School Construction in Developing Countries
What do we know?

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Executive Summary

EFA will require unprecedented numbers of classrooms to be built in many countries. Fortunately, some approaches have already succeeded in bringing down unit costs across most EFA countries. These include community-driven approaches, NGOs, contract management delegation, and social funds. Some efforts have failed, such as the use of local materials or a combination of community building and centralized material procurement. Several issues still need to be resolved, such as capacity for planning, maintenance of facilities, and urban construction.

The following findings are important for donors to consider: (i) demand-driven approaches are efficient; (ii) community-based approaches are cost effective, (iii) savings through bulk procurement are an illusion. (iv) well-defined partnerships are the keys to success, (v) simplified procurement procedures are needed to when working with community partnerships; (vi) focus needs to remain on local capacity and techniques, without useless experiments (vii) social funds and contract management agencies are efficient, (viii) new ideas for maintenance need to be addressed; (ix) sectoral and long-term approaches need improved donor coordination; (x) capacity building in monitoring and evaluation needs to be addressed.

I. Rationale

1.1. The EFA goal of universal access to, and completion of, primary education by the year 2015, presents an immense challenge in terms of construction and maintenance of primary school facilities. These challenges can be quite different for countries that have already achieved a 90% primary enrollment rate as compared to countries below 50%.

1.2. This paper will discuss school construction using the cost, and attempts to reduce it, as the unifying thread. Classroom costs are discussed, as are square meter unit costs, which take into account regional differences in classroom areas. Annualized investment costs will also be compared to recurrent costs. Several strategies have been supported by the World Bank and other partners to reduce the financial burden of building school facilities, while improving capacity to manage school building programs. This paper will look at both the technical approaches to cost reduction and the related managerial and organizational issues.

1.3. Information has been collected from World Bank documents (PAD, ICRs, working papers, EDI documents), documents of other donors, country-based studies and a few published research studies. Consistent quantified information about costs was the biggest challenge faced by this paper. However, enough information was available for clear themes to emerge and lessons to be drawn. The paper highlights the case of Mauritania as one of the success stories in school construction. Comments on the draft paper were received from Robert Prouty, Sverrir Sigursson and Alain Mingat.

II. Past and current practices

2.1. **School Construction – the end of the nightmare.** In the 1960s, most World Bank education projects focused on buildings. This "hardware" approach has given way over time to a "software" approach, with a much greater focus on teaching and learning issues and classroom processes. The share of World Bank funds for education going into civil works has fallen from almost 100% in the 1960s to about 45% (1995-98.) The nature of the civil works components has also changed considerably. Yet despite these important changes, civil works are still the single largest share of World Bank lending to education.

2.2 In spite of the focus on construction in the past, implementation was often extremely difficult. During the 1980s, for example, the number of classrooms planned in any given World Bank-financed education project was typically quite modest as compared to needs, and yet results were often poor. For example, in its 1984-91 WB-financed Primary Education Project, Peru planned 1,250 classrooms [1] when more than half a million school-age children were not enrolled. And only 493 had been built by 1991, at a rate of 70 classrooms per year [2]. In the 1980s, the average Sahelian country needed 1,000 additional classrooms per year, whereas construction during this decade averaged 75 classrooms per year [3]. During the 1970s and the 1980s this issue was mainly addressed through efforts on the "technical" field – i.e. technology, architectural design, construction engineering -- which provided little results.

2.3. During the 1990s, efforts to improve in-country construction "technical" capacity shifted towards the "organizational" field -- i.e. implementation and procurement arrangements, decentralization -- with positive results. By the end of the decade, the EFA programs in Senegal and Guinea provided for the construction of 2,000 classrooms annually. Based on the positive improvements of the last decade, one can be optimistic that every country should be able to produce the required number of classrooms to reach EFA by 2015.

2.4 **A wide range of construction costs.** Available information on classroom unit costs shows tremendous variance among regions and countries. Among the 15 countries of the sample in Table 1, the lowest classroom costs (in WB-financed projects) are all in Asia, where a number of countries (Bangladesh. India, Vietnam, China) succeed in building classrooms at a unit cost of under US$4,000 [4]. At the opposite end of the spectrum, countries in Central and South America have unit costs often exceeding US$8,000. In the middle are African countries ranging from US$4,600 to US$8,800 [5]. In the sample below, the average classroom cost of the five Latin American countries [6] is 29% more than for the five African countries, which are in turn, 50% higher than the six Asian countries sampled.

Table 1. Last available classroom unit cost in selected Government educational programs (in current US$)

Africa			Asia			LAC		
Country	*US$*	*year*	*Country*	*US$*	*year*	*Country*	*US$*	*year*
Chad	6,300	(2002)	Bangladesh	3,900	(1997)	Brazil	8,200	(1993)
Guinea	7,500	(2000)	China *	2,450	(1997)	Columbia	4,700	(1998)
Mauritania	4,700	(2001)	India	3,100	(2001)	Honduras	9,000	(1995)
Senegal	6,400	(2001)	Pakistan	4,500	(1987)	Mexico	10,000	(1998)
Zambia	8,800	(1991)	Philippines	10,400	(1996)	Nicaragua	8,800	(1995)
			Vietnam	2,500	(2000)			
Average	6,740		Average	4,475		Average	8,140	

*Peoples Republic of China

2.5. **Classroom construction cost vs. teacher salary**. Table 1 provides an inter-country comparison of absolute investment costs. It is important to compare these costs in relative terms with other educational costs. The relative initial investment cost of classroom construction can be compared with annual teacher salaries in the same countries [7]. Table 2 shows the results for the same countries in Table 1. The initial investment cost for one classroom compared to a yearly individual teacher salary also shows large disparities between regions and countries. In Africa, where teacher salaries are largely higher in Francophone countries than in Anglophone countries, building one classroom may cost between 2.5 years of teacher salary (with low classrooms costs and high teacher salaries, such as in Senegal and Mauritania) and 11 years (such as in Zambia, where the conditions are reversed). In other words, investing in classroom costs for Zambia costs less than two times what it would for Mauritania or Senegal in absolute costs (US$), but the relative cost is four times as great. In Asia, the bracket is lower. Many countries, such as Bangladesh, India and Pakistan, have low construction costs that are equivalent to only two to three times the annual teacher salary, which are in the medium range by international standards. Despite its high construction costs, the Philippines are in the same range in relative terms compared to teacher costs. The case of Vietnam is exceptional--its very low construction cost is still five times the annual teacher salary, which is extremely low. In Latin America, such as Honduras and Nicaragua, building one classroom is equal to 5 to 7 years of teacher salary. This is the result of high construction costs and medium range teacher salaries.

Table 2. Classroom initial investment unit cost compared to annual teacher salary in selected countries (current US$)

Africa				Asia				Latin America			
Country	*Clsrm initial invest. unit cost US$*	*Teacher salary per year (1) US$*	*Clsrm invest as mult of teacher salary*	*Country*	*Clsrm initial invest. unit cost US$*	*Teacher salary per year (1) US$*	*Clsrm invest as mult of teacher salary*	*Country*	*Clsrm initial invest. unit cost US$*	*Teacher salary per year (1) US$*	*Clsrm invest as mult of teacher salary*
Chad	6,300	960	6.6	Bangladesh	3,900	1,900	2.1	Brazil	8,200		
Guinea	7,500	1,215	6.2	India	3,100	1,564	2.0	Columbia	4,700		
Mauritania	4,700	1,887	2.5	Pakistan	4,500	1,316	3.4	Honduras	9,000	1,785	5.0
Senegal	6,400	2,450	2.6	Philippines	10,400	5,199	2.0	Mexico	10,000		
Zambia	8,800	810	10.9	Vietnam	2,500	468	5.3	Nicaragua	8,800	1,344	6.5
Average	6,740	1,464	5.7	Average	4,880	2,089	3.0	Average	8,140	1,565	5.8

Note: Teacher salaries are from: Mingat, Burns: Achieving Education For All 2015, except for Philippines SAR No 15888,.

2.6. **Classroom annualized investment cost vs. student recurrent cost**. Another way to look at construction costs relative to other education costs is to compare the annualized investment cost of one classroom [8] to the annual recurrent cost of educating the students housed in this classroom [9]. All countries need to balance investment and recurrent budgets and may be interested to know the cost of the investment relative to the recurrent one. On average, for the African countries in our sample, the annualized investment cost is equivalent to 38% of the recurrent educational costs associated with the group of students accommodated in a standard classroom. Disparities are even greater between African countries when construction costs are compared to teacher costs. For instance, in Zambia, compared to recurrent costs, classroom construction is six times higher than for Senegal and five times higher than for Mauritania. The average classroom construction costs in Africa compared to recurrent costs are less than half (15%) than those in Asian countries. The costs are intermediate in Latin American countries and lowest in Asia. This shows, again, that capital comes at a much higher price for Africa than for countries in other regions. Donor support will continue to be essential for African countries.

Table 3. Classroom annualized investment unit cost compared to recurrent unit cost of children in classroom

Africa						Asia						Latin America					
Country	Clsrm annualized invest. unit cost US$	Annual recurrent cost: cost per pupil US$	nb stud. per clsrm	cost per stud x clsrm	Clsrm ann. Inv. as % of stud x clsrm	Country	Clsrm annualized invest. unit cost US$	Clsrm recurrent cost: cost per pupil US$	nb stud. per clsrm	cost per stud x clsrm	Clsrm ann. Inv. as mult. of stud x clsrm	Country	Clsrm annualized invest. unit cost US$	Annual recurrent cost: cost per pupil US$	nb stud. per clsrm	cost per stud x clsrm	Clsrm ann. Inv. as mult. of stud x clsrm
Chad	447	20	45	909	49%	Bangladesh	277	36	50	1,786	15%	Brazil	582		38		
Guinea	532	38	40	1,512	35%	India	220	47	36	1,689	13%	Columbia	333	138			
Mauritania	333	48	45	2,181	15%	Pakistan	319	62	30	1,829	17%	Honduras	639	67	45	3,022	21%
Senegal	454	71	50	3,550	13%	Philippines	738	144	40	5,742	13%	Mexico	710		36		
Zambia	624	21	40	828	75%	Vietnam	177	28	35	969	18%	Nicaragua	624	56	38	2,139	29%
Average	478	40	44	1,796	38%	Average	346	63	38	2,403	15%	Average	722	131	79	2,580	25%

2.7. **Significant cost reductions in Africa.** Africa has achieved a remarkable reduction of classroom costs over the past 20 years. This achievement is a major policy success for many countries where reduction of classroom costs has long been a high priority of the Education Ministries. In the 1980s, African unit costs per classroom were the highest in the world ($13,000-$18,000) [10]. Two decades later, these unit costs are half, and in some cases such as Mauritania, a quarter of their previous levels. Over the same period, Asian countries experienced slight increases or decreases around initial costs [11], while Central and South American countries of our sample experienced larger increases and decreases. [12].

Table 4. Evolution of classroom unit cost in selected Government programs (in current US$)

Africa			Asia			LAC		
Country	*US$*	*year*	*Country*	*US$*	*year*	*Country*	*US$*	*year*
Guinea	13,450	(1989)	Bangladesh	2,700	(1980)	Brazil	6,000	(1989)
	7,500	(2000)		3,900	(1998)		8,200	(1993)
Mauritania	17000	(1984)	India	3,700	(1993)	Honduras	5,500	(1987)
	4,700	(2001)		3,100	(2001)		9,000	(1995)
Senegal	13,200	(1982)	Pakistan	8,700	(1987)	Mexico	16000	(1991)
	6,400	(2001)	(NWFP)	6,800	(2001)		10,000	(1998)

Note: IDA-financed projets and programs

2.8. **Community construction without financial and technical capacity.** Because of the often extreme limitations of government efforts to provide school construction, communities and parents have always been important players in the area of school construction. In Guinea, 50% of the classrooms were built during the 1989-94 First Education Sector Project (PASE II) [13]. Some countries experienced periods during which communities were the only classroom supplier, such as Mauritania in 86-87, or Chad in 87-92. However, despite their willingness, communities are poor and do not have the financial and technical capacity to build classrooms that meet technical and pedagogical requirements. Community-built classrooms are often deficient in certain areas which include: (i) limited space, (ii) earth-built walls that are subject to cracking and erosion, (iii) small windows with insufficient ventilation and light, and (iv) wooden roofing that is prone to termite attacks. These weaknesses result in a large number of temporary buildings. In 2001, one third of the classrooms in Mauritania were built by communities out of non-durable materials, mainly earth-bricks (banco) [14]. Twenty-five percent of the classrooms in Gambia (1995) and 20% in Guinea (1999) were built by communities through a traditional mode called “tesito”. In Chad, more than 53% (2000/01) of the classrooms are made of plant materials such as millet stalk pallets (secco), rebuilt yearly by the communities, and unusable during the rainy season. This substantially shortens the school year in the southern half of the country [15]. In 1985, only 30% of the classrooms in Bangladesh were well constructed, and 70% were made of bamboo, which required constant repairs [16]. In 1979, the government of Pakistan determined that 60% of the primary schools did not met basic requirements [17]. In 1987, in the Pakistani Punjab province, one third of the classrooms were not constructed of durable materials. Forty percent were made of "katcka" (mud walls and bamboo) requiring continuous maintenance, and the rest were "shelterless" schools [18]. In 1993, the Pakistani province of Balochistan had 43% shelterless classes and 10% fully shelterless schools [19]. In Vietnam, the majority of classrooms in 1993 were built by communities using palm leaf thatch and mud foundations, which must be replaced every second or third year [20]

2.9. **An ongoing need to build.** Despite the shift from "hardware" to "software", the need for construction remains high and requires ongoing funding from governments and the donor community. Actual construction needs and programs differ among regions. African governments in some small to medium size countries have already started sector-wide long-term programs with reasonable chances of success, while the magnitude of the problem in Asia seems to overwhelm current programs, and needs in Latin America have already progressed toward replacement of existing stock.

- **Africa**. In several African countries, national construction capacity has increased enough in the second half of the 1990s to enable them to embark on sector-wide educational programs aimed at universal primary education at the end of the present decade (Gambia, Guinea, Mali, Mauritania, Senegal [21]). The reliability of such programs has convinced donors to partner with governments for full coverage of the planned primary classroom needs. The school construction program of the five above mentioned countries is presently largely financed by donors, except for Senegal, which provides 45% from its own budget [22] The others rely on 90% donor support, which needs to be continuous. Some countries are facing the additional challenge of replacing a weak existing infrastructure. Chad, for instance, currently faces the challenge of replacing 51% of its classrooms built by communities in plant materials [23].

- **Asia**. In 1996, India estimated its total needs at 1 million classrooms and planned to build 21,100 under the 1996-2003 WB-financed Second District Primary Education Project [24] in addition to the 10,500 in the 1994-2002 District Primary Education Project [25]. The six subsequent WB-financed projects added 54,000 classrooms, reducing the shortage significantly, but many needs still exist [26]. Bangladesh estimated its needs at 100,000 classrooms in 1992 while the 1990-98 WB-financed General Education project planned to build 22,000 [27] and through a subsequent project (1998-2004) 5,000 others, but the country is still far from where it needs to be [28]. The 1993 Vietnamese Primary Education Project addresses only 20% of the needs and attempts to solve this by triple shifting [29].

- **Latin America.** In countries close to UE, needs shifted from construction of new facilities to maintenance of the existing facilities, which is also important. In 1988, Colombia determined that 70% of rural primary schools required infrastructure upgrading, half of these needing classroom replacement [30]. However, construction of new classrooms is still needed: with net enrollment of 98% in 1991, Mexico still had 300,000 out-of-school children because of a classroom shortage of 29,000 primary classrooms [31] and the two WB-financed projects of 1991-98 and 1994-99, in the 14 poorest states, provided funds for only 9,000 classrooms [32]. However, these two projects financed the rehabilitation of more than three times the classrooms (6,500 for the first project and about 64,000 for the second one), setting a new standard.

A. The limits of the "technical" approach for school construction

2.10. The affordability of EFA goals depends in large part on the unit cost of classroom construction, and on the mix of related facilities built in the schools. In a given country, construction costs depend mainly on (i) technology, (ii) architectural standards, and (iii) procurement arrangements. These three dimensions have been the object of considerable experimentation over the past decades. Together, they constitute what one may call the "technical" approach, or the approach of architects, engineers, and contractors.

Construction technology

2.11. **The non replicable local materials experiments.** Beginning in the 1970s, in developing countries around the world, a host of projects sought to lower construction cost by use of local materials produced through "appropriate" [33] technologies. The movement started in Latin America with soil-cement technology. In Africa, such efforts reached their peak in the 1980s and have declined throughout the 1990s. Secondary objectives of these efforts were to : (i) reduce foreign exchange component of costs; (ii) reduce non-renewable energy-consuming materials such as cement [34] by promoting, for instance, compressed earth blocks, (iii) save scarce natural resources (i.e. Sahelian wood) by promoting traditional architectural forms such as vaults for roofing, (iv) use labor-intensive construction techniques to decrease high unemployment levels in poor areas, (v) improve community ownership through participation in financing and labor. This approach was formally endorsed by the UN system [35] which supported several National or Regional Centers for the Research and Promotion of local materials. [36] Support was also given by some European universities [37]. Experiments were implemented by Governments mainly through NGOs, and supported by a large range of donors including the World Bank [38] and involved significant international expertise. The United Nations Center for Human Settlements (UNCHS) created a Center for Adapted Technologies (*Centre de Technologies Adaptées – CTA*) in Bamako (Mali). UNESCO financed a large number of school prototypes built in local materials (BREDA and UNESCO Sudan Bureau). However, as early as the late 1970s (i.e. the WB-financed Education project in Brazil) [39] the absence of replicable results of these experiments was identified. Actually, these experiments always required large and costly technical assistance (international experts, UNESCO experts and staff form international consulting firms), and failed to survive after this assistance ends with the promoting project. However, tests continued for another decade with same results, as in WB-financed Education project in Niger (1986-95) [40]. By the late 1980s, after two decades of effort, the local materials approach was generally recognized as unsustainable, was generally abandoned. Reviewing Sahelian experiences, a 1993 World Bank Discussion Paper stated: "This research very quickly reached its limits, running into difficulties in transferring the know-how both to the formal and informal construction sectors" [41]. Compared to costs in the modern informal construction sector, local materials have not proven to be less expensive than modern technology, nor have they succeeded widely in reducing cement consumption, and leading to increased local ownership [42].

2.12. **The failure of full pre-fabrication attempts.** During the 1980s, some countries attempted to launch a process of classroom industrialization. The idea is attractive: classrooms are very standardized items, to be built in large numbers (Philippines 10,000 per year). Industrialization seems like a promising way to reduce costs and delays and to improve quality, providing at the same time a unique opportunity to contribute to the modernization of the national construction industry. Two countries tried full classroom prefabrication: Pakistan in 1985 [43] and the Philippines in 1994 [44]. With prefabrication, Pakistan expected to decrease its unit cost from an average of $4,500 per classroom [45] to less than $3,500 [46]. Bids came in even lower than expected, at $2,700 per classroom, but contractors were unable to carry out more than 5% of the contract, due to difficulties to transport prefabricated classrooms through existing low standard routes and paths, and to set-up them on school lands with inadequate topography. At the end of the project, actual classroom costs were double and frequently triple the $3,500 initially planned [47]. The Implementation Completion Report notes the disconnect between reliance on a sophisticated factory-made product, which was supposed to be suitable for all geographic and climatic conditions, and the local technological, administrative and social conditions in which the high-tech technology would be implemented [48]. The Philippines, with experience building more than 10,000 classrooms per year, made its attempt at pre-fabrication in 1994-95 with the objective of lowering costs from US$10,000 to US$9,200 and simplifying procedures by reducing the number of contracts. However, cost savings were reduced by the cost of site preparation by LGUs, and more than 25% of the prefabricated classrooms could not be transported to or assembled on the sites due to road or land conditions. Prefabrication was quickly abandoned by both countries [49] which returned to previous classic technologies. In addition to the actual implementation failure, the sophisticated technology of industrialized classrooms generate communities' frustration since the investment has no impact on local employment, requires unavailable high-tech technology for maintenance, and cannot be a model for other communities' investment. The failure of classroom full-prefabrication in developing countries is consistent with similar experience in developed countries where small construction projects are still built by small and medium contractors at competitive prices compared to prefabricated buildings. Based on experience to date, classroom industrialization does not appear to be a promising solution in the EFA context.

2.13. **Modern construction technology suitable for SMEs and the informal sector**. Throughout the period of experimentation mentioned in paragraph 2.11, the informal construction sector continued to serve the construction needs of the poor, shifting from traditional techniques based on local materials to modern techniques (cement blocks for walls, corrugated-iron roofs, reinforced concrete structure) as its clients' financial resources evolve. The dynamism of this sector is evidence of its clientele's demand for the technology it proposes. The informal sector shows a strong spontaneous tendency to appropriate modern technology even if it means adapting technical norms to the financial capacity of its clientele. A 1993 study comparing direct costs of construction by the informal sector with projects promoting improved local materials through "appropriate" technology concluded that, as a whole, the informal sector is performing better than the "local materials" projects [50]. When indirect costs are included, NGO- and donor-sponsored "local material" projects are more costly than equivalent projects financed locally and implemented by the informal sector. As demonstrated by the Mauritanian experience [51] below detailed in the case study, most successful classroom construction programs are based on modern proven technology, with modest architectural standards providing a minimum durability requirement of 25 years, and allowing easy implementation by small scale local contractors from the formal or informal construction sectors. In the Sahel, since the mid-80s, IDA-financed education projects in Burkina Faso, Senegal, Niger and Mali have followed this model, making possible reductions of construction costs by some 30-50% [52]. In terms of technology, this route seems the most promising one for EFA, since: (i) it recognizes the cultural and economic interest of poor urban or rural communities for modern construction technology, (ii) it is consistent with historical construction trends by which the informal sector moves fairly quickly to appropriate and adapt formal sector technologies, and (iii) it generally leads to lower costs.

Architectural standards

2.14. **What kind of classroom for what price?** For given technology and procurement arrangements, the unit cost of classrooms is strongly related to (i) geography and local culture and (ii) architectural and technical specifications. Buildings are a significant part of cultural heritage, but since it is difficult to change traditions, people are adaptable, as seen by the performance of the informal construction sector throughout the developing world.

2.14.1. **Small or large classrooms?** Classroom size varies among regions and countries, resulting from: (i) the accepted norm in terms of the number of pupils that a classroom is expected to accommodate, and (ii) the accepted standard area per student, (iii) the technical challenge of building rooms exceeding six meters (typical width of a classroom), compared to 4-5m wide rooms (typical roof span of a house or dwelling). In some countries, standards vary by state or province (Brazil, Pakistan), for urban and rural schools (Bangladesh, Vietnam) and by period of time (Philippines). Table 5 below provides averages for the most recent national programs for which data are available. In this sample, the smallest standard area per student is found in Asia (0.7-0.9 m^2 in Bangladesh, India and Vietnam), the largest in Latin and South America (1.5 m^2 in Brazil and Nicaragua), with Africa in the middle (1.1-1.4 m^2). The small area per student in Bangladesh is because the children usually sit on floor mats [53]. Floor mats were also temporarily adopted as a national norm by Mauritania (1990-98) as a measure to cope with the huge enrollment demand of more than 50 student per classrooms [54]. The standard class size (country's ideal number of students per classroom) varies widely in Asia (35-50) and Latin America (36-45), and is generally high in Africa (40-50). The smallest classrooms are found in Asia (India averages 33-36 m^2), and the largest variability is in Latin America (36-57 m^2); classrooms in Africa are comparatively large (48-59 m^2). The Philippines went in 1990 from a relatively high standard of 48 m^2, similar to some present standard classrooms in Africa (Guinea, Mauritania) to an even higher standard of 56 m^2, similar to current standards in other countries in Africa (Senegal, Zambia) and in Latin America (Brazil, Nicaragua). Small classrooms -- which seem, at first, to better suit the needs of low populated areas – can actually become an obstacle to multigrade teaching which is the only cost-efficient answer for education in low density areas. In addition, classrooms that are undersized are unable to accommodate pedagogic strategies that use library corners or student groups. A clear need exists to revisit architectural design from an educational point of view, to make classrooms more suitable for active pedagogy, multigrade teaching, and student self-reading.

Table 5. Gross and net classroom area, and number of students per classroom in selected Government programs

Africa						Asia						Latin America					
	Gross	*Net area*		*m2*	*Stud*		*Gross*	*Net area*		*m2*	*Stud*		*Gross*	*Net area*		*m2*	*Stud*
Country	*area*	*Clsrm*	*adj fac**	*per*	*per*	*Country*	*area*	*Clsrm*	*adj fac**	*per*	*per*	*Country*	*area*	*Clsrm*	*adj fac**	*per*	*per*
	m2	*m2*	*m2*	*stud*	*clrm*		*m2*	*m2*	*m2*	*stud*	*clrm*		*m2*	*m2*	*m2*	*stud*	*clrm*
Guinea	56.16	48	4.00	1.20	40	Bangladesh	43	34.8	4.7	0.70	50	Brazil	61	56	-	1.5	38
Mauritania	51.84	48	-	1.07	45	India	39	36	7	1.0	36	Honduras	42	39	-	0.87	45
Senegal	63.94	59.2	6.00	1.18	50	Pakistan	39	33	3	0.9	30	Mexico	39	36	7	1.0	36
Zambia	59	54.6	-	1.37	40	Philippines	60	56	-	1.4	40	Nicaragua	62	57		1.5	38
						Vietnam	43	30.7	9	0.9	35						
Average	58	52	5	1.20	44	Average	45	38	5	0.97	38	Average	51	47	7	1.2	39

*adjacent facility in the same bloc: veranda, office: ratio per classroom

2.14.2 **Architectural standards should be modest**. Should, for example, the classroom bloc include a veranda? a ceiling under the roof? Venetian blinds? All these features are required by Ministry of Education standards in some countries, but they add to the unit cost of classroom construction. Most are useless inputs since “learning can occur in a modest facility as easily as in an elaborate one” [55]. They are also examples of the common gap between Ministry and community “minimum” standards: when the Mauritanian team discussed classroom-veranda with the communities which were expected to co-finance the classroom, they said “why do our children need to have, in the school, something that we cannot afford for our own homes?” Communities rejected classroom ceilings for the same reason. A school building is not only a place for learning, but is also a symbol for parents and communities. However, the very modest Mauritanian model – by far the most modest in West Africa – is still the most beautiful building in the vast majority of the villages tn this desert country, generating high community pride.

2.15. **The cost per square meter**. Asian countries achieve the lowest unit cost per square meter due to low labor cost (skilled and unskilled) in this part of the world, coupled with community involvement (See paragraph 2.31.) However, Mauritania and Senegal are achieving results close to these of Bangladesh and India. Latin American costs are still on the high side. In our sample, the gap between the average unit cost per square meter in Latin America and Africa is 58%, much higher than the gap between classroom unit cost in the same regions (29%). However, the gap between average unit cost per square meter in the African and Asian countries of our sample is only 10%, much lower than the gap between classroom unit cost in the same regions (38%). This shows the success of some African countries in lowering school construction costs.

Table 6. Classroom cost per (gross) square meter in selected Government education programs (current US$)

Africa			Asia			LAC		
Country	*US$*	*year*	*Country*	*US$*	*year*	*Country*	*US$*	*year*
Chad	122	(2002)	Bangladesh	91	(1998)	Brazil	136	(1993)
Guinea	134	(2000)	India	95	(2001)	Columbia	NA	
Mauritania	91	(2001)	Pakistan	175	(1987)	Honduras	214	(1995)
Senegal	100	(2001)	Philippines	172	(1996)	Mexico	257	(1998)
Zambia	149	(1991)	Vietnam	58	(2000)	Nicaragua	142	(1995)
			China *	55	(1997)			
Average	119		Average	108		Average	187	

*Peoples Republic of China

2.16. **Unit cost per square meter vs. unit cost per student**. Inter country comparison of absolute unit cost per square meter is not telling about other educational costs. Table 7 compares unit cost per square meter (investment), relative to unit cost per student (recurrent). Again, African countries have the highest average unit cost per square meter: 4 times the recurrent unit cost per student, differing greatly by country, from 1.9 times in Senegal (which has the lowest unit price per square meter in terms of student unit cost) and Zambia again, which has the highest (more than 7 times) followed by Chad (6 times). At 1.9 times, Mauritania's unit cost per square meter is close to those of the Asian countries in our sample, all close to the average of 2.4 times. Asia is closely followed by the sample of Latin American countries (2.9 times). Again, unit costs per square meter, compared to unit costs per students are much higher in Africa than in countries of other regions. However, Senegal and Mauritania are exceptions to the rule.

Table 7. Classroom unit cost per square meter compared to annual recurrent cost per student

Africa				Asia				Latin America			
Country	*Clsrm unit cost per sq meter US$*	*Recurr cost per student US$*	*cost per sq meter as multip of stud unit cost*	*Country*	*Clsrm unit cost per sq meter US$*	*Recurr cost per student US$*	*cost per sq meter as multip of stud unit cost*	*Country*	*Clsrm unit cost per sq meter US$*	*Recurr cost per student US$*	*cost per sq meter as multip of stud unit cost*
Chad	122	20	6.0	Bangladesh	91	36	2.6	Brazil	136		
Guinea	134	38	3.5	India	95	47	2.0	Columbia	NA		
Mauritania	91	48	1.9	Pakistan	175	62	2.8	Honduras	214	67.2	3.2
Senegal	100	71	1.4	Philippines	172			Mexico	257		
Zambia	149	21	7.2	Vietnam	58	28	2.1	Nicaragua	142	56.3	2.5
				China *	55						
Average	119	40	4.0	Average	108	43	2.4	Average	187	62	2.9

*Peoples Republic of China.

2.17. **The shift from classrooms to schools.** In the past, donor-financed primary education often focused exclusively on classrooms. Providing shelter for teaching and learning activities was the priority. As enrollment rates progressed and the focus of countries shifted from enrolling new children to retaining students, particularly girls, the focus moved from classrooms to schools. Although primary schools have a variety of non-classrooms facilities, projects supported by the Bank and other donors have focused mainly on latrines, which influence girls' enrolment, and potable water.

2.17.1. **Latrines and drinking water**. At the beginning of the 1990s, the existence of latrines and potable water was very limited. Over the last ten years, these two facilities have been considered essential for all schools and, as a result, receive government attention and donor support. However, the level of coverage is still unacceptably low.

- **Africa**. Historically, school construction projects rarely included latrines or water supply. In some countries, such as Mauritania and Chad, the inclusion of latrines and water in primary school construction projects only started in 2001 and 2002, respectively, with the sixth WB-financed education project [56]. The water supply component included in the previous Mauritanian project failed to be implemented [57]. In Chad, only 1/3 of the schools have latrines and 2/3 have drinking water [58]. In other countries, such as Guinea, the systematic inclusion of latrines and water supply in all new schools could be found as early as 1989 [59]. However, the retrofitting of 2,000 existing schools lacking latrines and 2,900 lacking water (out of a total of about 4,300) was only included in the recent 2001 Education For All Program, which is planned to be implemented over a ten year period [60]. In Senegal, while only 39% of classrooms have sanitation and 33% have access to drinking water, these facilities are not systematically included in the school construction program. However, communities, which are requested to contribute to 5% of the construction costs, interestingly often prefer to contribute by building sanitation or wells on the side of the classroom built by the CMA, rather than contributing to the classroom construction itself.

- **Asia**. In 1993, 64% of the 73,000 primary schools in the Indian state of Uttar Pradesh were without latrines and 43% without water supply [61]. Between 1993 and 2001, with the support of three WB-financed projects, this state built more than 41,000 toilets – not so far from the initial need -- and provided drinking water to more than 17,000 primary schools. For all of India, eight WB-financed projects provided 91,000 toilets -- more than the number of new classrooms built within the same projects – and 57,000 drinking water facilities. Unit costs decreased over time for latrines from about US$1,000 to US$250 [62], but the cost of drinking water facilities remained at US$1,000 [63]. In Bangladesh, 70% of the almost 45,000 primary schools in 1985 had no latrines and 10% were without water supply [64]. The WB-financed education project (1985-90) had limited objectives: 4,000 latrines and 3,600 tube wells [65] while the subsequent project (1990-96) had no provisions for the facilities [66]. The following project (1998-2004) included 7,000 of each facility [67] leaving a large gap of unequipped schools. Unit costs at the end of the first project (1990) were US$520 for latrines and US$130 for tube wells. In Pakistan (1990), more than 51% of primary schools of the Sindh province had no sanitation and 42% were without water supply [68]. The project plans to build 2100 latrines, which represents 20% of the needs [69]. Proportions in the North-West province were even worse in 1995: more than 80% of primary schools have no sanitation facilities and half of the schools are without drinking water [70].

- **Latin America**. Latrines and drinking water received more attention in Latin America as well. Mexico, for instance, added almost 3,200 latrines to the primary schools of the four states targeted by the (1991-98) Primary Education Project [71]. The Second Primary Education project (1994-99) provided ten other states with latrines at an estimated unit cost of US$2,150 for 4 units of 4 square meters, and potable water facilities at an estimated unit cost of US$1,300 [72].

2.17.2. **Other facilities**. Some countries have standard school designs that include specific elements considered necessary by the Ministry of Education, but may be questioned by parents, communities or donors. For example, rural communities criticized the kitchen-storehouse in the Honduran MoE’s standard design. On the other hand, boundary school walls gradually became part of many donor-supported projects at the end 1990s [73]. Other countries have specific facilities considered socially important despite the little impact they have on student learning.

Procurement Arrangements

2.18. **Large vs. small contracts**. Because classroom needs are large and predictable, they were considered, in the past, as a good basis for large packaging of works to be executed through large contracts. In the 1970s, most of the education projects in Africa financed by IDA, AfDB, UE, among others, were based on large contracts which were characterized by: (i) centralized procurement leading to International Competitive Bidding [74], (ii) simplification of procurement procedures by governments with limited procurement capacity and donors favoring prior review of procurement processes, (iii) reliance on large contractors with strong financial and technical capacity where Government of donor monitoring capacity was limited. Large contracts often resulted in: (i) an inadequate distribution of schools due to centralized planning resulting in empty new schools co-existing with unmet needs nearby, (ii) construction delayed by cumbersome public procurement procedures [75], (iii) high construction costs up to $17,000 (Mauritania 1984) to $20,000 per classroom, due to a low level of competition between the few large contractors (sometimes forming a cartel) able to fulfill formal administrative requirements for bidding, dividing between themselves a small public construction market. At the end of the 1980s, most Governments and donors shifted from supporting large contracts to smaller contracts. Small size of contracts, geographic dispersion of sites, and competitiveness of the local construction industry appeared to be favorable conditions for lowering construction cost, resulting in lower-cost schools, managed either by: (i) central Government Agencies (or local branches of such agencies), (ii) NGOs, and (iii) Contract Management Agencies (CMAs). By the end of the 80s, most World Bank-financed projects shifted to small contracts awarded through NCB procedures (Bangladesh [76], India [77]). In the 90s there were no ICB procedures in any projects financed by the World Bank or the other principal donors.

B. Construction costs: the promises of the "organizational" approach

2.19. After two decades of experimentation and disappointingly modest results, the 1990s and the 2000s have already seen a large array of organizational innovations.

Implementation Arrangements

2.20. **Central vs. decentralized governmental planning and procurement**. Until the 1980s, in most developing countries, governments' central agencies were responsible for school construction, from planning to construction contract management. In some countries, central directorates in Ministries of Education attempted to carry out the full range of activities: from construction planning, school design, to works procurement and site supervision. In other countries, the MoE delegated this responsibility to the ministry over civil works. World wide experience shows that Government management of the school building program either centrally or regionally, results in: (i) inadequate classroom allocation, (ii) weak monitoring capacity of the implementation agency, and (iii) low construction quality [78]. Since the 1980s, several Governments started transferring procurement responsibilities from the central level of the Ministry to sub-level entities of the same Ministry through decentralization, such as the Philippines. Not much of a cost savings was seen as a result of the decentralization.

2.21. **Devolution to Local Governments**. Throughout the 1990s, there has been considerable pressure within countries and the international community to modernize governments by reducing the role of the central government to one of primarily policy and norm setting, while devolving service delivery and infrastructure to regional and local levels, or even private entities. Expectations were that this would result in lower costs and improved construction quality through better site monitoring by local government engineers. Devolution to local government is also expected to produce the following improvements: (i) closer monitoring leading to better work quality, (ii) local bidding, with increased use of local labor, lower costs and heightened community ownership leading to a greater commitment to maintenance, (iii) better integration of municipal investment between sectors expected to result in more active support of education.

- **Africa**. In 1989, decentralization of classroom construction (Conseils de districts) was piloted by Guinea under a World Bank-financed Education Sector Improvement Project (PASE I) with poor results. Costs remained high at US$13,450 per classroom, quality was low, and construction was slow. This approach was replaced in 1994 by an NGO-based approach (see paragraph 2.13). Senegal's 1996 law on decentralization shifted classroom construction from MoE to local government responsibility. However, there was no transfer of MoE's resources to local governments. Under the World Bank-financed Education for All Project, MoE's resources for construction are managed by a Contract Management Agency (AGETIP), with sub-agreements with local governments. Since local governments do not manage the program, cost savings result more from the delegation of contract management than from the devolution to local governments (see paragraph 2.14).

- **Asia**. Local government assumed responsibility for managing classroom construction in the Philippines in 1996 [79]. However unit cost remained high: $10,400 per classroom on average [80] or $180 to $250 per square meter, depending on geographical location. When Bangladesh shifted school construction from the Facilities Ministry to the local governments in 1998, the decrease in unit cost was negligible (US$3,900 against US$4,000), although more emphasis was given to school mapping [81].

- **Latin America**. In 1994, Mexico decided to transfer all school construction in four states from its Federal Agency (CAFCE) to the local governments. This resulted in an immediate 32% decrease in unit costs from US$11,500 to US$7,800 [82] per classroom. This example was quickly followed by Nicaragua in 1995 (ref). In Northeast Brazil, transfer of funds to local governments in 1993, led to higher unit costs per classroom: $8,150 in the decentralized project [83] compared to $6,000 in the previous project [84]. In addition, the implementation of devolution to municipalities encountered resistance. During the project, only 40% of the classrooms were effectively built by municipalities instead of the 60% planned, suggesting difficult state-municipal relationship, which prevented the latter from having access to funds [85].

2.22. Experience reveals that shifting responsibility from central to local governments does not automatically result in decreased classroom costs.

2.23. **The disappointing combination of partial community-based approaches and partial centralized procurement**. The World Bank has supported community construction of school buildings in several projects in Africa and South Asia. Many of these projects met difficulties because the designs called for construction techniques unfamiliar to local craftsmen and could only be implemented by providing intensive supervision and training. In response, alternative solutions were tried. For instance, community participation was limited to site preparation and foundation building, while the remainder of the building was constructed by an experienced contractor. This design adaptation also proved too complex. The cost of providing technical support often exceeded any savings associated with community construction.

- **Africa**. In Zambia, the community participation approach combined with centrally procured materials, was implemented in 1993 as an OPEC-financed project [86]. This resulted in a classroom unit cost of US$9.200, which included 25% community participation. Another fully community-based project (Social Recovery Project) built similar classrooms at US$ 8,200 (also included 25% community participation) [87]. In the Gambia's Education Sector Project (1990-99), the community participation was satisfactory, but coordination with the delivery of imported materials resulted in 2-3 year delays [88]and was not cost efficient. The classrooms cost US$120 per m^2 (1993-95) compared to US$93 per m^2 achieved later (1993-97) by the MoE after it returned to awarding national contracts [89]. Subsequent Gambian education projects [90] continued to finance national contracts.

- **Asia**. In 1980, under a WB-financed education project [91], Bangladesh also tried to combine local labor contracts with large contracts of materials (packaged in large bulks) through ICB. After paralyzing delays, they quickly shifted (1983) to inclusive work and material contracts [92].

2.24. **Positive results from delegation to NGOs**. Many countries have delegated school construction to NGOs at some point to promote community participation and reduce construction costs. NGOs often have better access to the poor and can mobilize local resources, stimulate participation, and generate innovative solutions to local problems. NGOs are playing an important role in promoting education through school construction. Many NGOs are able to build low-cost classrooms with their own funding, but the scale is usually too small to have a national impact. In a few countries, the government has fully delegated its national school construction program to NGOs.

- **Africa**. Guinea adopted the NGO approach, with World Bank funding, during the Education Sector Improvement Project II (1995-2001). This implementation arrangement was chosen by the Government to ensure effective community participation in the construction process. However, in addition to strong community participation, it resulted in a tremendous increase of effective implementation capacity, which allowed a doubling of the number of classrooms to be built each year (from 600 to 1,200) during the project period. Compared to previous arrangements (delegation to local governments with unit costs of US$13,500) cost decreased to US$7,600 per classroom in 2000 (US$ 165 per m^2). However, the costs are still high compared to: (a) a parallel program funded by KfW using National Competitive Bidding to achieve a unit cost of US$8,200 per classroom with higher technical standards and much larger area leading to a cost of US$115 per m^2 and (b) a program carried out by another NGO, Aide et Action, which builds similar classrooms with its own resources at US$96 per m^2. The subsequent program, Education For All (2002-06) expects to address this issue through competition between NGOs. In 1998 The Gambia delegated to NGOs a part of its Third Education Project (1998-2005) to use all existing national capacity. This latter objective was achieved, but unit costs of the sub-program managed by NGOs (US$120 per m^2) were not expected to be lower than these of the sub-program managed by the MoE though NCB (US$93 per m^2) for the same construction quality [93].

2.25. Delegation of responsibility to NGOs did provide significant savings but not the expected ones, and raises other issues related to: (i) sustainability of such a system since NGOs are not a permanent institution, and (ii) willingness of construction contractors to remain sub-contractors of NGOs. To address this issue, the Guinean Government is testing a community-based demand-driven approach.

2.26. **Delegation to Contract Management Agencies (CMAs)**. Since 1990, many countries in Africa have worked through Contract Management Agencies. Following the non-profit AGETIP model (Agence d'Exécution de Travaux d'Intérêt Public – Public Works and Employment Agency) created in Senegal in 1989 [94] subject to ex-post monitoring by the government, 11 AGETIP-type agencies [95] were created in West Africa (Benin, Burkina Faso, Gabon, Gambia, Guinea-Bissau, Madagascar, Mali, Mauritania, Niger, Senegal and Togo). These agencies were given operational autonomy to implement large-scale small construction programs, to be carried out by small contractors with local labor. These institutions were relieved of the burden of public procurement and disbursement procedures and enjoy quick procedures described in public operation manuals. They are staffed with skilled professionals recruited from the private sector. They select, pay and supervise contractors and architectural/ engineering services for site supervision. Their mandate is to promote small and medium enterprises (SME) by allowing them to bid for contracts. These agencies have changed the "rules of the game" and have contributed to the growth of the construction industry [96].

- **Africa**. From 1994 to 1998 in Senegal, the use of AGETIP for KfW- and IDA-financed classrooms has brought unit costs down from $13,200 per classroom to $6,700, considerably better than the target of $9,300 [97]. During the same period, construction financed through government budget funds and contracted by the Ministry of Education through NCB, averaged a unit cost of $8,100 [98]. Under the

Education For all Program (effective since 2001), unit costs through AGETIP have resulted in a further decrease in unit cost to $6,300 per classroom, probably due to an increasingly competitive environment.

2.27. Ex-post evaluations and stakeholder assessments, while recognizing that unit costs under the AGETIPs have decreased by as much as 40%, have questioned the quality of AGETIP and social fund (discussed below) projects [99].

2.28. **The increasing role of Social Funds**. Social funds were initially developed in the 1980s to mitigate the effects of the structural adjustment crises, and designed to provide employment. By the 1990s, they had become almost ubiquitous instruments in the fight against poverty. In 2000, social funds existed in 50 countries in the World Bank's LAC region, 24 in Africa, some in the World Bank MENA Region, and were rare in Asia [100]. Social funds have gradually moved from using construction to promote temporary employment, to longer-term poverty reduction and community participation. Like the AGETIPs referenced above, social fund agencies are generally exempt from public procurement and civil service rules. The main characteristic of social funds is that they are demand-driven with projects generally originating in communities and NGOs. Most projects funded by Social Funds are not community-based and are implemented by the social fund agencies themselves, which act as contract management agencies, managing contracts with private firms and varying degrees of community involvement. Some social funds, such the Zambian one, are community-based (see below). Others, such as is the case for Angola's FAS, are in the middle, with communities taking decisions and hiring labor teams while the Agency manages funds and pays invoices [101].

- **Latin America**. A 1998 IDB review of 16 Social Investment Funds in LAC concluded that they have proved to be good in rapid execution of school construction projects in poverty-stricken areas, and have built needed infrastructure rapidly and cheaply [102]. The volume of resources managed by these funds is important: US$4.4 billion in 1990-96, 53% of which finances social infrastructures (water, health and education) [103]. Many Social Investment Funds are significant players in term of construction and maintenance of classrooms. In Nicaragua (1991-99) the SF provides 49% of public education investment. In Honduras education-sub projects of the FHIS consumed, in 1994-97, 40% of the SF resources, contributing to 58% of the new schools and 61% of the new classrooms [104]. In Peru (1992-98): out of $890 million in 1991-1996, US$12.2 million financed 10,000 education projects [105]; unit costs appear to be lower compared to these obtained by local government [106]. This may be due to citizen participation through so-called vigilance committees [107]. Available data do not evidence a systematic reduction of school construction. Opposite results were achieved in Honduras, where beginning in 1995, the Basic Education Project delegated the management of classroom construction to the Social Investment Fund. This resulted in much higher classroom unit costs - about US$9,000 [108] -- compared to unit cost of US$5,800 achieved by the ministry of education through NCB during the previous WB-financed Education project [109] and 20% higher than the construction costs recommended by the national Chamber of Commerce [110]. In Nicaragua, the unit cost of classroom (US$8,500 [111]) built by FISE appears to be 40% higher than that of local governments [112]. In addition, FISE administrative procedures have proven cumbersome and inefficient [113]. Social funds were not necessarily more flexible in terms of adaptation to local conditions: for instance, in Honduras, the standard design specified a perimeter wall with a standard length; when the real perimeter turned out to be greater, it was left unfinished. If the community have been involved in the contract procedure, it might have been possible to find better solutions [114].

- **Africa**. Social funds emerged in 1991 following the Latin American model started 6 years earlier, and presently account for one-quarter of the WB lending to social funds [115]. As in Latin America, they are important contributors to education. For instance, in Zambia, school rehabilitation projects under social funds constitute 16% of school stock. In 2001, a review of 17 social funds concluded that the efficiency of social funds is typically superior to other approaches, measured by: (i) the share of overhead, and (ii) the unit cost of investment compared to other delivery mechanisms [116].

2.29. Despite the fact that their initial mandate to provide employment and not school buildings, Social Funds have proven being able to do so with great efficiency, and their classrooms are used (they respond to demand and teachers are supplied by MoEs). In addition, SF provide an opportunity to develop education-health-production in an integrated way. Despite their common social nature, Education and Health Projects have rarely succeeded in applying similar implementation procedures. Some examples, such as Education and Health Sector Projects in Senegal succeeded in adopting similar implementation arrangements for the construction by using the same CMA and identical contracting arrangements with local governments. Social Funds may serve as unique system for community level facility production.

2.30. Two track classroom construction programs. Where social funds and classical procurement procedures co-exist, this is usual to the detriment of the latter. The ICR of the 1984-2001 Peruvian Primary Education Quality Project highlights this issue [117]. Honduras solved this problem in 1996 by simply closing the School Construction Division of the education ministry and absorbing its activities into the social fund (FHIS) [118]. In Nicaragua, the 1995-99, WB-financed Basic Education Project delegated school construction to the Social Fund (FISE) while the subsequent Second Basic Education Project abandoned the social fund in favor of delegating the responsibility for construction to school councils [119]. Bolivia also decided in 1998 that the school construction component of its WB-financed education project will be carried out by its Social Investment Fund [120]. Nigeria also decided that all community-level facility in Health and Education will be longer be included in

2.31. **Delegation to communities: a success story**. Community-based approaches are of two types: (a) demand-driven as in the Mauritanian and Indian examples below, and (b) targeted, as in the Malian example below. However, results are all positive.

- **Africa**. In 1989, Mauritania was the first country to fully delegate its national classroom construction program to communities (Parents' Associations) under the World Bank-financed Education Sector Restructuring Project (see Case Study) through community-based, demand-driven process. Unit costs were cut from $18,000 (1984) to $5,600 in 1991 (for lower architectural standards, but same size and similar life expectancy) [121]. The demand-driven community-based approach established a dynamic that boosted demand for education and helped mobilize additional donors (AFD). Communities built about 1,000 classrooms instead of the 250 initially planned by the project. By the end the subsequent WB-financed Education project [122] which continued this best practice, communities had built about 2,600 classrooms. Unit costs stood at about $4,600 per classroom in 2000 [123], one third of the cost (US$13,200) of the same type of classroom built by a contractor hired by Amextipe (Agetip-type MCA) under NCB [124]. Gross primary enrollment reached 86% in 1998/99 compared to 47% in 1989-90. Mali undertook in 1998 a successful community-based demand-driven approach with the Grass-roots Initiative Project in the Mopti region which built classrooms at US$6,600, 13% cheaper than similar constructions built by Agetipe at US$7,600 [125]. A similar approach was developed by Zambia in 1991 by the EU and WB through a Social Fund [126] and adopted in 1999 by the WB-financed Education Project [127]. In both projects, community-built classroom unit cost was $8,800-9000, less than half the cost of classrooms built over the same period using classic NCB procurement [128]. It is estimated that 40% of the cost difference is attributable to higher architectural standards, and 60% to the implementation and procurement arrangements [129]. The Social Fund created in Malawi in 1996 also adopted the community-based demand-driven approach. The Education Ministry in Chad decided in 2001 to follow a similar approach, using the Mauritanian engineers as technical assistants to set up their project.

- **Asia**. In 1993, India started full delegation to communities in 10 Districts of Uttar Pradesh State [130] and, based on very successful achievement [131], gradually extended it to 18 States and 242 District reaching 60 million children in 2001. [132] In all DPEP projects, unit costs remained extremely low during the decade from US$3.050 in 1993 to US$3,140 in 2001. Bangladesh decided in 1990 to transfer construction responsibility for rural schools from MoE to communities (upazilas) [133] obtaining units costs of US$2,800 compared to US$4,500 in urban areas where classrooms where built by contractors centrally contracted by MoE through NCB [134]. Vietnam also started in 1993 a large School Building Program by which rural communities are responsible for school construction with unit costs less than US$2,200 per classroom (typhoon- and flood resistant), 15% cheaper that urban classroom built under NCB.

- **Latin America**. In 1994, Mexico launched a WB-financed two-pronged school construction program: 50% are handled by its Federal Agency (CAFCE) through NCBs and the other 50% are executed by communities, mainly school boards, through community-based simplified procurement procedures (with contribution equivalent to 10% of construction cost). This new approach was 40% cheaper than through CAFCE [135] from US$19,700 to US$11,800. In 1998, the Mexican Government decided to generalize the community-based approach to the whole country, with an average unit-cost objective of US$10,000 per classroom, almost half of the unit-cost resulting from the centralized approach. Under this project, communities bound by standard Contract Agreement receive 60% in advance and balance as civil works progress [136]. After delegating to social funds during the Basic Education Project (1994-99), the MoE of Nicaragua decided in 1999 to fully delegate the school construction to the School Councils under the WB-financed Second Basic Education Project.

2.32. Strategies for the success of community-based construction include the following: (i) only locally available materials are used, (ii) only construction techniques familiar to villagers and local craftsmen and contractors are used, (iii) design improvements are limited to those necessary to ensure standard durability and safety, (iv) duties and responsibilities of partners are well defined. Regular technical supervision will help in ensuring that quality standards of construction are met, but does not substitute to close monitoring by communities. The Mauritanian experience, based on result-oriented technical supervision combined with appropriate advices to local builders by supervisors, provides good results since supervision is regular and supervisors accountable. In the South-East countries, authorities tended to consider supervision as money wasted since weak supervision resulted in some proportion of classrooms of poor quality. Community pride in ownership of a well-built school, combined with appropriate technical advice to local builder is the main factor of quality construction.

2.33. Finally, community-based approaches are likely to be successful in countries where community involvement is a tradition. Community-based approaches in places where community participation it not the norm needs to be introduced carefully as a social change experiment.

B. The General Failure of Maintenance

2.34. **The unsolved problem**. Classroom maintenance is still an unsolved problem. For Governments, maintenance of investment is an economic duty. In addition, good or bad maintenance of educational facilities has an impact on educational outputs since decrepit and inadequate facilities make schooling a less attractive product to children, parents and teachers. This well known issue has not been correctly addressed. The composition of national classroom stocks to be maintained, result from the combination of communities' and Government construction efforts. Classrooms built by communities, often with local non permanent materials request a permanent high level of communities' efforts, just to keep them operational, consuming a large part, if not all, communities' maintenance capacity. In the opposite, government-built classrooms are most often legally Government-owned, and considered by communities to be maintained by the owner, while the latter, in most developing countries, have never budgeted adequate resources nor set up adequate implementation arrangements. In many countries, poor Governments have simply shifted this responsibility to communities, also poor and heavily burdened by all other education costs. In addition, communities' reluctance to maintain Government-owned school buildings increases when the quality of construction is low, thus requiring, ironically, more maintenance. Many WB-financed Education projects do not include a maintenance component, most of them rhetorically assigning school maintenance to the Government – without looking at its feasibility -- some others mentioning the expected role of communities [137], few discussing in detail a specific component for school maintenance [138], but results are generally far from expectations.

2.35. **The inevitable rehabilitation/repair programs**. The absence of regular maintenance results in the need for rehabilitation/repair on all donor-financed education projects. These rehabilitation/ repair programs were simply addressing, at the end of a multi-year period, the deterioration since the beginning of the project. In India, for instance, the eight WB-financed projects (1993-2001) financed the repair of more than 42,000 classrooms, while financing 86,000 new classrooms. As donors wrote maintenance costs into the projects, Governments had not incentive to provide it themselves.

2.36. **The magnitude of the maintenance problem and some solutions**.

- **Africa**. Most African countries have no real maintenance policy for school buildings -- as for all other public facilities. Moreover, when communities committed to school construction, the Government often left all maintenance in their hands. In many countries, there was no maintenance component in the WB-financed education projects (Mauritania, Education V 1995-2001). In other countries, such as Senegal, education projects included tests for school maintenance, based on community training combined with provision of tools. However, such tests were not appropriately monitored (PDRH2 1994-2000). This almost total absence of Government support to primary school maintenance results in the gradual dilapidation of a large share of the classroom stock. For instance, in Chad, aside from the 55% of classrooms built with plant materials, another 13% of the classrooms built with durable materials are in very bad condition, [139] needing urgent rehabilitation. This proportion is 15% in Senegal [140] and 20% in Guinea [141].

- **Asia**. Pakistan is an interesting example. The 1972 nationalization of the primary schools ended the previous long-term community commitment to school maintenance, and it was not replaced with any clear maintenance policy. During the subsequent 15 years without maintenance, the durable classrooms ("pucca") deteriorated so much that one third were totally dilapidated and unusable, and another third needed substantial repair [142]. The following solutions were tried: (i) the Third Primary Education Project (1987-96) for the Punjab province included the development of a maintenance policy [143], which resulted in a plan (1996) to release funds directly to communities with significant impact on community and teacher involvement in repair and maintenance [144]; (ii) under the Sindh Primary Education Development Program (1991-95), the World Bank provided increment to the 50% of the maintenance budget for the rehabilitation-maintenance of about 2,000 classrooms [145]. This raised maintenance to 2% of the primary education recurrent budget; community awareness increased as a result of the establishment of PTAs empowered to manage recurrent funds, which included maintenance [146]; (iii) in the Balochistan province, the operation and maintenance budget (including classroom materials) was raised, in 1993, to 4% of the total recurrent costs [147] managed by communities [148]; (iv) in the North-West province, 37% of the 1995 classroom stock needed repairs beyond routine maintenance [149] and the 1995 project planned a maintenance annual budget of 1.5% of capital costs [150].

- **Latin America**. It is often said that maintenance is not part of the culture in this region [151]. However, with gross enrollment rates close to 100%, maintenance of the existing facilities has become more important than creating new ones. The MoE of Colombia estimated in 1982 that 31% of its classrooms needed to be repaired and 21% simply needed to be replaced [152]. In 1988, the situation was worse; the proportions moved respectively to 70% and 35% [153]. In Mexico, in 1991, schools often had no funds for basic operation and maintenance [154]. In 1994, following the 1992 decentralization law, Mexico decided (for 10 States) to adopt the "escuela digna" model by which municipalities receive a fixed amount of US$64 per classroom per year, for maintaining infrastructure and furniture. This is in addition to contributions (monetary, labor and in-kind) from communities [155] estimated at 10%. In 1998, it was recognized that decentralization and community participation gave considerable impetus to the project [156]. In Peru, in 1994, after 5,700 schools (out of 23,300) were already rehabilitated in 1991-94 by the Social Fund for a total amount of US$121 million [157], only 30% of the classroom stock is in good conditions and 13% have deteriorated to such degree that they are unsalvageable [158]. Since Social Funds build but do not operate projects, maintenance is a serious problem. [159]. Maintenance is also a chronic problem for line ministries.

C. Who pays for the work?

2.37. **Government vs. Donor financing**. Since Governments are normally expected to cover 100% of recurrent costs, donors commit themselves to investment costs and generally like to support the highly visible school construction program. In many African countries, 100% of Government owned classrooms have always been built with donor funds (Mauritania, Guinea, Chad, Zambia). In this region, some countries, such as Senegal, have started financing, on its own budget, the construction of 1,000 classrooms per year (since 1998), corresponding to 50% of the needs. In the Philippines, WB-Japan combined support financed 100% of the central government's share of the cost of the Divisional school building programs in the 26 poorest Divisions (out of 134) targeted by the 1997-2003 Third Elementary Education Project, while the Government financed on its own budget 100% of its share to the school building programs in the other Divisions. Brazil, through the WB-financed Innovation in Basic Education Project, introduced in 1991 a cost-sharing between the Sao-Paolo State and the WB which financed 31% of primary schools and 60% of pre-schools [160].

2.38. **Central vs. Local Government financing**. Since decentralization from central to local Governments (LGs) is progressing all over the world, this gradual shift has implications in school financing, which is shared more and more by LGs. However, regional differences are important, reflecting different path of urbanization: cost-sharing of LGs is rare in Africa, slightly developed in Asia, and more common in Latin America.

- **Africa**. Africa is the least urbanized region in the world. However, its urbanization rhythm is the highest in the world, generating since the 1990's, the emergence of strong forces towards decentralization to Local Governments (LGs). Nevertheless, centrifugal forces remain extremely strong: (i) few countries have elected bodies governing Municipalities (Mauritania since 1992, Senegal since XX). In many other countries such as Chad, municipal boards are nominated by the central Government; (ii) even fewer countries have devolved the national investment budget to LGs (even Senegal, the most decentralized country of West Africa, has not done so to date). Because LGs have such low resources, their contribution to school construction financing is negligible.

- **Asia**. In 1997, the Philippines introduced a cost sharing mechanism between the Central and Local Governments (Municipalities) for school construction. The new program increased the responsibility and accountability of Municipalities, and directed additional municipal resources to education. The LG contribution (from their own resources) will range between 10-30 percent of construction costs, with an average of 25%; the richer provinces contribute more funds to compensate for the inequalities among provinces [161].

- **Latin America**. During the expansion of the Escuela Nueva model to all rural schools through the Second Subsector Project for Primary Education (1988-94), Columbia introduced a cost-sharing of 5% from the Department and 20% from Municipalities in view to increasing their responsibilities. However, procurement of works was still kept in the hands of public financial management intermediaries (Bancos) [162], limiting the empowerment of LGs.

2.39. **Community participation**. The contribution of communities, whether cash or in-kind, is generally considered an important way to foster community involvement. Community participation is generally requested where it is culturally appropriate. Such involvement is common in large parts of sub-Saharan Africa, where parents and communities band together for most local projects. Similar traditions are also found in some of the poorest communities in East Asia (rural Indonesia, Pacific Islands). However, in South Asian countries (Pakistan, India) community involvement usually only involves cash contributions (matched by project-funded contributions); and community involvement is rarely found in ECA, the Middle East, or North Africa. Community participation generates project ownership and usually results in lower construction costs.

2.40. **Africa**. Community participation is common in Africa. Rooted in tradition, it is also encouraged by governments (for public burden reduction) and by many donors, which like to match community contributions as evidence of communities' demand for schooling and guarantees for subsequent maintenance. However, within each country, the inefficiency of donor coordination leads to severe disparities. In Guinea for example, the community participation is requested by MoE at 12% of total costs for WB-financed construction, 10% for KfW-financed ones, 0% for BAD-, BID- and OPEP-financed construction, while the NGOs *Aide et Action* and *Plan Guinée* are financing large construction programs with 12.5% and 5% of community participation. In Senegal, the MoE: (i) requests a 5% contribution to LGs which they often turn over to local communities because of low resources; (ii) does not request any community participation for classrooms built with BAD, BID, OPEP or its own funds. In Mauritania, the MoE's program in rural areas is based on a community participation of 30%, while contributions requested by AMEXTIPE for urban classrooms are expected to be paid out of communal budgets. In almost all African Social Funds (with exception of Burundi, Sao-Tomé and Rwanda) communities' contribution to investment is required, in cash or in-kind ranging from 8% in Madagascar to 25% in Zambia. However, urban works handled by CMAs (5 out of 14 first generation of AGETIP-type work in Africa) no contribution was required from the beneficiaries.

- **Latin America**. Since 1994, when adopting community-based approach for school construction, Mexico includes a 10% community participation in school construction programs, resulting in an impressive cost reduction (see paragraph 2.31).

D. School Planning.

2.40 When planning the geographical distribution of schools, accessibility for children and the affordability for governments must be considered. This depends on the norms and the planning implementation arrangements.

2.40.1. **Norms**. Norms are essential to guide the Governments in investment planning. Without norms, schools may be placed improperly and will remain empty. However, rigid norms can also be an obstacle to enrollment, such as the need for a minimum population. They can also be costly, such as the need to build one-story classrooms in urban areas, or two-classroom schools in very low populated areas. Government's do not have the capacity to establish, adjust, and implement cost-effective norms. Until now, efforts of WB-financed projects to build this capacity has had mixed results.

- **Africa.** In the 1990's, most African countries adopted a minimum core of norms for school construction, such as a minimum population in the catchment area (i.e. 600 inhabitants in Mauritania-1989) and a standard block of 2 classrooms (Mauritania, Gambia) or 3 classrooms (Guinea). The main objective was to quickly expand the network with cost-effective solutions for investment (to avoid under-used classes and minimize construction unit-cost). Few norms were developed for guiding school growth. For example, criteria for deciding to open a new classroom rather than introducing multigrade teaching; or for guiding school network growth. As a result, in many countries, the school network grew between the 1980's and the 1990's to almost cover the entire territory (Mauritania, Senegal) but with a majority of small incomplete schools, contributing to a strong increase of the intake and a very low level of retention. The existing norms often contradict the EFA objective. For example, norms need to focus on a cost-effective means to reach all children in a given country. For rural low populated areas – which are standard in many African countries, there is a need to develop criteria for schools with one to two classrooms and six grades.

- **Asia**. In 1993, the Government of Uttar Pradesh (India) adopted a norm of 1.5 km walking distance in the plains and 1.0 km in hill areas, and 3 km for upper primary schools primary, and a standard two-classroom school. At this time, 1.3 million children did not have a primary school within reach [163]. In 1999, the Government of Rajasthan (India) recognizing that the majority of the schools to be built under the Rajasthan Second District Education Project (2001-06) are in remote areas with populations under 200 and 30 primary school-aged children. They decided to revise the state norm of two-classroom schools and adopt a cost-effective one-room building specially designed to accommodate multigrade teaching and easily expandable to two rooms if enrollment requires [164]. In Pakistan, the absence of standard architectural plans during the Fourth Education Project in Pakistan (1979-87) caused supervision difficulties resulting in low quality of buildings [165]; the absence of norms for school creation resulted in an inadequate distribution of primary schools. They either had very small schools with enrollments fewer than so or large primary schools attached to secondary schools [166]. This was corrected under the Second Primary Education Project which established clear guidelines for school building [167]

2.40.2. **Implementation arrangements for school planning**. During the 1980s, school planning was centralized throughout the world. All MoE had – at least on paper – a Planning Directorate to collect and process educational data and to produce a yearly statistical book. They often had engineers to perform contract management for school construction. In general, school planning is very weak, and donor support to improve it has met little success. Countries' movement toward decentralization rarely translated into decentralized planning capacity. Nevertheless, both localized decision-making and the improvement of transparency are enhancing planning efficiency.

- **Africa**. In Francophone countries, MoE's planning units – as all other MoE's directorates -- are generally staffed with teachers with some training in the field of planning. School mapping is generally performed as a desk exercise, based on (often old) collected data and estimated actual enrollment ratios. Requests from heads of schools and local authorities are incorporated, complemented with field visits, ending with top-down decisions sometimes politically influenced. This process often results in the improper placement of new schools/classrooms and they remain unused. For instance, 16% of the 15,600 classrooms in Guinea were recorded unused in 1999-2000 [168]. Decentralization is generating a totally new paradigm. Decision-making becomes a local process closer to real needs. Following the issuance of its 1996 Decentralization Law devolving school construction to LGs, Senegal started, in 2000, with the Education For All Program, a participatory (MoE-LG), decentralized, bottom-up school planning process. Its statistical yearbook is regionalized and available a few months after the beginning of the school year, to facilitate the next year's planning.

- **Asia**. In 1994, the MoE in the Philippines recorded 22% of its 313,000 classrooms unused [169]. In 1997, under the Third Elementary Education Project, the MoE decided to decentralize school planning at the Divisional level (Province), through a mechanism based on contractual agreements between Division and LGs. They received responsibility for building and procurement.

- **Latin America**. In 1997, in Antioquia, Colombia decentralized to school management to LGs, including school mapping to be based on School Improvement Plans [170].

2.40.3. **Monitoring and Evaluation**. Education Projects' M&E components were probably the weakest part of most of the WB-financed Education Projects. There is a need to strongly improve M&E capacities of MoEs and LGs, and to improve strategies supported by donors to build this type of capacity.

E. **The urban / rural issue**.

2.41. In the past, most of the developing countries were rural countries, and primary schools were also mainly rural. For instance, in 1979, 85% of Pakistanese primary schools were rural [171]. In 1980, this was the case of 90% of primary schools in Bangladesh [172]. In Africa, Government policies generally favored urban areas as well as the private sector. In Guinea for instance, in 1999/2000, 43% of classroom are in urban areas where live only 30% of the population. Half of the classrooms built between 96/97 and 1999/2000 were built in the capital Conakry, mainly by the private sector [173]. Because of, either the better school coverage by previous Government policies of urban areas compared to rural ones, or the dynamic of the private sector in the capitals, WB-financed education projects were almost exclusively targeting countries' rural areas. It was the case, for instance, for the 1979-87 Pakistan Primary Education Project [174]. In addition, this priority was in line with countries' poverty reduction objectives, which generally targeted rural areas where poverty is larger and deeper than in urban areas. However, urbanization is progressively changing the countries' demographic profile towards increased urbanization. This shift was not accompanied by WB-financed Education projects. Not only for the above mentioned reasons, but also because school construction in urban areas was supposed to be largely supported by WB-financed Urban Development Projects. As a result, in countries where the private sector is not active, urban school coverage deteriorated. In Mauritania for instance, during the period 1990-91 to 1999-2000, while the school coverage was improving in all the country, it was deteriorating in the capital Nouakchott : the proportion of classrooms in the capital declined from 13,3% to 12,6% of the total classrooms while the population of the capital increased from 20% [175] to 24% [176] of the total country population. In the future, there is a need to support construction classrooms in urban areas.

F. Donor support and coordination

2.42. **The donors' tendency to withdraw from "brick and mortar" support.** The shift from "hardware" to "software" projects mentioned in paragraph 2.1 was not only a change for WB-financed projects, but for most donors committed to education. This means a reduction in construction funding. "Bricks and mortar" support is no longer fashionable, despite the importance of construction needs. We must not forget the need for building construction.

2.43. **The Government capacity to mobilize donors resources**. Government capacity to mobilize donor resources is a key element for project success or failure. For instance, in Pakistan, during the North-West Frontier Province Primary Education program (1995-2001), less than half donor funds committed to primary education were disbursed between 1987 and 1994 [177]. This was a result of the Government's weak commitment and low implementation capacity.

2.44. **The need to simplify donor support to construction**. Few countries have such low donor support as Mauritania (WB, AFD). Most countries receive support from a large group of donors, regardless of their size. In Senegal, 17 donors are regularly supporting education, of which, seven are supporting classroom construction. These figures are respectively 15 and 8 in Guinea. Small countries such as Zambia receive support from nine donors. In this country, three donor-financed projects built less than a hundred classrooms each. During the last decade in Senegal and Guinea, donors have gradually adopted the same standard design for classrooms, which simplifies the job of builders, and results in narrowing the range of unit costs between donors -- with the exception of JICA-financed classrooms which follow Japanese technical standards and cost US$27,000 in

Senegal [178]. In Senegal, three donors (WB, AFD and KfW) have adopted similar implementation arrangements with the same CMA. However, in the past, the general pattern was that each donor used to impose its own procurement procedures, to conduct its own supervision mission and to request its own progress report. With the gradual adoption by countries of sector-wide program approaches, the situation is improving. For example, following the Indian model in place since the first District Primary Education Project in 1993, Senegal succeeded, since the 2000-2004 Education For All Program, in managing joint supervision missions with all donors meeting with Government at the same time (mainly WB, AfDB, AFD, CIDA, FAC, KfW, BID) and receiving a common reporting.

III. Dimension of the problem

How Many Classrooms to Be Built?

3.1. The dimension of the construction problem is linked to the following elements: (i) the stock is aging and deteriorating, (ii) many previous projects resulted in substandard classrooms to be replaced, (iii) the stock of sub-standard classrooms built by parents without support is still important and needs full replacement, (iv) the life span of constructions is not averaging more than 25 to 30 years. By and large, until 2015, the developing countries will have to build about 3.4 million new classrooms to accommodate additional pupils, i.e. about 225,000 per year. But the need to replace existing classrooms will add 7.7 million classrooms, i.e. about 550,000 per year (one the basis of an average life span of 25 years), which is two times the number of new additional classrooms. The total (new plus replacement) will be more than 10 million classrooms. As shown by table 8, despite the differences of their demographic profile, each of the three regions: Sub-Saharan Africa, South Asia and East Asia, will have to build about 200,000 classrooms per year until 2015.

- **Africa**. According to the calculations in table 8, Sub-Sarahan countries have, by far, the largest share of its school-age population out of school: 40% i.e. 46 million children. The fertility rate, which is expected to remain high, will add 34.4 million children in this region in 2015. The sub-region will have to accommodate an additional 80 million children to reach EFA, corresponding to at least 2 million new classrooms to be built, i.e. 134,000 per year. This represents 60% of the total number of new additional classrooms to build in the world until 2015. The gradual replacement of the existing stock (about 1,7 million classroom in 1998) will raise the need of new classroom per year over 200,000 for the sub-Saharan region (on the basis of a life span estimated at 25 years).

- **Asia**. As of 1998, the region had already managed to school about 322 million children, leaving “only” 54 million out of school, i.e. 17% of the total, most of them in South Asia. However, the fertility rate decrease will result in a decrease of about 23 million school-age children in 2015, limiting the need for new classrooms at almost 1 million, while the need for replacement of existing classrooms will constitute the bulk of the needs with 5.9 million of classrooms to be rebuilt, i.e. 368,000 classrooms each year.

- **Latin America.** This region has only 5 million school-age children out of school, corresponding to about 7% of the total. Due to the fertility rate, the number of school-age children is expected to remain almost stable until 2015. Only 11% of the 91,000 classrooms to be yearly built until 2015 in Latin America, will be “new classrooms” the remaining 89% will be classroom replacement (still based on an estimated average life span of 25 year).

Table 8 : Estimation of the classroom construction quantative needs until 2015

	Primary school-age children in school in 1998 (1) *(million)*	ratio student per classroom (2) *(student per clsrm)*	Estimated number of clsrms in existing schools in 1998 (3) *(million)*	Primary school-age children out of school in 1998 (1) *(million)*	Primary school-age children change until 2015 (1) *(million)*	Primary school-age children to be acco-modated in 2015 (1) *(million)*	Primary new clsrms to be built until 2015 (3) *(million)*	Primary new clsrms to be built per year until 2015 *(units)*	Primary existing clsrms to be re-built per year until 2015 (4) *(units)*	Total annual clsrms to be built per year until 2015 *(units)*
Latin America	71	35	2.0	5	0.4	5.4	0.2	10,286	81,143	91,429
Sub-Saharan Africa	68	40	1.7	46	34.4	80.4	2.0	134,000	68,000	202,000
Midlle East North Afric	36	40	0.9	6	6.1	12.1	0.3	20,167	36,000	56,167
South Asia	124	35	3.5	48	-0.3	47.7	1.4	90,857	141,714	232,571
East Asia	198	35	5.7	6	-22.5	-16.5	-0.5	(31,429)	226,286	194,857
Total	497	185	13.8	111	18	129	3.4	223,881	553,143	777,024

Note (1) source: WB Ed-Stat; (2) objectives generally accepted in concerned regions; (3) calculations based on (2); (4) on the basis of life span 25 years

3.2. **A Rough Estimation of Construction Costs**. Estimating the cost of building (and rebuilding) the required number of classrooms to enroll all school-age in 2015 is obviously impudent since: (i) estimated quantities displayed in Table 8 are very rough figures; (ii) estimated regional unit costs at present are averages calculated on the few data obtained from the very small samples of countries for which data are available and displayed in Table 1 – average costs for East Asia and South Asia of Table 9 are calculated respectively on samples of 3 countries; (iii) unit cost of Middle East North Africa in Table 9 has been arbitrarily taken equal to Sub-Saharan Africa; (iv) moreover, unit costs in the future are unpredictable, depending on the success or failure of countries' efforts to reduce them. In the table below, they are taken equal to present costs as a conservative approach. The table below displays the results of an attempt to figure out the construction investment cost for 2015 EFA, based on quantities estimated in table 8 and unit costs estimated on the basis of the current achievements of the sample of countries shown in table 1 (i.e without factoring the potential of eventual further success in cost reduction efforts). Based on this very simple hypothesis, the financial need to build the world wide 2015 EFA required classrooms may be about US$19.7 billion for the new additional classrooms and US$52 billion to replace these which life will exceed 25 years (which is the life-span hypothesis used in table 8). In other words, during the coming 13 years, maintaining the world classroom stock by replacing over-aged classrooms will cost 2.6 times the cost of new additional classrooms. Again, regional differences are huge: on the one hand, the main cost of new classrooms will be in Africa, which needs 69% of the resources for new classrooms, -- but only 30% of total resources when classroom replacement is taken into account. On the other hand the main cost for classroom replacement will be in East Asia (38% of the total), followed by Latin America (22% of total).

Table 9 : Estimated classroom construction costs until 2015 -- new and replacement (based on current costs in US$)

	Primary new clsrms to be built until 2015 (1) *(million)*	Total primary clsrms to be re-built until 2015 (2) *(million)*	Total clsrms to be built until 2015 (3)=(1)+(2) *(million)*	Estimated average unit cost per clrsm in 2000 (4) *(US$)*	Total cost of primary new clsrm to be built until 2015 (5)=(1)*(4) *(US$ million)*	Total cost of primary clsrms to be replaced until 2015 (6)=(2)*(4) *(US$ million)*	Total cost of primary clsrms to be built until 2015 (7)=(1)+(2) *(US$ million)*
Latin America	0.2	1.4	1.5	8,140	1,256	11,229	12,484
Sub-Saharan Africa	2.0	1.2	3.2	6,740	13,547	7,791	21,339
Midlle East North Africa	0.3	0.6	0.9	6,740	2,039	4,125	6,164
South Asia	1.4	2.4	3.8	3,830	5,220	9,228	14,448
East Asia	(0.5)	3.8	3.4	5,120	(2,414)	19,695	17,281
Total	3.4	9.4	12.8		19,649	52,067	71,716

Note (1) From table 5, (2) From table 5, (4) Based on averages from above Table 1.

Maintenance

3.3. **A Rough Estimation of Maintenance Costs**. Since we have an idea of the number of classrooms to be built or re-built, and a rough idea of their unit cost for construction, yearly maintenance costs can be evaluated on the basis of a ratio between 1% and 2% of the capital to be maintained, ratio commonly used in developed countries. The table 10 below has been built on a maintenance ratio of 1,5% of the capital cost**.** This exercise sheds light on the importance of maintenance needs which are, generally, just forgotten. On the basis of the above-mentioned set of hypotheses, the world-wide cost to maintain existing primary classroom stock (without other facilities like furniture, latrines, wells, offices and storage, etc.) may be about the equivalent of US$ 1,15 billion per year. This number will rise to more than US$1.4 billion in 2015. Sub-Saharan Africa would need to mobilize more than US$172 million each year to keep their existing classrooms stock in good condition, and would need to double these resources by 2015. The situation is more stable for countries in other regions since they will not need to expand the number of classrooms. In East Asia, maintenance needs will decrease along with child enrollment. Again, Africa faces tremendous maintenance challenges, which will be far more difficult than any other region in the world.

Table 10 : An estimation of maintenance costs for existing and future classrooms (in current US$)

	Estimated number of clsrms in existing schools in 1998 (1) (million)	Total primary new clsrms to be built from now to 2015 (2) *(million)*	Total clsrms to be built until 2015 (3)=(1)+(2) *(million)*	Estimated average construct unit cost per clrsm (4) *(US$)*	Estimated average yearly maintenance cost per clsrm (5)=(1,5%)*(4) *(US$)*	Yearly maintenance cost of existing 1998 clsrms (6)=(1)*(4) *(US$ million)*	Yearly maintenance cost of new clsrms to be built between now and 2015 (7)=(3)*(4) *(US$ million)*	Yearly maintenance cost of total clasrms in 2015 (8)=(6)+(7) (US$ million)
Latin America	2.0	0.2	2.2	8,140	122	248	19	267
Sub-Saharan Africa	1.7	2.0	3.7	6,740	101	172	203	375
Midlle East North Africa	0.9	0.3	1.2	6,740	101	91	31	122
South Asia	3.5	1.4	4.9	3,830	57	204	78	282
East Asia	5.7	(0.5)	5.2	5,120	77	434	(36)	398
Total	13.8	3.4	17.2	6,114	92	1,149	295	1,443

(1) = Table 8, column 3; (2) = Table 9 column 1; (4) = Table 9 column 4.

IV. Potential for developing countries to align their investments with emerging best practice.

4.1. **The long term sectoral programs**. In 1995, many countries embarked on long-term sectoral approaches for education, supported by an Education Policy Letter defining long term goals. In Africa, for example, countries such as Senegal, Mali, Niger, Guinea, Mauritania, Chad, Gambia, have a long term plan, (10 to 12 years), with the goal of universal primary enrollment. Most of these plans (except Chad) have a credible financing plan to support construction needs during the first years, often through combination of a large array of donors working complementarily under Government's coordination. This is the case in Senegal, Guinea and Mauritania. The long term funding requires either that the present group of donors maintains its support or that the withdrawal of one be automatically compensated by the increase of another. These approaches have made predictable the financing of the EFA strategy and help countries focusing more on implementation than on fund raising. Donor coordination by Government under the sectoral approach helps providing to all donors transparent information about progress of implementation of all individual donor contribution, preventing double financing of same school or lack of funding of others.

4.2. **The phased approach**. Governments have divided an increasing number of the sectoral programs in education into 2-4 phases of 3-5 years each with intermediate sets of performance indicators. The following results are expected: (i) the phased approach allows the country to use new WB financial instrument called the Adaptable Program Lending (APL) which secures a long-term financial commitment through a series of credits, easing other donors' medium or long-term financial planning; (ii) when donors support different strategies – such as classroom construction in Guinea, it provides for periodical momentum, at the end of each phase, to jointly assess the relative performances of each individual strategy and, drawing lessons from experience, improve harmonization of donor support. In our example of the Education For All Program in Guinea, all donors involved in construction committed, at least informally, to accept a common set of criteria for monitoring and evaluation the national construction program; (iii) it helps test a new approach during the first phase, such as the community-based approach for school construction in Guinea, with the goal to expand it in the second phase if the test proves being more cost efficient than the current approach (the WB-financed approach for school construction is through local NGOs contracted by CMAs).

4.3. **The Civil Society Involvement**. Education programs now integrate community participation at all stages of the delivery of educational services. Construction is a good way for communities to get involved. Communities may not have been prepared in the past for duties such as fund management and procurement. However, community-based approaches for school construction have synergetic influences in other areas of community life, specifically in the field of education. The Malian GRIP project is an example. The new Community Demand-Driven (CDD) projects are in line with the positive experiences of the school construction. Examples are the Education Project III-V in Mauritania, the GRIP project in Mali, the sub-continental-wide experience of successive DPEPs in India, or the multiple community-based Social-Funds in Latin America.

4.4. **The HPIC initiative**. The relief of external debt and the commitment of concerned Governments to inject the equivalent amount of resources in social sectors, mainly Education and Health, fundamentally changes the financial panorama of the sectors in these countries. The HPIC initiative provides to the concerned countries. Resources, that were unexpected are henceforth available and may pay for expenditures that were never correctly budgeted in past history, such as school building maintenance, furniture maintenance and regular replacement, textbooks at a correct ratio of one per student in each of the core subject. It is essential to take the advantage of the HPIC initiative to build in stone countries' commitment to finance maintenance at its correct level. This should be a condition for donor's investment support.

V. Cross-cutting linkages

5.1. **Students learning outcomes**. Improving education indicators certainly depends more on the quality of teaching than on the quality of the buildings. Nevertheless, increasing the number of classroom, if appropriately located, may decrease the number of overcrowded classrooms, and of buildings in bad conditions, improving learning conditions. The community-based demand-driven approach for classroom construction can help determine the true need for education.

5.2. **Movement towards lower secondary education**. In countries where primary education is close to universal, donor support should gradually support lower secondary education, while consolidating progress towards universal quality primary education. As in the long term, lower secondary is also destined to be universal, strategies to expand lower secondary should shift to much more cost-efficient solutions than the present concept which considers lower secondary as the antechamber for upper secondary which is, in turn, the antechamber for higher education. The new paradigm shift links lower secondary more to primary – constituting the 9/10-year basic education – than to upper secondary. Cost efficient solution include a new concept of "neighboring college" (*petit college de proximité*) with the following characteristics: (a) size of school small enough to be close to housing – to prevent girls drop out, (b) polyvalent teachers to allow small size of school, (b) modest architectural and construction standards to make full coverage affordable to countries -- in addition to universal primary education.

VI. Lessons Learned

6.1. **Demand-driven approaches are more efficient than supply-driven ones**. This well-known lesson is largely confirmed by Social Funds (generally not community-based), which have proven that schools may be built faster, but will not necessarily be cheaper.

6.2. **Community-based approaches are cost-effective**. This is the main focus of this review. Whether classrooms are financed by the Ministry of Education, Local Governments, or Social Funds, the most cost-effective implementation is community-based. Community-based approaches are also demand-driven, although not all demand-driven approaches are community-based. Communities gain ownership through their participation in implementation, resulting in the cheapest construction costs. This is illustrated by the 12-year Education III-V Project in Mauritania, the GRIP project in Mali, the 10-years Indian DPEPs, and several other projects.

6.3. **Savings through bulk procurement are illusion**. Bulk procurement by central agencies is not as cost effective as transferring procurement responsibilities to the communities.

6.4. **Well-defined partnerships are the key to success.** A clear delineation of duties and responsibilities of all partners in a community-based project is vital to its success. Well-defined Manual of Procedures, jointly developed with the interested partners, are recognized (by partners themselves) as key elements for successful implementation (Education III-V in Mauritania, GRID in Mali) [179].

6.5. **Need for simplified procurement procedures to match the need to work with communities**. Most current standard procedures still date from an era when classroom construction was a highly centralized process. The recent change in the WB procurement guidelines for projects with community involvement provides room but little guidance. Building communities' capacity to take control of their own development, also requires building their procurement capacities, in a way that matches their interests and capacity.

6.6. **Focus on local capacity and techniques**. Regardless the implementing agency and arrangements, successful projects for primary school construction are based the use of local techniques known by local builders and improvements that they can implement. Architectural design and technical concept should fit the vision of communities rather than these of technical assistance. More than two decades of unsuccessful experiments using external models have been justified by the use of local materials and "appropriate" technology, but they are not replicable.

6.7. **Social Funds and Contract Management Agencies are efficient**. They are excellent mechanisms to quickly build the desired number of schools. This approach has proven being more cost-efficient than procurement by administrations such as MoEs, and reveals being less cost-efficient compared to community-based approaches. Social Funds have proven being able to reach the poor and to provide classrooms that are staffed by MoEs and used by communities.

6.8. **Focus on maintenance through new approaches**. Approaches relying on the communities alone have not provided adequate results since cost of effective maintenance are out of communities' capacities. Promising approaches are based still based on communities' involvement henceforth combined with complementing communities' contribution with the transfer to them of a minimum package of resources tailored and earmarked for maintenance. For highly indebted counties the debt relief initiative is a unique opportunity, with the new available funds, to create mechanism to inject adequate resources in the system for school maintenance.

6.9. **Support sectoral long-term approaches with improved donor coordination**. Countries' long-term education plans design a clear road map towards EFA and are key frameworks to successfully implement policies for achieving EFA. Donor coordination is important to synergize the various donor strategies into one country strategy.

6.10. **Need to focus on capacity-building in Monitoring and Evaluation** (M&E). Learning by doing is one of the more important ways for countries to take control of their futures. This paper showed that most countries are strong on "doing" but low on "learning." MoEs are not equipped to learn from their own experiences, since their M&E capacity is weak, and sometimes non-existent. For the same reason, donors learn little from the projects they support. Harmonizing simultaneous multiple donor-oriented approaches for school construction requires effective monitoring and evaluation.

VII. MAURITANIA: Education Sector Development Program Case Study (excerpt from PAD)

7.1. The Community Approach - Background

Status prior to the Education II Project (Before 1989). In the 1980s, the primary education system expanded at the rate of about 175 classrooms each year, of which half was built under the authority of the Ministry for Equipment and Transport (MET). The other half was built by grassroots communities without government intervention. All new classrooms in 1986 and 1987 were built by communities. Classrooms built by the MET followed standard plans. Construction was awarded to building contractors from the modern sector on the basis of National Competitive Bidding (NCB) procedures, and cost per classroom amounted to UM 1.25 million, equivalent to $17,000 [180], or UM 25,000 per square meter, equivalent to US$342 [181]. Classrooms built by communities were smaller (15 to 25 sq. meters), hardly functional, had a short life span (4-5 years) due to the use of non-permanent materials (walls in earth-bricks and roof in earth on palm tree trunks) and were poorly laid out. The construction of such non-standard classrooms required an average community investment (labor, kind or money) averaging UM 165,000, equivalent to US$2,250 [182]. At the same time, BREDA, the Regional UNESCO Office, was experimenting with the use of local materials for classroom construction in Mauritania and other Sahelian countries, estimating that the use of plaster (made with gypsum) in classroom construction could bring the cost down to about US$8,000 [183].

Education III Project Initial Strategy (1989). The project's initial strategy included testing an approach based on: (i) use of local materials in order to take advantage of local initiatives and skills, (ii) community training using volunteers, (iii) contributions from the community assessed at 50% of total classroom cost, then an estimated UM 600,000/classroom, equivalent to $US8,300 [184], and (iv) a pilot test phase limited to 250 classrooms over 5 years, or 50 classrooms/year.

Education III Project Actual Strategy (1990-95). The actual strategy implemented starting 1990 was to transfer responsibility for classroom construction to the communities. The rationale for this strategy was as follows. If communities were to maintain their contributions at least at pre-project levels, it was essential that community ownership remain strong with or without the project. This in turn implied that: (i) communities would become fully responsible for construction, as was the case when they built classrooms using their own resources; as a corollary the Ministry of Education would devolve to communities the management of Government's 50% cofinancing; (ii) building decisions would be left to the communities, with the result that the construction program would be demand-driven; (iii) a standard design would be simple enough (no veranda and no ceiling) to prevent resistance by poor communities to the financing of an architectural model making use of elements deemed non-essential--which communities did not use for their own habitat, and to limit the cost of its construction to no more than two times the average community investment prior to the project; (iv) building technologies familiar to communities and informal sector artisans would be used--which in turn required that the idea of using "local material" was abandoned; (v) a project financing system was needed that would be transparent, easily understood by communities, and that would make it difficult to misuse funds; (vi) communities would be supported with technical assistance. To provide such technical assistance, the project recruited highly skilled national experts to replace the originally planned technical assistance volunteers. As a result, many technical, administrative and social issues, which expatriate experts could not have properly managed, were successfully addressed on the ground [185].

Institutional Arrangements between the Project and the Communities. Communities submit their subprojects for classroom construction using a standard cofinancing request form widely disseminated by the project. Subprojects are approved by the MEN on the basis of eligibility criteria including: (i) conformity with the school map, standard plans and technical specifications, and (ii) community commitment to build according to standard design and specifications and receive payment of the Government's subsidy, by *tranches*, at the end of each of the four phases of the work, as a partial reimbursement of the construction cost (50% at project beginning). Once requests are approved, communities sign a cofinancing agreement that determines the amount of each tranche of the subsidy. Construction work is carried out under the responsibility of the communities, which are also responsible for the procurement of material, and contracting to an enterprise or specialized workers. Work performance is monitored by one of the project's "mobile teams" under the supervision of engineer. The latter will also provide communities with technical advice, and help them use sound procurement practices. He will certify the conformity of works with the plans and specifications, which will constitute authorization of payment of the tranche of the subsidy. The project has put in place 3 "mobile teams", each one comprising a civil engineer and an assistant recruited from the private sector on a competitive basis.

Education III Project Outcomes (1996). Technical and architectural options used in the course of this project lowered classroom construction costs from UM 460,000 in 1991 to UM 792,500 in 1995 (average national cost [186]) equivalent to US$5,600 in 1991 and US$6,100 in 1995 [187]. The community-based approach was so successful that IDA funds were fully disbursed in 3 years instead of 5 and that 408 classrooms were built with these funds instead of 250. With CFD agreement, Government decided in 1993 to allocate counterpart funds from the French Structural Adjustment Grant to the project [188]. The latter then built additional 534 classrooms, bringing the total to 942 instead of the 250 originally planned. Up to 1993, communities had cofinanced 50% of the estimated value, however after the 1994 devaluation, it became increasingly difficult for rural communities to maintain this level of cofinancing and the level of subsidy was brought up to 75% in rural areas (where 75% of the subsidized classrooms were located). By the end of the project, communities had cofinanced 38% of the total cost of the 942 classrooms. The cost of supervision by the 3 "mobile teams" and management overhead accounted for 15% of construction cost. Simultaneously GER increased from 38% in 1988-89 to 78% in 1994-95.

Education V Project (1996-2001). This project had estimated that 2,620 classrooms would be needed to reach a 100% enrollment rate by 1999 (slightly more than 500 classrooms per year). Under IDA financing, 1,430 classrooms were planned in 7 regions considered as disadvantaged in terms of education. Other donors, such as the CFD [189], would finance an additional 1,190 classrooms. The projects have planned to have AMEXTIPE to be the executing agency in Nouakchott and have communities be responsible for construction in rural areas along organizational arrangements similar to Education III, with a countrywide uniform level of subsidy of 70% (for urban and rural classrooms). The standard plan for classrooms as well as the manual of procedures of the previous project were maintained, and the "mobile teams", under the supervision of regional technical co-coordinators (RTC), continued to provide communities with the same support and carry out identical works supervision, with a revised contract in which 30% of their fees were linked to the productivity of the 'mobile team'.

Education V Project Outcomes (2001). In July 2001, because of the devaluation of the national currency, the project had supported, under IDA financing, the building of 2,237 classrooms instead of the 1,430 originally planned, and under CFD financing, 417 classrooms; the total of 2,654 classrooms being built by communities with the technical support and under control of the "mobile teams". By July 2001, more than 1500 classrooms under IDA and 400 under CFD were completed, with the remaining classrooms to be completed before December 31 2001. Upon completion of the planned classrooms still to be built, communities will have built a total of more than 3,500 classrooms in 10 years. In 1999, construction costs were as follows: (a) construction cost in Nouakchott including community contribution: UM699,000 equivalent to US $3,330 [190]. With an average distance-coefficient of 38% for classrooms nation-wide, the average cost of a classroom built under the program is UM965,000, equivalent to US$4,600 (current), or cost per square meter *h.o.* of UM17,800, equivalent to US$85 per sq. meter, of which communities contribute 30%. The level of the costs of supervision by the "mobile teams" remains at 15% of the construction cost.

Table 7. Planned Vs Actual Community-built constructions

Years	IDA III		CFD I, II et III		IDA V		CFD IV		Total	
	Planned	Actual	Planned	Actual	Planned	Actual	Planned	Actual	Planned	Actual
1990	8	0							8	0
1991	99	63							99	63
1992	281	59							281	59
1993	28	202	444	66					472	268
1994		43	147	124					147	167
1995		13		162	182	0	417	0	599	175
1996		9		66	1080	71		149	1080	295
1997		6		58		692		163	0	919
1998		3		27		328		38	0	396
1999		4		10		51		25	0	90
2000		0		7	975	90		16	975	90
2001		6		14		20		4	0	44
subtotal	416		591		2,237		417		3661	
Cancelled	8		57		0		22		87	
Total	408	408	534	534	2237	1252	395	395	3574	2,566

Source : RTC reports

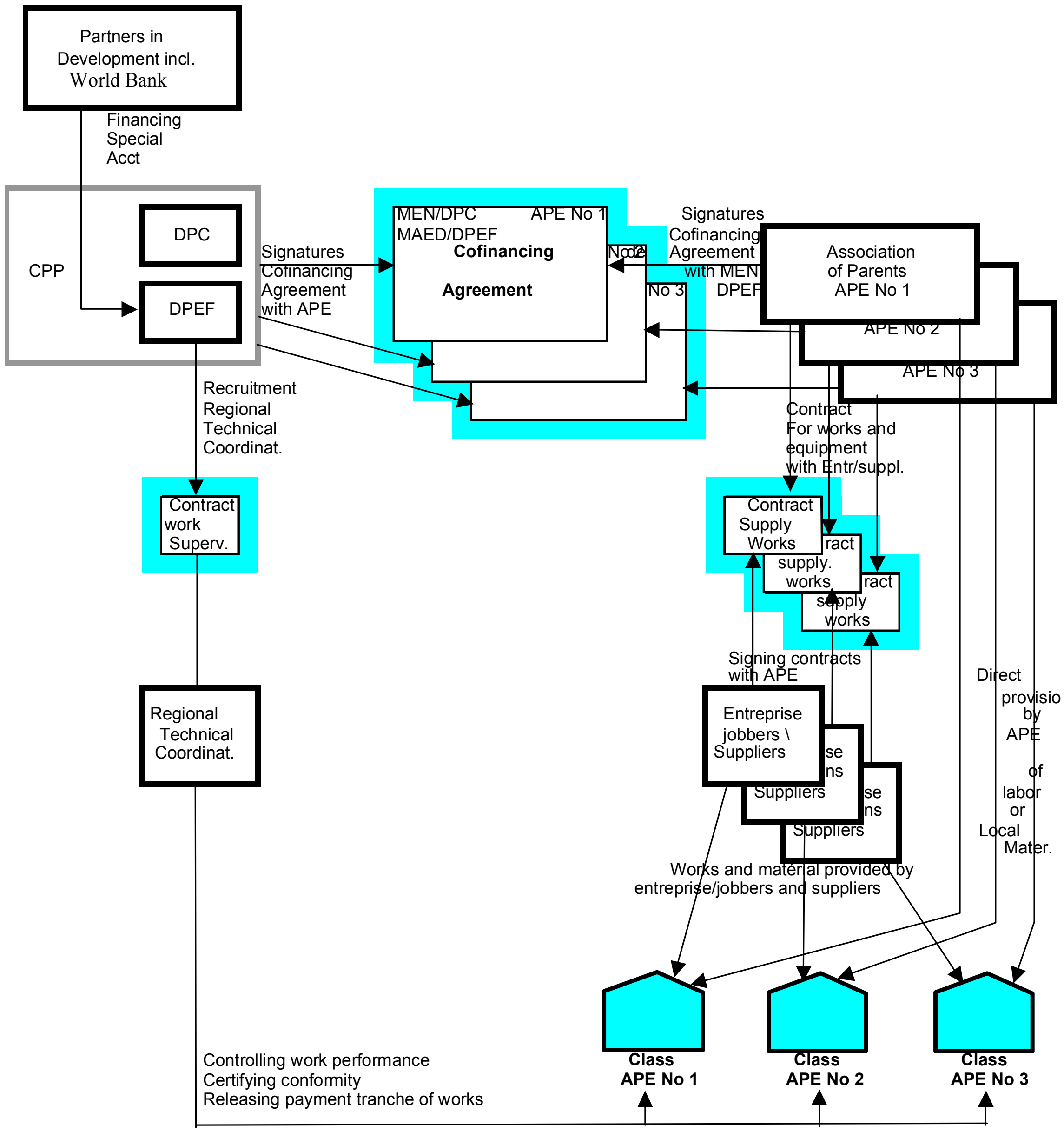
According to the technical audit of the construction program under the Education V project [191], 95% of constructions are rated "Good" and "Satisfactory" on the basis of a standard 25 years durability criterion; 4% are rated "Poor" and 1% "Bad", requiring a complementary program. After comparing costs of construction by communities and by AMEXTIPE at the same location (Selibaby), the audit concludes that classrooms built by AMEXTIPE are 3 times more expensive than those built by communities: UM 3,348,000 for AMEXTIPE [192] against UM 1,135,000 for communities [193].

7.2. PNDSE (2001-2006) Phase 1

Strategy. The strategy is similar to that of prior projects: communities have been given the responsibility of implementing their classroom construction and equipment subproject, which is cofinanced by the Government under terms and conditions defined in a cofinancing agreement signed by all eligible communities and the DPEF. Eligibility and priority criteria have been revised to give higher priority to incomplete schools aiming at developing a complete school by combining classroom construction and multigrade teaching. Priority will be given to communities promoting a complete 6-level, 3-classroom school. The community support program for school construction will be broadened to include: (i) construction of headmaster's office and storage facilities, (ii) construction of latrines, (iii) classroom furniture and (iv) wire mesh fencing in rural areas and permanent fencing in urban areas. The level of subsidy for classroom construction remains at 70% as in the past, and at 100% for the new complementary facilities. The manual of procedures has been adjusted accordingly and will be finalized by credit effectiveness. The revised manual will spell out the specific procedures communities should follow for material procurement, recruitment of specialized labor or contracting with local enterprises. These procedures reflect Bank's experience in community procurement in other countries and other projects such as social funds. The Program organization is illustrated in the diagram hereafter.

Estimated cost. In July 2001, the nationwide average cost of a classroom was estimated at UM1,215,000 (including a 30% community contribution), equivalent to US$4,730. The reference cost of a classroom in Nouakchott is UM880,000, equivalent to US$3,425, excluding complementary facilities.

Diagram 1: Contracting school construction in the program



Serge Theunynck

- Washington, March 28, 2002

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[1] WB-financed Primary Education Project (Education II), Loan 2465-PE, SAR, Report No 4487-d-PE.

[2] WB-financed Primary Education Project (Education II), Loan 2465-PE, PCR, Report No 12561.

[3] WB, Social Infrastructure Construction in the Sahel, Options for Improving Current Practices, Bernard Abeillé and Jean-Marie Lantran. p. ix.

[4] Sources of information: (i) Bangladesh: unit cost US$3,900 cited in WB-financed Primary Education Development Project, PAD, Report No 14271, p. 15; (ii) China 1997, unit cost US$2,450, this classroom unit cost is calculated on the basis square meter unit cost cited in WB-financed Fourth Basic Education Project, PAD, Report No 16367, p. 26, and classroom area estimated equal to the Asian average of table 3 of the present document; (iii) India 2001: unit cost US$3,100 cited in WB-financed Rajasthan Second District Education Project, PAD, Report 21955, pp. 51, 56; (iv) Pakistan 1987, unit cost US$4,500 achieved during WB-financed Fourth Education V project (4 Provinces of Punjab, Baluchistan, Sind and NWPF), Credit 892-PAK, ICR, Report No 6827 (average cost all 4 provinces); (v) Philippines 1996: unit cost US$10,400 cited in WB-financed Third Elementary Education Project, SAR, p. 31; (vi) Vietnam 2000: unit cost US$2,500 cited in Primary Education Project, Credit 2548-VN, SAR, Report 12203, p. 25 (average).

[5] Sources of information: (i) Chad: unit cost US$6,300 achieved during WB-financed Education V Project, cited in WB-financed Education Reform Project, PAD in preparation, Annex on construction; (ii) Guinea: unit cost US$7,500 achieved during the WB-financed Education Sector Support Project (PASE II), third phase, cited in WB-financed Education For All Project 1, Annex on construction; (iii) Mauritania, unit cost US$4,700 achieved during WB-financed Education V project, cited in WB-financed Education Sector Reform Project, PAD, Report No 203529-MAU, Annex on construction; (iv) Senegal: unit cost US$6,400 achieved during WB-financed Human Resources Development Project (PDRH2), cited in Education For All Project, PAD, Report No 19610-SE), Annex on constructions; (v) Zambia, unit cost US$8,800 achived during WB-financed Social Recovery Project, cited in Zambia Primary School Infrastructure Study, Final Report, Group 5.

[6] Sources of information: (i) Brazil: unit cost US$8,200 (average) cited in WB-financed Second Northeast Basic Education Project, Loan 3604-BR, ICR, Report No 111298, p. 84-89; (ii) Columbia: unit cost US$4,700 cited in WB-financed Second Subsector Project for Primary Education, Loan 3010-CO, ICR, Report No 18750, p. 20 and SAR, Report 7265, pp. 14, 55; (iii) Honduras, unit cost US$9,000 (civil works financed by KfW), cited in WB-financed Basic Education Project, PAD, Report No 13791, p. 81; (iv) Mexico: unit cost US$10,000 cited in WB-financed Basic Education Development Project, PAD, Report No 17535, p. 56; (v) Nicaragua: unit cost US$8,800 cited in WB-financed Basic Education Project, Credits IDA 26890 and 26901, SAR, Report No 13705, Annex 20.

[7] Teacher salaries are derived from: Achieving Education for All by 2015: Simulations Results for 47 Low-Income Countries, pp. 17-18, Alain Maingat and Barbara Burns, March 2002; except for Philippines: figures are calculated using data from WB-financed Third Elementary Education Project, SAR, Report No 15888-PH, p. 46 and 59.

[8] Based on the following formula: $AC = ACS.k \, . \, (1+k)^n / [(1+k)^n - 1]$.with: AC = Annualized cost of capital; ACS = Initial spending; k = Opportunity cost of capital 5%; and n =Life of use of capital: 25 years.

[9] Annual cost per student (recurrent) is derived from Achieving Education for All by 2015: Simulations Results for 47 Low-Income Countries, pp. 17-18, Alain Maingat and Barbara Burns, March 2002, except for Philippines' unit cost which is extracted from WB-financed Third Elementary Education Project, SAR, Report No 15888-PH, p. 59.

[10] Sources of information: (i) Guinea 1989: unit cost US$13,450 cited in WB-financed Education For All Project 1, Annex on construction,300; (ii) Mauritania 1984, unit cost US$17,000 cited in WB-financed Education Sector Reform Project, PAD, Report No 203529-MAU, Annex on construction; (iii) Senegal 1982: unit cost US$13,200 cited in Education For All Project, PAD, Report No 19610-SE), Annex on constructions.

[11] Sources of information: (i) Bangladesh 1980: unit cost US$2,700 cited in WB-financed Fourth Education Project, SAR, Report No 2954; (ii) India 1993: unit cost US$3,700 cited in WB-financed Utta Pradesh Basic Education Project, SAR, Report 11746; (iii) Pakistan, Province of NWFP: 1987, unit cost US$8,700 achieved during WB-financed Fourth Education V project (Provinces of Punjab, Baluchistan, Sind and NWPF), Credit 892-PAK, ICR, Report No 6827; (iv) Pakistan, Province of NWFP: 2001, unit coast US$6,800 , calculated from WB-financed Noth-West Frontier Province Primary Education Project, PAD, p. 17.

[12] Sources of information: (i) Brazil 1989: unit cost US$6,000 cited in WB-financed Northeast Basic Education Project, Loan 1867-BR, PCR, Report No 8266; (ii) Honduras 1987, unit cost US$5,500, cited in WB-financed Rural Primary

Education Project, Loan No 2804-HO, SAR, Report No 6609, p. 33; (iii) Mexico 1991: unit cost US$16,000 cited in WB-financed Primary Education Project, Loan No 3407-ME, SAR.

[13] Guinea. Education For All Program, PAD, Report No 20405-GUI, p. 22.

[14] Mauritania, Education Sector Development Program, 2001-2005, PAD, Report No 22529, Annex on constructions.

[15] Chad, Education Sector Reform Project, on-going PAD, Annex on construction.

[16] Second Primary Education Project, PAD, Report No 5362-BD, p. 3.

[17] Pakistan, Primary Education Project, Credit 892-PAK, SAR, Report No 2307-PAK, 1979, p. 12.

[18] Pakistan, Third Primary Education Project, Credit 1821-PAK, SAR, Report No 6492-PAK, 1987, p. 5.

[19] Pakistan, Balochistan Primary Education Program, SAR, Report No 11403-PAK, 1993, p. 4.

[20] Vietnam, Primary Education Project (1993-2001), Cr. 2548-VN. SAR, Report No 12203, p. 6.

[21] Gambia: Guinea: Mali: Mauritania: Senegal

[22] 2,750 Government-financed classrooms out of a total of 6,000. Senegal, WB-financed Quality Education For All Program, PAD, Report 19610-SE, p. 116

[23] Chad, WB-financed Education Sector Reform Project, on-going draft PAD, Annex on School Construction

[24] India, Second District Primary Education Project, PAD, Report No 15496-IN, pp. 4, 24.

[25] India, District Primary Education Project, PAD, Report No 13072-IN, p. 46.

[26] India, Third District Primary Education Project (1997-2003): 9,100 classrooms (PAD, Report No 17102-IN, Annex 6, p. 1), Uttar Pradesh Basic Education Project (1993-2000): 3,400 classrooms (ICR, Report 21754, pp. 8, 25), Uttar Pradesh Second Basic Education Project (1997-2001): 13,000 (PAD, Report 17103-IN, p.2), Uttar Pradesh Third Basic Education Project (1999-2006): 12.300 (PAD, Report No 19822-IN, p.38), Rajasthan District Primary Education Project (1999-2004): 3,400 (PAD, Report No 18934-IN, Annex 6, p.1), Rajasthan Second District Primary Education Project (2001-2006): 3,300 (PAD, Report No 21955-IN, p. 56).

[27] Bangladesh, General Education Project, SAR, Report No 2118-BD, p. 8.

[28] Bangladesh, Primary Education Development Project (1998-2004), PAD, Report No 17271-BD, Annex 6, p. 1.

[29] Vietnam, Primary Education Project (1993-2001), PAD, Report No 2548-VN, p. 13.

[30] Colombia, Second Subsector Project for Primary Education (LN 3010-CO), SAR, 1988, p. 55.

[31] Mexico, Primary Education Project (LN 3407-ME), SAR, 1991, Report No 9770-ME, p. 8.

[32] 2,124 new classrooms in the Primary Education Project for 4 States (LN 3407-ME), SAR, 1991, Report No 9770-ME, p. 20, and 6,900 classrooms in the Second Primary Education Project, SAR, 1994, Report No 12529-ME, p. 23.

[33] Mainly due to the world wide influence of the Egyptian Architect Hassan Fathy's book: "*Building with the people*", and Schumpeters' one: "*small is beautiful*".

[34] The price of petrol tripled between 1979 and 1982, boosting the price of cement.

[35] The UN Commission for Human Settlements of 1988 considers that the promotion of local materials is the first priority for the World Stratey for Housing towards 2000.

[36] Such as the *Centre des Technologies Appropriées* created in Mali in 1979.

[37] Such as the University of Grenoble (France) through the institution CRATERRE which supported research in Burkina Faso.

[38] Mali-Health Project 1987.

[39] In Brazil, the WB-financed Education Project provided funding for testing soil-cement technology for construction of school buildings. However, because the experimental program did not yield replicable positive results, it was decided that the project schools will be built following a more traditional technology. Northeast Basic Education Project (Loan 1867-BR), PCR, p. 5, 1989.

[40] In Niger, the WB-financed Primary Education Development Project (1986-95), Cr. 1740-NIR, tested prototypes in local materials (compressed earth-bricks), with vaulted roofs that was not replicable since work was fastidious and needed skilled workers unavailable in rural areas, thus, inappropriate for large-scale program. ICR, Report No 15748, p. 10.

[41] World Bank Discussion Paper: Social Infrastructure Construction in the Sahel, Bernard Abeillé and Jean-Marie Lantran, 1993, p. 12.

[42] Serge Theunynck, "Economie de la Construction au Sahel", 1994, 947 p.

[43] Second Primary Education Project, Staff Appraisal Report, (Credit 1602-PAK)

[44] Second Elementary Education Project (Loan 3244-PH)

[45] Fourth Education Project / Primary Education Project (Cr. 892-PAK), PCR, Report No 6827, June 19, 1987, pp. 73-112

[46] Second PrimaryEducation Project (Cr. 1602-PAK), SAR, Report No 5363-PAK, May 1, 1985, p. 15.

[47] Second PrimaryEducation Project (Cr. 1602-PAK), PCR, Report No 14218-PAK, April 3, 1995, p. 13.

[48] Second PrimaryEducation Project (Cr. 1602-PAK), PCR, Report No 14218-PAK, April 3, 1995, p. 9.

[49] Preparation of the Third Elementary Education Project, Aide-Memoire, Annex Civil-Works, February-March 95

[50] Serge Theunynck, "Economie de la Construction au Sahel", 1994, 947 p.

[51] Mauritania, Education Projects III, V and VI.

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[53] Bangladesh, Primary Education Project (4th Edu Project), Cr. 892-PAK, SAR, Report No 2305, p. 30.

[54] Mauritania, Education Sector Development Program, 2001-2005, PAD, Report No 22529, Annex on constructions, Table 4.

[55] Improving Primary Education in Developing Countries, Marlaine E. Lockheed and Adrian M. Verspoor and Associates, p. 178-179.

[56] Mauritania, Education Sector Development Program, 2001-2005, PAD, Report No 22529, Annex on constructions. Chad, Education Sector Reform Project (Education VI), draft PAD.

[57] Mauritania, General Education Sector Project (Education V), 1995, Cr -MAU, SAR, Report No 13569, 1995

[58] Chad, Education Sector Reform Project, 2002-06, draft PAD, Annex construction.

[59] Guinea, Education Sector Adjustment Credit (Projet PASE 1), 1989-1994, Cr –2155-GUI, ICR.

[60] Guinea, Education For All Program 1, (Credit -GUI), 2001-2005, PAD, p. 43.

[61] India, Uttar Pradesh Basic Education Project, Cr. 25090-IN, SAR, Report 11746-IN, p. 14.

[62] India, Rajasthan Second District Primary Education Project (2001-2006), PAD, Report No 21955-IN, p.56.

[63] India, Rajasthan District Primary Education Project (1999-2004), PAD, Report No 18934-IN, Annex 6, p.1.

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[66] Bangladesh General Education Project, SAR, Report 8015-BD, 1990,

[67] Bangladesh, Primary Education Development Project (1998-2004), PAD, Report 17271-BD, Annex 6, p. 1.

[68] Pakistan, Sindh Primary Education Development Program, Credit 2102-PAK, SAR, Report No 8178-PAK, 1990, p. 13.

[69] Pakistan, Sindh Primary Education Development Program, Credit 2102-PAK, SAR, Report No 8178-PAK, 1990, p. 41.

[70] Pakistan, North-West Frontier Primary Education Program, SAR, Report No 13432-PAK. Feburary 1995, p. 5.

[71] Mexico, WB-financed Primary Education Project (Loan 3407-ME) 1991-97, States of Oaxac, Guerrero, Chiapas and Hidalgo. ICR, Report No 17303, p.5.

[72] Mexico, WB-financed Second Primary Education Project, SAR, 1994-99, Report No 12529-ME, p. 93.

[73] Pakistan, Sindh Primary Education Development Program, Credit 2102-PAK, SAR, Report No 8178-PAK, 1990, p. 17.

[74] International Competitive Bidding

[75] The Gambia -

[76] Bangladesh Second Primary Education Projects, Report 5362-BD, 1985)

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[78] Philippines, IDA-financed Second Elementary Education Project (SEEP), ICR

[79] Philippines, IDA-financed Third Elementary Education Project (TEEP)

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[84] Brazil, WB-financed Northeast Education Project (Loan 1867-BR) 1980-1989, PCR, Report 8266-BR), calculations from tables pages 16-17.
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[87] Zambia Primary School Infrastructure Study – Final Report, August 2000, Group 5 consulting engineers, Rotterdam.
[88] WB-financed Education Sector Project (1990-99), Cr. 2142-GM), ICR, Report No 19269, p.5.
[89] SynergyInternational / GAP Consultants, Preparation of a Nation-Wide Classroom Construction Program under the Third Education Project, MoE/PIU, September 1997, Annex 6.
[90] WB-financed Third Education Sector Project (1998-2002), PAD, Report No 17903.
[91] Bangladesh, Fourth Education Project (1980-90), SAR, Report 1054-BD.
[92] Bangladesh, Fourth Education Project (1990), PCR, Report 8355-BD.
[93] SynergyInternational / GAP Consultants, Preparation of a Nation-Wide Classroom Construction Program under the Third Education Project, MoE/PIU, September 1997, Annex 6.
[94] With the exception of Gamworks in The Gambia.
[95] Actually, 13 were created, but the Chadian, created in 1994, had a short life.
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[105] Report on Second Conference on Social Funds, June 5-7, 2000, p. 8.
[106] Report on Second Conference on Social Funds, June 5-7, 2000, p. 13.
[107] WB-EDI, Social Funds and Reaching the Poor – Experience and Future Directions, 1998, p. 46.
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[175] Au recensement de 1998, la capitale abritait 380.000 habitants alors que la Mauritanie en comptait 1.864.236.
[176] Au recensement de 2000, la capitale abritait 611.883 habitants alors que la Mauritanie en comptait 2.548.157.
[177] Pakistan, North-West Frontier Primary Education Program, Report No 13432-PAK. Feburary 1995, p. 3.
[178] Senegal, Education For All Project, PAD, Report No 19610-SE, Annex on constructions.
[179] This is also a key lesson of the Primary Education Project in Solomon Islands where in the earlu 1980s, with a community-based approach, twice as many classrooms wer built as originally has been foreseen.
[180] Education Sector Restructuring Project – Staff Appraisal Report, Report No 7213-MAU, June 28, 1988, page 54.
[181] Taux de change Juin 1987 : 1US$ = 73,5 UM.
[182] Taux de change Juin 1987 : 1US$ = 73,5 UM.
[183] Education Sector Restructuring Project – Staff Appraisal Report, Report No 7213-MAU, June 28, 1988, page 60.
[184] Taux de change au moment de l'évaluation du projet en juin 1988 : 1US$ = 72,6 UM.
[185] Education Sector Restructuring Project – Implementation Completion Report, Report No 15739-MAU, June 4, 1996, page 10.
[186] Le coefficient d'éloignement moyen pour des constructions réparties sur tout le territoire est de 38% sur le prix de base calculé pour Nouakchott.
[187] Mauritanie – Projet d'Appui aux Collectivités pour la Construction de Salles de Classe – Couts des Constructions Scolaires, Serge Theunynck, Octobre 1999.
[188] environ 3,5 millions de dollars EU. Education Sector Restructuring Project – Implementation Completion Report, Report No 15739-MAU, p. 3. .
[189] Mauritanie – Projet d'Appui à l 'Enseignement Général (Education V), Rapport No 13569 MAU, p. 11.
[190] taux de change en 1999 : 1US$ = 210 UM.
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[192] Marché d'entreprise 2.768.000 UM ; suivi et contrôle 332.000 UM ; coût de gestion (honoraires Agence) 248.000 UM Synergy International. Rapport de mission d'audit technique du volet « construction de salles de classe », p. 7.
[193] Subvention 606.000 UM ; contribution collectivité 260.000 UM ; suivi, contrôle et gestion 139.000 UM. Synergy International. Rapport de mission d'audit technique du volet « construction de salles de classe », p. 7.