali, with IDA financing, health centers took seven years to build instead of two, and cost CFAF 287,000/m² instead of CFAF 85,000/m² as initially estimated.

34. Table 2 below sets out the full cost (design, execution, supervision and contract monitoring) for buildings meeting the durability criteria for a 15-25 year lifetime. It will be noted that there are significant discrepancies of up to 100% between the health and education sectors. This is due in general to the larger wall area per m² constructed for health facilities, together with the more stringent technical specifications. The differences from country to country are also interesting in that they indicate variations in the finished product and thus in design, or else differences in process (size of contractor, and supervision costs).
### TABLE 2: Costs\(^1\) for New Buildings (in CFAF/m\(^2\) Taxes Included)
(Based on a Sample of 46 Projects)

<table>
<thead>
<tr>
<th>HEALTH AND MISC.</th>
<th>RANGES OBSERVED</th>
<th>AVERAGE OF MOST ECONOMICAL PRICES</th>
<th>COMMENTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>BURKINA FASO</td>
<td>110 - 130,000</td>
<td>116,900</td>
<td></td>
</tr>
<tr>
<td>MALI</td>
<td>75 - 301,000*</td>
<td>118,700</td>
<td>• DESIGN AND FINISH VERY COSTLY</td>
</tr>
<tr>
<td>NIGER</td>
<td>91 - 197,000</td>
<td>121,500</td>
<td></td>
</tr>
<tr>
<td>SENEGAL</td>
<td>162 - 226,000*</td>
<td>174,000</td>
<td>• LEVEL OF FINISH VERY HIGH</td>
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</table>

<table>
<thead>
<tr>
<th>EDUCATION</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>BURKINA FASO</td>
<td>35 - 83,000</td>
<td>38,250*</td>
<td>• BY FORCE ACCOUNT (EDF)</td>
</tr>
<tr>
<td>MALI</td>
<td>38 - 57,000</td>
<td>44,200*</td>
<td>• DECENTRALIZED CONTRACTING AUTHORITY</td>
</tr>
<tr>
<td>NIGER</td>
<td>47 - 91,000</td>
<td>47,900*</td>
<td>• MIXED, SECOND EDUCATION PROJECT</td>
</tr>
<tr>
<td>SENEGAL</td>
<td>42 - 96,000</td>
<td>52,250*</td>
<td>• APE + TENDER (OPEC)</td>
</tr>
</tbody>
</table>

\(^1\) THE COSTS INCLUDE DESIGN, EXECUTION, SUPERVISION AND CONTRACT MONITORING.

35. **Use of proven technologies and identification of good examples.** In a second phase, as of 1985, efforts have focussed on the inventory and rational use of the best known and most proven techniques in order to determine improvements needed to remedy emergent technical shortcomings. Significant progress has been made in controlling costs and mastering techniques during execution of the IDA-financed projects in Burkina Faso, Niger and Mali. These models have made it possible to reduce construction costs by some 30-50%. The projects were based on better utilization of locally available materials and most common techniques, taking the builders' technical capabilities into account. These technologies are now reproducible.

36. **Total cost.** The survey showed that program managers generally paid attention to only one cost element: that to be paid to the materials supplier and the contractor or *tacheron*. These represent, of course, the major cost components, but there are other elements that must be considered:

   (a) **Design costs.** The survey brought to light evidence of waste in this area. Dissemination of standards and use of standard designs would prevent unneeded work of this sort.

   (b) **Supervision costs.** These costs may appear relatively high (5-9%), but this is all the more acceptable given that works supervision is generally too sporadic.

   (c) **Management costs.** The survey revealed that the managers of the agencies or directorates responsible for administering the programs were uninformed as to management costs per unit produced. At the start of the survey, reliable data were available only for a few projects.
TABLE 3: Cost Breakdown by Phase
(For New Buildings Based on a Sample of 46 Projects)

<table>
<thead>
<tr>
<th>SECTOR</th>
<th>STUDIES AND DESIGN</th>
<th>WORKS</th>
<th>SUPERVISION</th>
<th>MANAGEMENT</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>CFAF/m²</td>
<td>%</td>
<td>CFAF/m²</td>
<td>%</td>
<td>CFAF/m²</td>
</tr>
<tr>
<td>HEALTH</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Av. Cost (A)</td>
<td>4,750</td>
<td>4</td>
<td>131,300</td>
<td>87</td>
<td>4,700</td>
</tr>
<tr>
<td>Econ. Cost (B)</td>
<td>4,000</td>
<td>3</td>
<td>121,800</td>
<td>91</td>
<td>5,000</td>
</tr>
<tr>
<td>EDUCATION</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Av. Cost (A)</td>
<td>3,300</td>
<td>5</td>
<td>53,800</td>
<td>86</td>
<td>3,750</td>
</tr>
<tr>
<td>Econ. Cost (B)</td>
<td>2,500</td>
<td>5</td>
<td>37,150</td>
<td>82</td>
<td>4,000</td>
</tr>
</tbody>
</table>

(A) Average for all projects.
(B) Average for projects considered the best, disregarding those that it would not be desirable to replicate.

37. To keep costs down, certain projects readily use contractors of simple organization and limited coordination capacity. In such cases, the contracting authority or project manager must have an operational technical structure available, the real cost of which should be studied in advance. For programs where operations are widely dispersed, the additional supervision costs can feasibly cancel out all savings made on the contract price.

38. Nondurable nature of facilities constructed by communities. The study revealed that local communities and certain NGOs construct at a lower cost than municipalities or the government. This can be explained not only by the lower overhead costs of medium-sized firms, but also by the lower construction standards (resulting in less durable buildings) and virtually nonexistent quality control. However, the divergence found (see table below) is so great (CFAF 20,000/m² compared with CFAF 83,000/m² for classrooms and CFAF 54,000/m² compared with CFAF 128,000/m² for PHC facilities) that the study examined the question more in-depth. It was found that the beneficiaries keep close track of the use of funds they have raised themselves, and also avoid induced costs resulting from cumbersome public procurement procedures and slow payment. Indeed, this could explain a difference of 50%, but not one of 100%. The remainder is thought to be attributable partly to savings on construction costs which are canceled out by the nondurable nature of the buildings constructed. Many of these buildings have to be classified as no more than temporary shelters that need to be replaced every two to five years, depending on the standards applied. Table 4 below shows the unit costs per construction method and m² constructed per month in the two sectors.
TABLE 4: Construction Pace (m²/month) and Unit Costs (CFAF/m²) 
(Works at Economic Cost: Projects Implemented at a Normal Rate of Productivity)

<table>
<thead>
<tr>
<th>SECTOR AND PROJECTS</th>
<th>AREA CONSTRUCTED (m²/month)</th>
<th>UNIT COSTS (CFAF/m²; INCLUSIVE OF ALL TAXES)</th>
<th>FORM OF EXECUTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>HEALTH PROJECTS</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Djenne health center, Mali</td>
<td>34</td>
<td>54,000</td>
<td>Force account</td>
</tr>
<tr>
<td>117 health centers, Burkina Faso</td>
<td>227</td>
<td>117,000</td>
<td>Force account</td>
</tr>
<tr>
<td>25 other health centers, Burkina Faso</td>
<td>78</td>
<td>128,000</td>
<td>Contractor/bidding</td>
</tr>
<tr>
<td>Capital budget, Niger</td>
<td>65</td>
<td>152,000</td>
<td>Contractor/bidding</td>
</tr>
<tr>
<td>Education projects</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10 classrooms, Burkina Faso (EDF)</td>
<td>378</td>
<td>42,000</td>
<td>Force account</td>
</tr>
<tr>
<td>Fourth Education Project, Mali</td>
<td>465</td>
<td>56,800</td>
<td>Contractor; decentralized</td>
</tr>
<tr>
<td>Third Education Project, Burkina Faso</td>
<td>523</td>
<td>48,000</td>
<td>Contracts w/ tâcherons + materials bidding</td>
</tr>
<tr>
<td>Second Education Project, Niger</td>
<td>753</td>
<td>48,000</td>
<td>Contracts w/ tâcherons + materials bidding</td>
</tr>
<tr>
<td>Fourth Education Project (100 classrooms), Dakar</td>
<td>796</td>
<td>83,000</td>
<td>Contractor/bidding</td>
</tr>
<tr>
<td>APE classrooms, Senegal (general)</td>
<td>1,500</td>
<td>20,000</td>
<td>Force account</td>
</tr>
</tbody>
</table>

N.B.: The 100 classrooms for the Fourth Education Project (Dakar) were constructed in three months. The urgency with which this project was carried out is the reason why the cost of this component exceeded the average cost of the others by 25%. The table shows that productivity in the Third Education Project in Niger was very high, for a moderate cost level. The APEs have by far the largest implementation capacity.

39. Project management.\(^3\) As concerns the contracting authority, particularly in the education sector where the volume of operations is larger than in the health sector, the ministries have established technical services to carry out or supervise studies and to monitor works. These services, commonly termed construction directorates, school or health infrastructure directorates, or occasionally project units, find it difficult to recruit the necessary specialists and to retain them in the public sector. Well-qualified specialists are tempted to move to other public or private enterprises which are more rewarding from a technical or financial standpoint. Because of the magnitude of the needs and the geographic dispersion of the responsibilities assigned to them, these units are able to carry out only a small part of their functions. For instance, instead of using specialized firms to carry out studies or topographic surveys, managers prefer to meet the immediate demand by accepting work that they could easily delegate, leading them to neglect their essential functions--namely dissemination of good practices and technical support to the regional authorities. In the health sector, on the other hand, the tendency is to entrust architectural studies and works monitoring to private firms or public agencies with

\(^3\) Project management is the role of the professional responsible for the design and monitoring of operations on behalf of the contracting authority.
responsibility for construction—the correct way to proceed, since projects in the health sector are few in number and generally more complex.

Differences in project management costs. The survey showed that studies and monitoring activities carried out by the private sector are less expensive than the same services carried out by ministry-based entities. The cost of such work by private firms is determined by contract, and the percentage with respect to the total for the works is fully verifiable. The cost does not exceed 8-10%. However, the survey shows that when the work is carried out by public agencies using their personnel (plus technical assistance), the figure can reach 18% and, sometimes, as much as 25% of the cost of the works.

Excessive time spent on studies. It has been observed that studies which could have been completed in three or four months have taken longer than 12 months. Lack of the type of complete information that should be provided by governments (land surveys, results of drilling, urban planning codes, possibility for hookup to public services) is a source of many mistakes and weaknesses in the preparation of studies. As a result, and coupled with complex selection procedures and administrative delays in awarding contracts and approving the different phases of studies, the time taken is abnormally long (see Table 5, paragraph 47). In other cases, the scope of the studies could have been reduced if proven, satisfactory models had been used. If these models had been known to and accepted by the responsible staff, the new studies could have been limited to evaluation of sites and erecting buildings, which would have reduced the amount of time required.

Inconsistency of quality control. The quality of the buildings constructed depends on the technical specifications and the monitoring works execution. The choice of materials and technical specifications has a direct impact on the initial capital cost and on the useful life of the facility. The monitoring of the quality of implementation is often sporadic. As a result, construction defects that could easily have been avoided or corrected immediately compromise the soundness of the building or entail costly repairs. Supervision and monitoring are entirely lacking in projects undertaken by users or local communities, except in the case of a few large communes, such as Dakar, that have their own technical services or can afford to employ private firms. As far as projects executed with external financing are concerned, the quality control applied has generally made it possible to meet the prescribed specifications. In conclusion, the control functions need to be codified in order to ensure homogeneous quality.

Management and procurement procedures. In general, the awarding of contracts tends to be subject to considerable delays owing to the cumbersome nature of procedures and their application. The survey also raised questions about the efficiency of these procedures in light of efforts to reduce corruption.

Service contracts. As regards contracts for studies and quality control, it must first be emphasized that imprecision in the definition of programs and the drafting of terms of reference for work entrusted to consultants leads to undesirable decisions on consultant selection in terms of quality and execution time, as well as costs. These mistakes then give rise to inefficiencies and conflicts in contract management, and also have an extremely negative impact on the development of efficient local consulting firms. All four countries surveyed have experienced major difficulties harmonizing the donor-recommended procedures for consultant selection with the current procedures and practices followed in the individual countries. This situation is even more sensitive when public procurement codes are ill-suited to professional services, and when the national procurement commissions are unfamiliar with the donors’ requirements.
45. *Works contracts.* For works contracts financed by the government, the legislation requires that a contract be concluded with a general contractor when the amount exceeds CFAF 5-10 million. For contracts of lower value, it is sufficient to obtain quotations from three contractors before awarding the contract. In principle, this simple procedure is best suited for small contracts with *tâcherons.* The private contract formula is not generally authorized. A large number of projects also use mixed methods in which the government procures the materials and has them delivered, after calling for local or international bids; the actual construction is then left to small contractors, awarded on the basis of competitive bidding. This formula has worked well, particularly in Niger and Burkina Faso, in reducing unit costs. Finally, but with increasing rarity, the works may be carried out by genuine force account. This procedure is limited to small operations, or when specialized entities have been set up for this purpose (as in the case of FEER in Burkina and that of *Travaux communautaires* in Niger); however, this approach had to be abandoned because it proved more costly and the end product was of lower quality. Moreover, the management structure of these entities is not conducive to motivating efficient performance. The sample of projects studied in the four countries furnished the data on which the following table—which shows, for 46 projects, the area constructed by type of procedure—is based.

<table>
<thead>
<tr>
<th>New Construction</th>
<th>Rehabilitation</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Health</td>
</tr>
<tr>
<td>Bidding</td>
<td>18,304 m²</td>
</tr>
<tr>
<td>Limited Bidding</td>
<td>636 m²</td>
</tr>
<tr>
<td>Force account or mixed (a)</td>
<td>25,664 m²</td>
</tr>
<tr>
<td>Local communities</td>
<td>122 m²</td>
</tr>
</tbody>
</table>

(a) Materials procured by contracting authority; execution by small contractor.

46. *Contracts awarded by local communities.* When local community participation is incorporated into the operation, the community’s contribution is either in the form of materials and/or labor, or a financial contribution to pay the *tâcheron* or small enterprise hired. The procedures applied by the communities correspond to commercial practices, whereas those used by decentralized public agencies are determined by the public sector’s procurement code. The government’s contribution under these mixed arrangements consists of supplying materials and/or payment of a subsidy (see the FAEF in Mali).

47. *Time taken to conclude works contracts.* In general it takes four to eight months to award a contract, not including the studies phase. Contracts are rarely concluded during the period of bid validity, which is usually 120 days. In all the cases studied, these delays have been due to the poor quality of bidding documents and the cumbersome procedures of central procurement commissions. These commissions—rather than limit their role to ensuring adherence to procedures by the entities responsible for the works and conducting post facto verification—are implicated in every step of the procurement process and contract approval. Table 5 below provides details on the time taken for the different phases: 48% to 55% is spent on studies (24-35%) and contract award (20-24%).
TABLE 5: Timeframe by Phase of Operation
(Sample: 46 Projects)

<table>
<thead>
<tr>
<th>SECTOR</th>
<th>STUDIES AND DESIGN</th>
<th>PROCUREMENT</th>
<th>NEW WORKS</th>
<th>CUMULATIVE PERIOD</th>
<th>AREA OF CONSTRUCTION</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mths.</td>
<td>%</td>
<td>Mths.</td>
<td>%</td>
<td>Mths.</td>
</tr>
<tr>
<td>Health</td>
<td>6</td>
<td>35</td>
<td>5</td>
<td>20</td>
<td>9</td>
</tr>
<tr>
<td>Education</td>
<td>4</td>
<td>24</td>
<td>4</td>
<td>24</td>
<td>9</td>
</tr>
</tbody>
</table>

W.B.: There appears to be no necessary correlation between execution period and unit cost. Nevertheless, projects that encountered technical and management problems were more costly than expected, and the periods were in all cases of longer duration than the averages shown above.

48. Impact of procedures on costs. The only way to reduce implementation costs is to award contracts swiftly and pay bills on time. However, emergency procedures that affect costs should be avoided (the report for Senegal shows that costs were 25% higher for an emergency program to build 100 classrooms in four months, bidding included). Furthermore, the credibility of the agency handling payments has a considerable impact on the level of bids, since contractors have to factor in the financial costs and risks in the event of delayed or partial payments.

49. Lack of sufficient works of a similar nature and the implications on productivity and cost. The irregularity in programming social infrastructure construction operations increases costs and therefore has a detrimental effect on programs undertaken. SMEs and skilled workers that could specialize in this type of construction are prevented from acquiring the necessary equipment and from training and maintaining qualified personnel. As a result, productivity and construction quality suffer. Sudden fluctuations in the volume of words lead either to a depressed market causing contractors to agree to impossibly low prices (giving rise to problems for project execution), or to an overheated market that both increases contractors' costs and cancels out the effects of competition. Planners and decisionmakers should endeavor to program construction works over time, since this would enable local entrepreneurs to develop their capacity in a climate of healthy competition.

50. Organization of the execution of works. The organization of execution must to be examined with due consideration of the decisionmaking level. Three main modes of production are discussed below.

51. Beneficiaries' initiatives. In this scenario, a committee manages the operation as soon as funds are available for execution of the program. The choice of technology depends on the beneficiaries' financial resources, materials available locally, and know-how of local builders and artisans hired by the committee. In the case of APEs, school directors play an important role in terms of coordination, and in many instances all or part of the labor is furnished by volunteers. This volunteer labor helps to gather necessary aggregates for preparation of materials (bricks and blocks). Funds must still be raised to procure manufactured items (cement, ironwork, frames, roofing and joinery work). The fundraising is spread over several years, so that materials are purchased at different times and used as soon as available. The result is a phased construction approach. In such operations there is essentially
no real supervision of works or control of supplies. There is no one available to provide advice on improvements or correction of design or implementation errors. Quality cannot be guaranteed and is usually very inferior, resulting in rapid deterioration and the need to replace the building at an early date—this time with the assistance of a properly organized agency.

52. Initiatives undertaken by decentralized agencies. Under this scenario, operations are organized by a commune or region, using its own financing. Usually, given the absence of technical entities, assistance from independent specialists (often free of charge) or from a regional technical agency is obtained. The construction method choice is generally determined on the basis of standard plans provided by the regional technical services (usually the regional directorates of public works). The works are executed by small enterprises or tâcherons selected according to the practices of the decentralized agencies (normally by limited bidding, when the amounts involved do not exceed between CFAF 5-10 million). The chief accountant of the contracting authority makes the necessary payments, as instructed by the signatory of the contract, sometimes upon the advice of the technical assistance specialist.

53. Central-level initiatives. These initiatives are seldom included in the government’s capital budget. For the purposes of this study, such activities were divided into two categories—a "project-based approach" or a "program-based approach." In both cases, the type of management adopted depends on the type of financing (grants, subsidies or loans) and the size of the project.

54. Project-based approaches. Stand-alone microprojects, for 100% of financing is provided through NGOs or bilateral arrangements, are managed by the donors themselves, with no links with the central government. For larger projects involving more than 25 units or forming part of a multicomponent project receiving 100% of its financing from NGOs or bilateral arrangements, the donors (e.g., USAID, EDF, etc.) act in close coordination with the supervisory ministries while themselves undertaking project management, even in cases when the ministry responsible for overall planning retains responsibility for authorizing expenditures. Very few organizations deposit all the financing for a program in a bank in the recipient country. In the case of credits or loans, the government directly involves the supervisory ministries and establishes a form of project unit responsible for coordination and management. Increasingly, cofinancing is used for these projects, requiring efficient coordination among the various donors. Construction design is entrusted to consulting firms. Generally, these firms provide quite different architectural and technological plans as a result of the lack of written standards and satisfactory models on which project negotiations can be based. Proposals use either conventional technologies (i.e., modern materials such as reinforced concrete and metal roofing), local materials (with attempts to develop the use of traditional materials and methods such as the use of earth, stone or fired brick), or innovative methods (i.e., the introduction of new architectural or technical methods involving a total overhaul of construction procedures). Although the second approach aims to take advantage of existing expertise, it entails development of prototypes and the training of instructors. The highly innovative approaches using uncommon materials or construction know-how unfamiliar to the private sector require continuous on-site supervision, together with the provision of training for laborers and contractors. Innovative technologies can be used only on important sites situated within the same locality because, if they are widely dispersed, the cost of supervision becomes excessive.

55. Program-based approaches. These approaches are characteristic of the new generation of projects and better meet the need for coherence among the various initiatives. They aid in defining norms and standards on which projects can be based. In numerous projects in the Sahel these approaches
have led to better facilities management. A format involving delegated contracting authority makes it possible to manage centralized programs with greater efficiency (see text box below).

### In Senegal, AGETIP has been given the authority to manage social sector construction programs for the public sector. Its role consists of:

- drawing up simplified standard contracts
- using simplified contract award procedures, with post facto verification
- preparing standard plans for routine works
- selecting and training consultants to act as project managers
- selecting and upgrading artisans and small contractors
- managing contracts, and helping local communities to execute their construction programs.

56. In certain projects involving participation by local communities, the scale of the program and the procedures to be followed fail to take into account these communities’ limited capacity to prepare requests, mobilize funds and organize themselves to manage the operations. In the absence of simple guidelines, the information made available by project managers or regional authorities is sometimes distorted and the consequences can be disastrous, both for the timely execution of a project and for its technical quality. By way of example, if promises are made too soon to local communities or to too large an area, and are not then promptly followed up by concrete actions, community enthusiasm wanes and the project loses credibility. Contradictory or inappropriate technical advice on how to carry out or organize works leads to wastage and poor quality. When local communities receive assistance, the execution pace of a contracting firm will rarely match the working methods of volunteer labor. It is preferable in these cases to provide the materials and allow the community to manage implementation with the services of a tâcheron. This was the conclusion made in Senegal, where two approaches were tested simultaneously (supply of materials by an enterprise responsible for organizing and training the community, and supply of kits of materials to communities that used small contractors). It was quickly found that when the project provided the communities with a minimum of technical assistance, it was better to opt for the second format (supply of materials, in conjunction with technical advice, with execution of the works by a small contractor hired by the community).

57. Table 6 below, on the different modes of execution, shows very clearly that utilization of general contractors is much more widespread in the health sector. Certain countries, like Burkina Faso, also have a more established tradition of carrying out works by force account or using mixed formats (supply of materials combined with hiring of contractors).
TABLE 6: Mode of Execution

<table>
<thead>
<tr>
<th>Country</th>
<th>Materials + Small Contractors (Force Account)</th>
<th>Contractors</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Education</td>
<td>Health</td>
</tr>
<tr>
<td>Burkina Faso</td>
<td>100%</td>
<td>90%</td>
</tr>
<tr>
<td>Mali</td>
<td>10%</td>
<td>10%</td>
</tr>
<tr>
<td>Niger</td>
<td>45%</td>
<td>0%</td>
</tr>
<tr>
<td>Senegal</td>
<td>5%</td>
<td>0%</td>
</tr>
</tbody>
</table>

58. Lack of supervision of decentralized operations. Since responsibility for infrastructure construction has either been completely centralized or left entirely to the communities, there has been, in most instances, no organization responsible for the supervision of decentralized operations, and no party to ensure the efficiency and effectiveness in the use of resources provided by the communities or users. There are a number of agencies and entities that could have been used at the national level (regional directorates and technical services), if they had been informed and given responsibility, and if their role had been carefully defined.

D. Utilization of Facilities

59. Lack of maintenance and its consequences. Central governments, and to an even greater extent local communities or the beneficiaries themselves, tend to neglect routine maintenance and repair of buildings. When faced with pressing needs, government budgets favor new construction, which has a high "visibility" quotient. Following several awareness-building campaigns, improvements have been noted in upkeep of joinery and locks. However, in general no preventive or "curative" maintenance is carried out. Buildings are allowed to deteriorate to a critical stage at which either emergency rehabilitation must be carried out or else the buildings would become unusable after two or three years. This of deterioration usually involves:

(a) deterioration of the site surroundings, leading to erosion of backfills around foundations;
(b) gradual disappearance of cement floor finishings, with consequent effects on furniture;
(c) deterioration of woodwork and ceilings;
(d) roof leaks that cause masonry and brickwork to deteriorate; and
(e) weak frame and roof brackets.

60. The annual expenditures needed to prevent or remedy these problems in good time are negligible (1-2% of capital costs), compared with the cost of rehabilitation which can be as much as 60%.
of new construction costs. However, the reason put forward for failure to perform maintenance is lack of resources. Major repairs due to unforeseen accidents, together with replacement of components that reach the end of their useful life, also tend to be neglected by the government or local authorities. The cases studied also show that the rehabilitation programs finance work that is not primarily for the maintenance of buildings proper (for example, 30% of the funds is spent on repainting). Such work could be handled by the local communities or users. The funds provided could then be used, by priority, for major repair work necessary to preserve existing facilities. Rehabilitation costs range between CFAF 5,000 - CFAF 30,000 per m², with an average of CFAF 16,000/m². These figures represent 10-60% of the cost of putting up a new building of the same standard (over 60% rehabilitation is not justified). Average rehabilitation cost is about 30% of the cost of new construction. After rehabilitation, the useful life of a building is estimated at at least 15 years.

61. **Amortization costs.** The concept of annual amortization costs is never taken into consideration by government authorities responsible for infrastructure planning. Decisionmakers are aware of the importance of the durability of buildings and are even prepared to invest significant sums to obtain buildings of a higher standard than necessary. On the other hand, precise data on building durability and maintenance costs for calculating amortization costs are lacking. From the strictly economic standpoint, it could certainly be shown that very low-cost (not exceeding, for instance, CFAF 120,000 per classroom), simple, temporary shelters made from local plant materials would offer better annual amortization costs, even if they had to be replaced every year. This type of facility represents only 2-5% of the infrastructure in the countries surveyed; these structures do not satisfy pedagogical or sanitary standards, particularly as regards protection of the equipment stored there; at the same time, the uncertainty regarding the community mobilization needed each year to rehabilitate the facilities threatens the interruption of the services provided in these facilities. From another angle, the sums invested by communities (between CFAF 800,000 - 1 million) are too great not to be used to the greatest advantage. They lead to high annual amortization costs when considering replacement and repair needs over a 30-year period. If judicious choices are to be made as to quality, price and durability, the annual amortization cost must be taken into account. The study shows that, over a 30-year period, depreciation of the invested capital is higher for a poorly built facility (costing CFAF 1 million) with a five-year life than for one costing CFAF 2 million with a potential lifetime of 30 years. Over 30 years, in constant terms, the annual amortization cost is CFAF 200,000 for the former, compared with CFAF 66,000 for the latter, thus confirming the advantages of complementing funds raised by communities and ensuring quality construction.

III. **RECOMMENDATIONS AND STRATEGIES**

62. The Sahelian countries' considerable needs in terms of primary school and PHC facilities call for far-reaching reforms of planning and budgeting methods as well as major efforts to improve efficiency throughout the whole construction process.

A. **Establish Global Plans and Budgets**

63. To achieve this goal, planning methods need to be reformed and the role of the government redefined with the objective of mobilizing all parties and coordinating utilization of all available resources. The main actions to be taken are the following:
(a) inventory existing facilities by decentralizing the gathering and updating of data and centralizing the main elements gathered;

(b) set national priority criteria, and establish databanks in the individual countries and for the Sahel as a whole;

(c) reallocate roles and organize cooperation among governments, regions and users; make the regions responsible for the greater part of the operations to be carried out (with financial and technical assistance from the government), while holding the government responsible for planning, and implementing special emergency programs designed to correct regional imbalances (requires the restructuring of the planning team);

(d) draw up comprehensive annual budgets defining the allocation of government assistance to the regions, and include rehabilitation and maintenance in the physical programs and in the sector budgets.

To illustrate these recommendations, the boxes below present figures on management of primary school facilities in a typical Sahelian country with the objective of defining the overall annual program and budget for construction, rehabilitation and maintenance of the country's primary school facilities.

64. **Inventory existing facilities**, including all classrooms, regardless of financing origin. In this light, the regional directorates will be mobilized for gathering data, even if initial expectations as to the comprehensiveness and reliability of the data are modest.

65. **Prepare a global inventory of facilities**. This inventory should include facilities built by communities or user associations, or by NGOs, about which little is usually known (number, location, size, type of construction, state of buildings). It can be assumed that facilities of this sort deriving from local initiatives have been, or will be, numerous; they account for nearly half the total for the education sector in the countries surveyed.

66. **Mobilize the regional directorates for data gathering**. The gathering and updating of data should not be carried out by the central authorities as this would inevitably mean that incomplete, and even incorrect, information would be received, far behind schedule. Instead this work should be entrusted to the regional authorities, who will be better motivated and who are much closer to the population and facilities concerned. However, summaries of the data gathered must, of course, be forwarded to the national planning team which will prepare and distribute the national summaries (annual publication in the press is recommended).

67. **Start data gathering with modest goals**. When precise data on existing facilities are lacking, it would be counterproductive to defer startup of a project until a global inventory has been completed. In such a situation, project preparation studies can be based on representative samples of
existing facilities. These surveys should make it possible to set the ratios for determining the percentage of buildings to be rehabilitated, repaired, replaced or built. This means that the same criteria for defining the volume and nature of works to be carried out and for computing the relevant estimate must be used by the project managers responsible for the detailed studies and supervision of works.

The inventory of our typical Sahelian country comprises 10,000 classrooms, unequally distributed, of which 4,000 will require rehabilitation in the next few years.

68. **Set priority criteria.** Establishing priorities is the government’s responsibility, the needs for education having been identified by the school mapping exercise, and for health by the health coverage development plan. However, these needs are not typically ranked by priority. Should the very poorly served areas be favored, even if the users are not requesting anything? Or should priority be given to those who are helping themselves? (Although this would aggravate the already marked regional and ethnic disparities.) A policy which is balanced, clear, and accepted by the population must be formulated. In principle, the school and health center mapping process should provide regional and central decisionmakers with the information they need to set priorities and formulate programs. The relevant planning standards, such as access to services by a sufficient number of potential users, and capacity and usage ratios, will have to be added to the physical data on facilities.

69. **Leave the initiative, for the most part, up to the regions.** The regions, larger urban areas, or users, will continue to provide a part of the necessary financing. The government will then have to contribute the remainder, in accordance with conditions known to the authors of those initiatives. Taking the long-term view, user initiatives are the most promising because they ensure a sustained interest in the maintenance of infrastructure.

70. **Simultaneously undertake centralized emergency operations.** These programs are justified when the local authorities do not propose and are not in a position to cofinance operations which, on the basis of the national criteria mentioned above, would be considered priority. This is particularly the case when a region is manifestly lagging behind, or is underprivileged compared to the national average. The government will then organize an emergency operation directed by the central authorities, with a view to preparing the transfer of the infrastructure to the regional authorities at a later stage (see table on alternative modes of production, paragraph 88). Such emergency programs should not represent more than 10-20% of the total program.

71. It is essential that planning standards and methods be drawn up and updated at the national level, but it is also indispensable for the efficiency of the system that regional authorities (education inspectors or district chief medical officers) be responsible for the preparation of the first planning scenario and its subsequent implementation.
In our reference country, of the 1,000 classrooms to be built per year, 900 are "assigned" to decentralized initiatives (one-third financed by the initiative-taker and two-thirds by the government); the other 100 classrooms fall under a revolving centralized program designed to expedite elimination of regional inequalities (program 100% government-financed).

72. **Set up databanks** (by country and for the Sahel) and keep them up-to-date in order to record successes and failures, and to derive from them relevant lessons to be learned and information to consider when formulating future activities.

73. **Establish technical requirements and specifications.** The urgent need for standards must be satisfied, at the subregional level, by combining available valid data on identification of needs and determination of usage rates and capacity of the facilities and surface area to be constructed. On the technical side, guidelines must also be developed as concerns ventilation and lighting, solar protection, heat- and sound-proofing, hygiene, and protection against theft and fire. As noted in the preceding chapter, low population density in rural areas renders multigrade classrooms and more rudimentary health facilities unavoidable. This must be reflected in the definition of norms, with the resulting lower construction unit cost. For example, having several groups of students in the same room does not reduce the total area required, but it does allow for the placement of intermediate supports, reducing the roof span, and simplifying certain construction components. As regards health centers, the specific features of rural areas has an impact on the number of rooms, and on the size of maternity facilities in particular. The various work done in this area, mainly during preparation of construction manuals, should be summarized and made available to selected regional institutions.

74. **Identify alternative modes of production.** Classify potential suppliers of goods and services in the private sector, taking into account their performance and qualifications. The private sector will develop its capabilities more readily if it can count on a sustained and regular demand for its services.

75. **Observe average cost and time required** (for construction, rehabilitation and maintenance). Maintaining an up-to-date databank will make it possible to better estimate resources to be allocated to future programs. A simplified comparative cost table for new construction (cost of works, materials and labor) should be maintained for the Sahel region. This table should not be a detailed comparison of unit prices, but a record of average costs for the main items to be included in estimates, such as foundations and floors, walls, roofing, doors and windows. Additionally, a record should be kept of rehabilitation and maintenance costs, since regular maintenance is a potential source of considerable savings in facilities management.
In our reference country, the average construction cost of a classroom is CFAF 3 million. The cost of rehabilitation is CFAF 900,000, and annual maintenance cost of a classroom is CFAF 60,000.

76. **Reallocate roles and organize cooperation** among the central government, the communities and users. In the future, the government’s role should be one of guidance and technical and financial support, complementing the decentralized initiatives that will take on the lead role in decisionmaking and implementation.

77. **Improve coordination of local initiatives.** All available resources must be mobilized, and duplication of efforts and waste must be avoided. Improved coordination requires first, for the government, a sustained effort to gather and disseminate information on needs, resources, and the plans and intentions of the different parties. Coordinating grassroots initiatives (APEs, communes, private sector, NGOs), whether among themselves or with central-level activities, can be difficult. It is important not to paralyze these initiatives through overregulation, and not to force them to meet inappropriate requirements. The most delicate, and at the same time most important, undertaking is to devise reliable and predictable procedures for government support so that the users or communities will know what assistance they can expect, and when, how and under what conditions it will be granted. User contributions through taxation (local tax) appreciably modify financing arrangements, but should be utilized, when possible, in order to increase resources available to the sector. It is, of course, essential to carefully assess the tax base and collection rate to avoid dropping the APE subscription system; it is also essential to devise a system for balancing resources among the different areas in order to protect those where collection rates are high, or to broaden the tax base in certain cases to prevent transfers between areas displaying disparities. In this respect, special attention should be paid to the larger urban agglomerations where tax yields are often low (Mali is an example) owing to the relatively small number of taxpayers in a position to pay. It is relatively easy to coordinate centralized initiatives (government, donors). When a cofinanced operation is jointly decided upon, an efficient coordinated management system must be established (see below).

78. **Restructure planning teams.** To strengthen planning capacity requires the creation or reorganization of central directorates responsible for facilities management and planning within each ministry. A good team of qualified and experienced professionals with computerized instruments available to them is essential for establishing and maintaining the databank, and for preparing future programs. This team will have to synthesize data provided by the regional directorates. It must be capable of drawing up the construction and maintenance budgets to be delegated to the regions, and of monitoring the performance of the decentralized agencies in the implementation of their annual programs. The team should delegate operational tasks, such as technical studies and works supervision, to project managers or executing agencies. It should also establish twinning arrangements with similar organizations already operational in other countries.
79. Assign this team the following essential functions:

(a) planning
- inventory of existing facilities and updating of school map
- identification of multiyear programs
- preparation of budget proposals

(b) technical data
- definition and dissemination of construction standards and standard building models
- inventory of most common techniques and "know-how" in the country for this sort of construction
- update of price table
- preparation and dissemination of construction and maintenance manuals
- inclusion of physical plant management and maintenance courses in training programs for education and health personnel

(c) design
- delegation of studies to project managers

(d) program execution
- devising of technical, administrative and financial arrangements
- delegation of contract management and supervision

(e) decentralization
- assistance to regional directorates for preparation of regional programs
- organization of a quality control system for works execution

(f) contract standardization
- participation in drawing up standard contracts

80. Establish an overall annual budget, covering all new construction, rehabilitation and maintenance operations, regardless of the parties involved. This overall budget will represent performance indicators of sector policy at the national level and should show the breakdown of support furnished to the decentralized structures.
81. **Include rehabilitation and maintenance in the programs and budgets** since these activities make it possible to maintain at lower cost, and therefore to provide more facilities than a program limited to new construction. By way of example, the annual classroom budget of our typical country is given in the table below:

<table>
<thead>
<tr>
<th>Amounts in CFAF million</th>
<th>Total cost</th>
<th>Gvt. share + donors</th>
<th>Local share + direct assistance</th>
</tr>
</thead>
<tbody>
<tr>
<td>New construction</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>a) centralized (100)</td>
<td>300</td>
<td>300</td>
<td>100%</td>
</tr>
<tr>
<td>b) decentralized (1000)</td>
<td>2,700</td>
<td>1,800</td>
<td>2/3</td>
</tr>
<tr>
<td>rehabilitation (800)</td>
<td>720</td>
<td>480</td>
<td>2/3</td>
</tr>
<tr>
<td>current maintenance</td>
<td>600</td>
<td>200</td>
<td>1/3</td>
</tr>
<tr>
<td>Total</td>
<td>4,320</td>
<td>2,780</td>
<td>64%</td>
</tr>
</tbody>
</table>

82. **Program rehabilitation** of a classroom or a PHC facility if: (i) its characteristics match the requirements for so-called permanent structures; and (ii) the cost of rehabilitation does not exceed 60% of the cost of a new building.

83. **Program and budget maintenance needs.** To encourage users to maintain classrooms, partial financial assistance to regional budgets, on the order of 30%, should be provided by the government. As for rehabilitation, this financial contribution by the government will generate considerable savings, since regular maintenance prolongs the life of buildings or averts much more costly rehabilitation work or reconstruction.

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* Four comments need to be made regarding this table:

* The table includes in one column the contributions of the government and the participating donors, and in another column the contributions of local communities, APEs and entities directly assisting these communities, such as small NGOs.

* The amount shown for the government’s share represents 16% of Mali’s education sector budget, i.e., on the order of CFAF 17 billion. In this same country, the capital budget for education is CFAF 200 million, i.e., 7% of what is needed, or in other words, the bare minimum necessary to meet current maintenance requirements.

* It should be borne in mind that the unit costs per classroom used for this calculation are: construction: CFAF 3 million; rehabilitation: CFAF 900,000; maintenance: CFAF 60,000/year.

* Finally, it must be emphasized that users finance construction of schools more readily than other types of infrastructure.
In our reference country, it has been decided to rehabilitate 4,000 classrooms in four years (average unit cost of CFAF 900,000). It has also been decided that the government will provide an annual maintenance subsidy of CFAF 20,000 per classroom, which will cover one third of the annual maintenance cost, estimated at CFAF 60,000 per classroom.

B. Improve Productivity

84. The case study indicates the need to resort to more than one mode of production, each being organized in such a way as to attain maximum efficiency. This means facilitating the choice of technical standards, standard plans and construction techniques, and better organizing the implementation and management of operations. The following paragraphs discuss how to reallocate the roles of the various parties in the initiative, design, supervision, and execution of works. In general, the government will seek to share, delegate or transfer implementation responsibilities to those who can best carry them out, and to facilitate the work of the different parties involved.

85. **Select the technique to be employed.** Quality standards, models and construction techniques must be specified. Adherence to standards will make it possible to control quality. Selection of models and techniques that have been tried and tested will help to prevent waste and enhance the efficiency of the selection production mode. Whether the location is rural or urban must also be taken into account.

86. **Specify quality standards.** The government has a major role to play in the definition and dissemination of construction quality standards. The survey indicates that a manual of recommendations should be prepared for contracting authorities, project managers, and users which draws their attention to the more important issues, such as:

(a) southward orientation of main facades in order that a minimum of wall surface (gable walls) be exposed to oblique sun, against which an ordinary roof overhang affords little protection;

(b) the absolute necessity of providing stable foundations that will not be affected by soil erosion;

(c) specifications for perimeter tying of walls and adequate framework to ensure the stability of the buildings and locate load-bearing points and wind uplift potential;

(d) minimum height beneath roof to permit good ventilation (with or without a suspended ceiling) and reduce the effects of secondary heat radiation from the roof;

(e) minimum precautions to ensure the durability of inside floors (for instance, flooring incorporated into a concrete slab at least 8 cm thick);

(f) importance of roof overhangs to protect the facades against rainwater and sun;
(g) minimum roofing requirements (e.g., metal sheet thickness at least 50/100), supporting framework, and the way in which the latter is attached to the structural framing;

(h) specifications for the manufacture and protection of woodwork and furniture, so that they will be able to stand up to intensive use and not be susceptible to corrosion or damage by termites or other insects and rodents.

87. Contracting authorities must also be convinced of the impact of planning and design weaknesses, use of substandard materials, and poor execution of works on the durability of a building and its components. The media should be used to inform the public of cases where such deficiencies have entailed costly rehabilitations, or even complete reconstruction, of recently constructed facilities. Local communities and users must be made to understand that they are wasting their money by not insisting on minimum quality design and execution. It is better to construct well and in successive phases, than quickly and poorly.

88. Select standard plans, techniques, and proven modes of production. There is a direct relationship between mode of production, technique employed, and model constructed. These three elements should thus be studied together. At this stage of local initiative coordination, the positive impact of widespread dissemination of data collected in the databank, particularly concerning "good" plans and "good" techniques should be emphasized. For the Sahel as a whole, the information center proposed above could be used to disseminate good examples from each country so that others might benefit, thus underscoring the usefulness and necessity of using, in parallel, the four major implementation modes described in the following summary table.
**Summary table of alternative modes of production**

<table>
<thead>
<tr>
<th></th>
<th>decentralized initiatives</th>
<th>centralized initiatives</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1A</td>
<td>1B</td>
</tr>
<tr>
<td></td>
<td>nonsubsidized</td>
<td>subsidized</td>
</tr>
<tr>
<td></td>
<td>communities</td>
<td>communities and</td>
</tr>
<tr>
<td></td>
<td>regional authority</td>
<td>regional authority and</td>
</tr>
<tr>
<td></td>
<td>regional authority</td>
<td>supervisory ministry</td>
</tr>
<tr>
<td></td>
<td>program approval</td>
<td>regional authority and</td>
</tr>
<tr>
<td></td>
<td>supervisory ministry</td>
<td>supervisory ministry</td>
</tr>
<tr>
<td></td>
<td>contracting authority</td>
<td>communities</td>
</tr>
<tr>
<td></td>
<td>communities</td>
<td>communities</td>
</tr>
<tr>
<td></td>
<td>delegation to</td>
<td>delegation to</td>
</tr>
<tr>
<td></td>
<td>specialized agency</td>
<td>specialized agency</td>
</tr>
<tr>
<td></td>
<td>project manager</td>
<td>standard designs and</td>
</tr>
<tr>
<td></td>
<td>standard designs and</td>
<td>technical advice</td>
</tr>
<tr>
<td></td>
<td>technical advice</td>
<td>specialized agency and</td>
</tr>
<tr>
<td></td>
<td>technical advice</td>
<td>consultant</td>
</tr>
<tr>
<td></td>
<td>works execution</td>
<td>small contractor</td>
</tr>
<tr>
<td></td>
<td>small contractor</td>
<td>small contractor</td>
</tr>
<tr>
<td></td>
<td>contractor</td>
<td>small contractor</td>
</tr>
<tr>
<td></td>
<td>conclusion of contracts</td>
<td>usual commercial</td>
</tr>
<tr>
<td></td>
<td>usual commercial procedures</td>
<td>procedures</td>
</tr>
<tr>
<td></td>
<td>competitive bidding</td>
<td>competitive bidding</td>
</tr>
<tr>
<td></td>
<td>Govt. financing</td>
<td>technical advice</td>
</tr>
<tr>
<td></td>
<td>70-80% subsidy</td>
<td>100% of construction</td>
</tr>
<tr>
<td></td>
<td>contract</td>
<td>100% of supplier and</td>
</tr>
<tr>
<td></td>
<td>disbursement</td>
<td>region and supervisory</td>
</tr>
<tr>
<td></td>
<td>communities</td>
<td>ministry</td>
</tr>
<tr>
<td></td>
<td>region and supervisory</td>
<td>specialized agency</td>
</tr>
<tr>
<td></td>
<td>ministry</td>
<td>specialized agency</td>
</tr>
</tbody>
</table>

89. On one hand, these formats have proven effective. On the other hand, none are presently capable of meeting all the requirements. The breakdown of operations between centralized and decentralized formats might be viewed as follows:

<table>
<thead>
<tr>
<th>Format</th>
<th>Health</th>
<th>Education</th>
</tr>
</thead>
<tbody>
<tr>
<td>decentralized</td>
<td>80-70%</td>
<td>90-80%</td>
</tr>
<tr>
<td>centralized</td>
<td>20-30%</td>
<td>10-20%</td>
</tr>
</tbody>
</table>

90. *Take into account the urban/rural nature of the environment.* Grassroots initiatives take on different characteristics in cities and in the countryside, and these differences have to be considered from the outset during the design phase when standard plans, techniques and modes of production are selected. In cities, the financial contributions of users should, preferably, take the form of direct contributions or tax payments. It is relatively easy to coordinate financing contributed by local communities with that of government, particularly when the communities have access to well structured technical services. In the rural areas, the use of voluntary labor to collect and supply local materials or to carry out construction activities is likely to take the usual form of participation by village groups or parent associations. This may, however, lead to problems given the difficulties of combining volunteer labor with contractor labor, since the quality of the work and the materials supplied by the volunteers may
be inconsistent with those of the contractor. Consequently, the pace adopted must be that of the local initiative, and no attempt should be made to achieve a rapid rate of implementation concentrated over a short period within a given area. It has been shown that the introduction of intermediate columns makes it possible to lighten the roof frame of rural, multigrade classrooms. For projects executed at the central government's initiative, the contractor will have full responsibility for construction.

91. **Redistribute management tasks.** The government should restrict its direct intervention in the management of operations. As much as possible, it should leave it to the other actors to assume contracting authority and project management responsibilities, while its role becomes primarily that of providing technical and financial assistance, with particular insistence on observance of quality standards.

92. **Delegate or share contracting authority.** Users and/or communities, or specialized executing agencies, need to be involved. But to enable users and communities to act responsibly and realistically in taking the initiative, they must first have access to the necessary information. As mentioned above, clarification must be given regarding the basic conditions under which the government will contribute counterpart funds to grassroots initiatives: how, when, on what terms. The government may also use the "delegated contracting authority" formula when undertaking emergency programs, in order to alleviate its program management burden.

93. **Delegate project management and shorten study deadlines.** Project management should be assigned to private sector professionals, who would be provided with the best standard plans and the most appropriate techniques. This would make it possible to shorten the period allowed for studies (which often take up 25%, and sometimes 50%, of a program's total duration). In addition, final designs for one or more core-type classroom and primary health-care center models should be developed and made known, to avoid the waste that has occurred with certain temporary classrooms built by APEs, or with overambitious health infrastructure projects. At the regional level, all skills need to be used, although sometimes this does not happen. Practical guidelines need to be developed, and sensitization workshops organized for technical staff.

94. **Ensure quality control.** Works must be subject to enhanced and regular supervision if the desired quality objectives are to be achieved. The government should, however, increasingly delegate such supervisory tasks to other actors, such as project managers in the private sector, and to the technical staffs, where they exist, of the regional and local authorities. Users and/or local communities responsible for decentralized initiatives should be systematically involved in the supervision of operations, both because of their optimal location, and because such involvement will enhance their feeling of "ownership" of the works concerned. On the other hand, it is essential to ensure that quality control is maintained and that a regional technical agency can provide support for the critical stages of choice of technique and selection of contractors, as well as support during construction (at least five visits). Actual technical supervision of the government's emergency programs should be subcontracted to project managers (local consultants).

95. **Better manage operations.** Better management assumes simplification of procurement and contract management procedures, a judicious choice of executing agencies, expanded output, better coordination of jointly financed operations, and, lastly, supervision/support of facility maintenance.

96. **Simplify procurement and contract management procedures.** The simplification of procedures will facilitate access to the market by SMEs, which are better suited than larger enterprises to carry out small-scale works in widely dispersed locations. The survey revealed that cumbersome
procurement procedures have a considerable influence on cost. Management of construction contracts needs to be more flexible, and payment deadlines should be shorter. A procedures manual should be developed to simplify small-contract management on the basis of two principles: delegation of authority and \textit{a posteriori} supervision. The popularity of the "supply of materials + tâcherons" approach is based on the fact that the project's technical management unit has the authority over and access to a special account enabling it to pay the "tâcherons" directly and thus promptly. It often happens that the same unit cannot directly pay a contractor's bill which becomes mired down in the traditional administrative circuit. To as great an extent as possible, it is recommended that payment mechanisms be decentralized, especially where authorization is concerned--which is automatic for works financed by local communities. When the government intervenes directly, it is in its interest to limit the number of contractors with which it has to deal, or to use executing agencies. By way of example, the following measures could be recommended:

(a) raise the ceiling price for local shopping (up to CFAF 15 million, for example);

(b) expand the use of contractor and supplier classification/preselection;

(c) expand the use of \textit{marches de clientèle} (i.e., contracts allowing the delivery of similar goods and services over a period of time); and

(d) make greater use of agencies specializing in contract management.

97. \textbf{Delegation of contracting authority, in conjunction with the development of simpler procedures, offers an effective solution to problems of contract management, since it makes it possible to avoid current administrative practices, which, originally devised as a means of supervising a small number of large-scale contracts, tend to paralyze the management of a large number of small contracts. Such delegation does not extend to the selection of facilities to be constructed which remains the prerogative of the beneficiaries and the government.}

98. \textbf{Good selection of contractors.} Government intervention must obviously consider the characteristics of the production mode to be utilized in order that the mode's capacity is used to the greatest advantage. The best results are obtained when the most competitive subsector of the construction industry for a given type of construction is used. For example, the costs of contract management and technical supervision will increase if the work is done by artisans or companies with limited technical and organizational capacities; however, costs are also higher if the contractors selected are overqualified for the nature of the works in question. Taking into account the logistical difficulties of supervision and the importance of quality work, the government and the local communities would do well to make the maximum use of the burgeoning capacities of local enterprises, and to gradually stiffen the criteria for selecting them (maintaining lists of qualified contractors). In the same way, well-drafted contracts providing for the delivery of goods and services over a period of time would facilitate the supply of materials or execution of works by distributors or enterprises established in the provinces. Improved or newly-initiated dialogue between the government and the private sector (consultants and architects, construction companies and artisans, manufacturers and distributors of materials, transportation companies, trade organizations and construction training center) should also improve knowledge of the sector and dispel the often widespread notion that the private sector has only short-term commercial motivations in mind. The government, for its part, has every interest in consulting contractors' representatives before establishing its programs, which would allow for true production capacities to be taken into account, and programming to become more realistic (sometimes more optimistic than at
The process of public notification of future projects needs to be improved in order to avoid sudden or substantial amendments, so that the private construction sector can organize itself accordingly.

99. *Increase production runs.* The effectiveness of resource use is also affected by the size of production runs and the reduction of unit costs. Steps must be taken to help the production process and subsector to develop into a more industrial type of organization, even for small, locally-initiated operations. The use of standardized technical norms makes it possible to achieve consistent quality and increased output, as a result of longer production runs. By way of example, standardization of the woodwork for classrooms will give suppliers the advantage of a broad and regular market, while users will have the benefit of a better quality/price ratio. The strategies to be designed and implemented should take into account the substantial volume of infrastructure to be constructed each year. To achieve this objective, a balance should be found between the choice of technologies that are functional, economic and, above all, well within the capacities of the project managers and contractors/suppliers. The size of the work lots must be determined in such a way so as to allow for economies of scale while avoiding contracts reserved for large companies with high fixed costs.

100. *Better organize cofinanced operations (core-type models).* The success of government/user cofinancing operations is based on the development of formulas allowing for flexible management of interventions. Tasks must be clearly distributed. For example, construction of the framework and roof may be entrusted to contractors paid by the government, while finishing may be left to the users, who will use local artisans or volunteers. The government may also distribute coupons for materials (cement, self-supporting profiled sheets, doors and windows) when the walls are put up under the direct responsibility of the users. Lastly, the government may pay fixed subsidies, in installments, at different stages of the construction process. Financial support for the local communities is a necessity in light of their limited financial resources and the need to guarantee sufficient quality to obtain a maximum return on the investments. Nevertheless, the problem of what circuits should be used to finance these subsidies remains: whether the mechanisms for government budget allocations to the regions should be used -- raising the question of the efficiency of those mechanisms, or whether use should be made of the executing agencies that will manage the funds and serve as liaison between the government and the local communities. When such agencies exist and have proven effective, it seems desirable to work with them.

101. *Ensure quality of implementation.* As explained above, steps must be taken to ensure that the technical supervisory service put into place performs its task effectively, with regular visits to the worksites. When the government is the contracting authority, it must ensure that the representative of the community or of the users be involved in the supervision of works. When the contracting authority is a local community or an association, the central government must assist with supervision, helping to select and pay a project manager or a technical supervisor. The government (preferably its regional technical services) should distribute guidelines for works execution and supervision. Also, it should be explained to volunteer workers that the quality of their work has a direct impact on the durability of a given building.

102. *Facilitate and monitor facilities' maintenance.* Once constructed, a building has to be maintained if it is to last. Regular allocation of resources to maintenance, and rapid intervention when spot repair is required, help to generate considerable savings at the national level by maintaining existing infrastructures in operating condition. First and foremost, the role of the government should be to train and inform users (with maintenance checklists displayed in every building, maintenance manuals delivered to those in charge, provision of training for inspectors and directors of the institutions concerned).
However, government should also assist users by granting fixed subsidies. Such subsidies, paid on the condition that preestablished technical criteria have been met, make it possible to save on costly repairs and to avoid deterioration of facilities. Contests should be held to encourage competition among different establishments to vie for the highest quality of maintenance; and incentive prizes could be awarded, with maximum visibility throughout the region and the nation.

IV. IMPLICATIONS FOR DONORS/SHORT-TERM ACTION PLAN

103. It is essential that the findings of this study be discussed with the countries of the Sahel and concerned donors in order to lay the basis for the collaborative preparation of future programs. To that end, a regional seminar should be organized. A regional institution would be entrusted with setting up the regional databank mentioned in Chapter 3. A timetable for the subsequent steps should also be drawn up.

104. **Implications for donors.** The donor community needs to focus on both the lack of institutional capacity for organizing and managing construction programs and the inadequacy of resources allocated by governments and local authorities to the financing of civil works, quality control during execution, and maintenance of existing facilities. To effectively help the countries to develop their social infrastructures, donors need to work in closer coordination with each other and link their interventions to changes in the role, attitude and methods of the governments in this area. Donor support should be tied to the implementation of the following measures:

(a) remove government from the execution process, so that it may better carry out its responsibilities in the areas of overall planning, dissemination of information, and adherence to minimum standards;

(b) promote resource diversification by stimulating and coordinating the initiatives of local authorities, users and NGOs;

(c) allocate resources and contribute the necessary technical support to reinforce the initiatives of decentralized institutions;

(d) establish annual work programs and budgets taking into account national objectives and the different sources of financing, giving priority to rehabilitation and maintenance of existing facilities;

(e) remedy the inequitable situation in the most disadvantaged areas by setting up annual emergency programs;

(f) adapt procurement procedures to the mode of production, and entrust reliable institutions with program management responsibility.

105. Disbursement mechanisms need to be adapted as well. Donors may support institution building projects or emergency programs set up by the government, which tend to follow a highly conventional and very familiar approach. But when donors decide to provide support to governments for financing subsidies, disbursement mechanisms need to consider the administrative and institutional constraints specific to each country, as well as the donors’ own procedures. The question arises of how
to allocate to the regions the financing derived directly from donor loans or grants. In most cases, donors' procedures do not permit such transfers, which require the opening of second generation accounts for expenditures not actually incurred. The approaches may differ depending on the case:

(a) donors may finance expenditures incurred at the central level (direct imports, as in the case of adjustment programs) or certain recurrent costs, so as to free up national budget allocations to then be channelled to the regional budgets;

(b) when a government’s financial situation allows, donors may reimburse it in annual or semi-annual installments for programs implemented by the regions using domestic counterpart funds; or

(c) when a government does not yet have sufficiently well organized decentralized agencies, financing provided by donors would not go through the public expenditure budget channels but rather through executing agencies, involving NGOs whenever possible. Such agencies, to which part of the project management responsibility would be delegated, would be required to act on behalf of the government in helping local authorities to implement their construction programs, and to manage contracts for government-sponsored emergency operations.

As part of the discussion to be initiated by these proposals, strategies appropriate to the specific situation of each country should be explored case by case. This discussion should serve as a catalyst for allocating a larger portion of public expenditures and donor assistance to the development of social infrastructure and support for the local authorities’ own initiatives. This will, however, be possible only to the extent that the governments are committed to taking the necessary complementary measures.

Organization of a regional seminar and publication of a practical guide. A regional seminar will be held in 1993 to discuss the results of the study. It is expected that key individuals from all the countries of the Sahel and the concerned donors will attend. The seminar will aim at reaching a consensus on the strategies to be followed in the countries of the Sahel (objective of Volume 1) and on the broad lines of the practical recommendations for implementing those strategies (objective of Volume 2). The seminar will provide the opportunity to discuss the contents of Volume 2 of the present study in order to formulate a manual of best practices for classroom and PHC facility construction in the Sahel. The four countries already selected for the survey have offered to prepare at their expense (or as part of ongoing projects) an audiovisual presentation on one or two projects that are most representative of successful initiatives carried out in recent years. The costs related to the seminar (preparation and overhead) should be borne by whichever government is willing to host the meeting and/or by the donors.

Designation of a regional documentation center. It is hoped that arrangements can be made for an existing institution to permanently and officially house available documentation and ensure its dissemination throughout the region. This institution could be designated during the regional seminar. Assistance could be provided to this institution to help it get started on gathering the relevant data.

Preparation of national sectoral programs. The last phase consists of actual application in each country of the strategies selected, which need to be incorporated into the preparation of the respective social infrastructure construction programs. This phase will require the organization of national sector-specific meetings during which the strategies can be presented to officials who did not participate in the regional seminar.
In addition to the documents listed in the Bibliography, this Report draws extensively from information contained in the following internal World Bank documents which are not available to the public.


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