


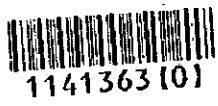
MINISTRY OF EDUCATION
THE REPUBLIC OF MOZAMBIQUE

BASIC DESIGN STUDY REPORT
ON
THE PROJECT FOR REHABILITATION
OF
THE CHIBUTUTUINE PRIMARY TEACHER TRAINING INSTITUTE
IN
THE REPUBLIC OF MOZAMBIQUE

SEPTEMBER, 1997

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JAPAN INTERNATIONAL COOPERATION AGENCY
YAMASHITA SEKKEI INC.



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PREFACE

In response to a request from the Government of the Republic of Mozambique the Government of Japan decided to conduct a basic design study on the Project for Rehabilitation of the Chibututuine Primary Teacher Training Institute and entrusted the study to the Japan International Cooperation Agency (JICA).

JICA sent to Mozambique a study team from April 7 to May 6, 1997.

The team held discussions with the officials concerned of the Government of Mozambique, and conducted a field study at the study area. After the team returned to Japan, further studies were made. Then, a mission was sent to Mozambique in order to discuss a draft basic design, and as this result, the present report was finalized.

I hope that this report will contribute to the promotion of the project and to the enhancement of friendly relations between our two countries.

I wish to express my sincere appreciation to the officials concerned of the Government of the Republic of Mozambique for their close cooperation extended to the teams.

September, 1997



Kimio Fujita
President

Japan International Cooperation Agency

September, 1997

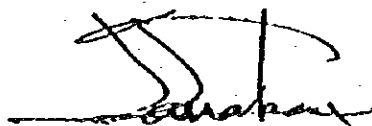
Letter of Transmittal

We are pleased to submit to you the basic design study report on the Project for Rehabilitation of the Chibututuine Primary Teacher Training Institute in the Republic of Mozambique.

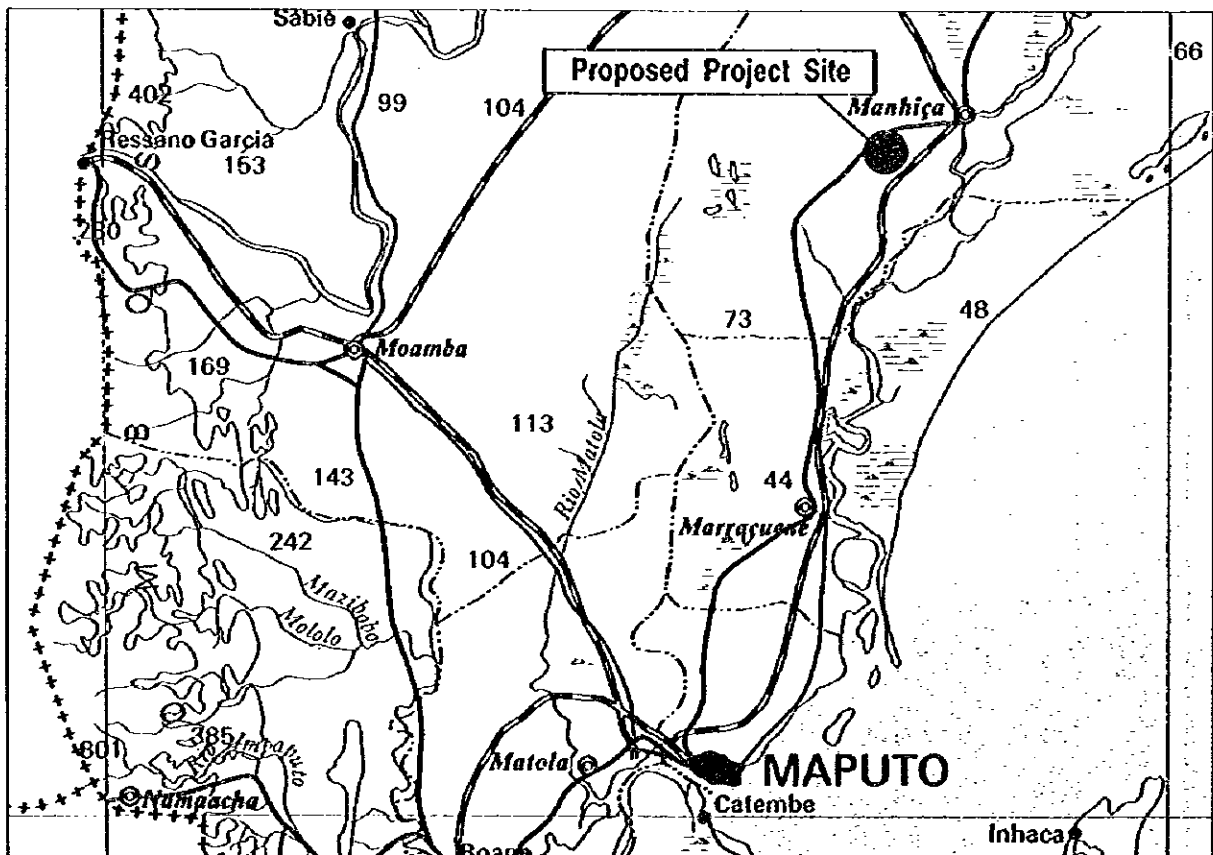
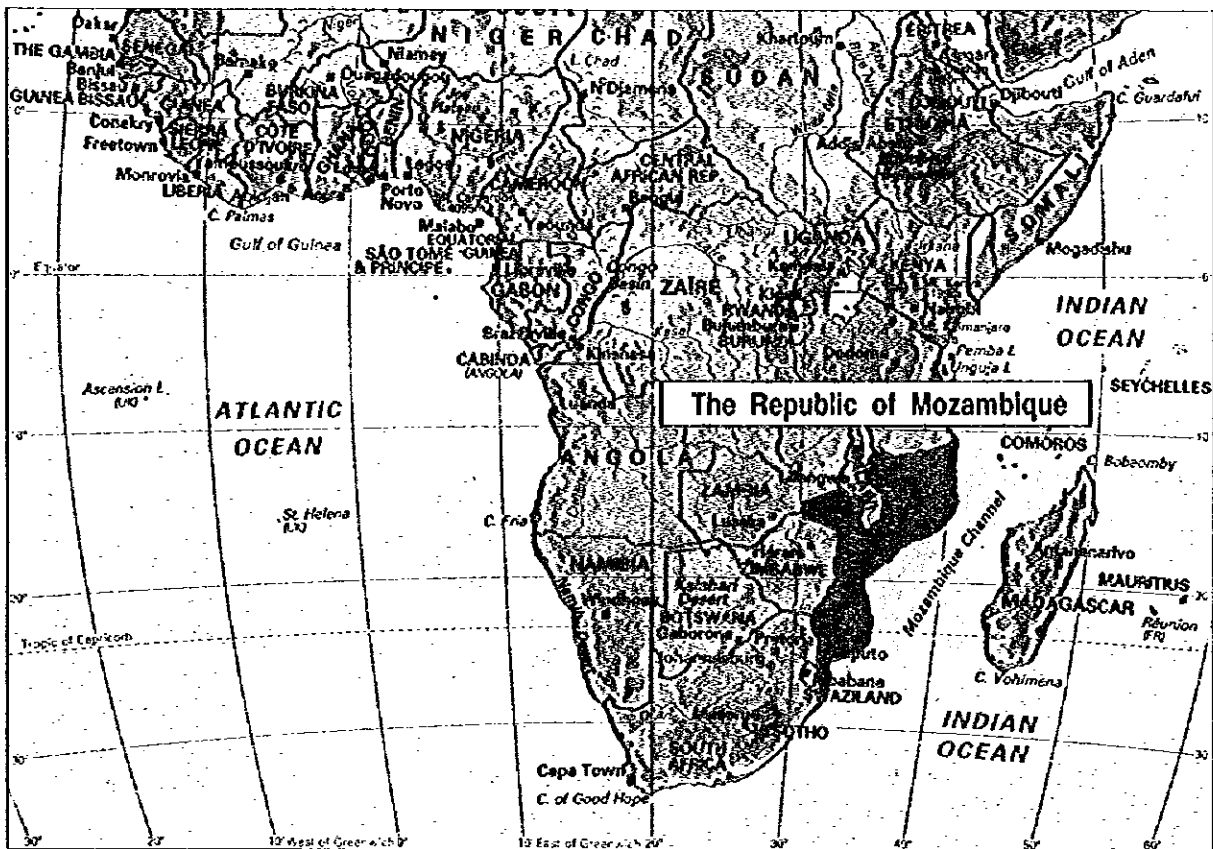
This study was conducted by Yamashita Sekkei Inc., under a contract to JICA, during the period from March 17 to September 30, 1997. In conducting the study, we have examined the feasibility and rationale of the project with due consideration to the present situation of Mozambique and formulated the most appropriate basic design for the project under Japan's grant aid scheme.

Finally, we hope that this report will contribute to further promotion of the project.

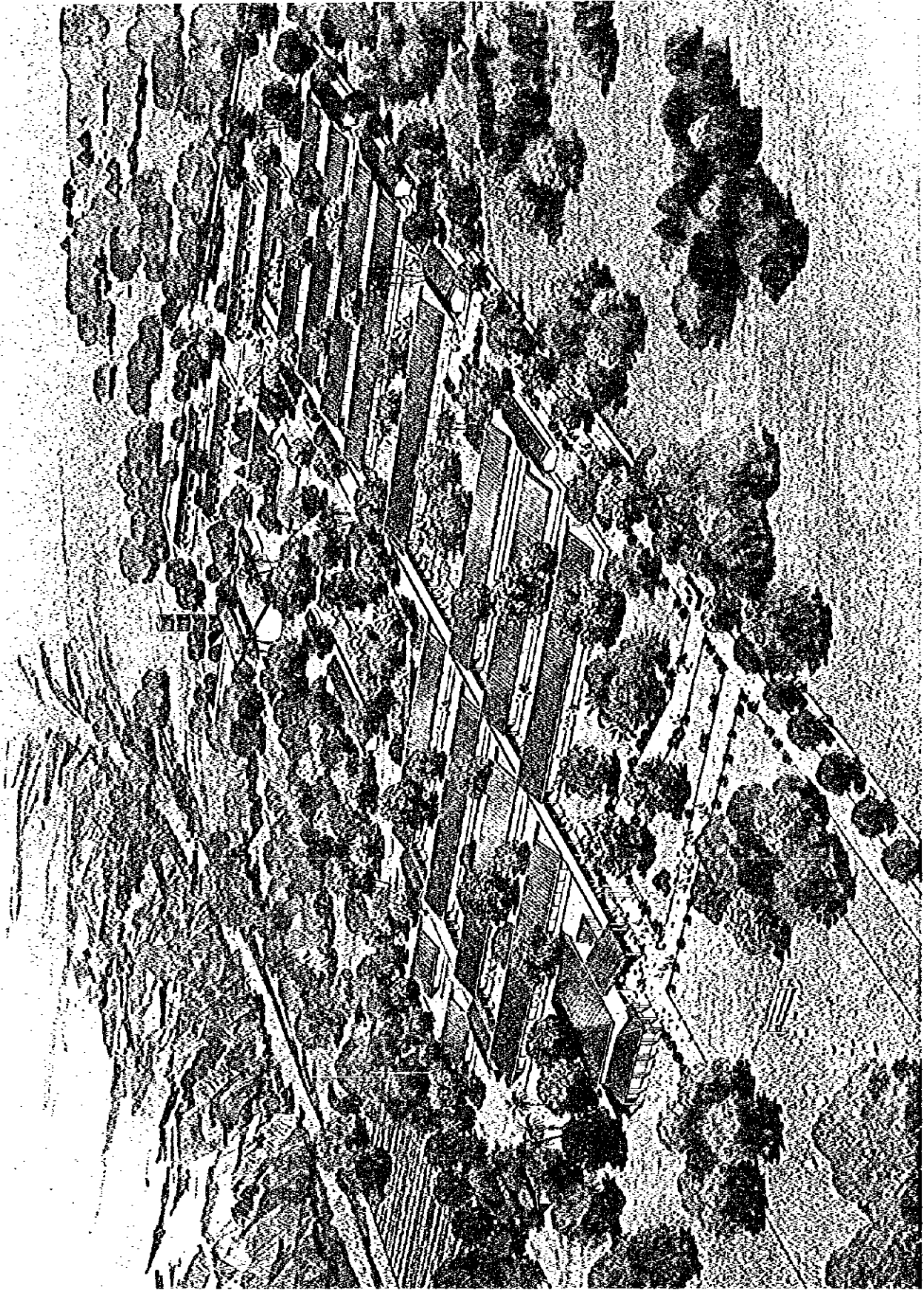
Very truly yours,



Takanori Tanaka
Project manager,
Basic design study team on the Project
for Rehabilitation of the Chibututuine
Primary Teacher Training Institute,
Yamashita Sekkei Inc.



LOCATION MAP



PERSPECTIVE

ABBREVIATIONS

CFPP	Primary Teacher Training Centre
DNEP	National Primary Education Directorate
DP	Planning Directorate
EP	Electricity of Mozambique
EP ₁	First Level Primary Education
EP ₂	Second Level Primary Education
ESG ₁	First Cycle Secondary Education
ESG ₂	Second Cycle Secondary Education
GEPE	Educational Projects Management Unit
IMP	Mid-Level Pedagogical Institute
IMAP	Primary Teacher Training Institute
IAP	Teacher Improvement Institute
TDM	Telecommunication of Mozambique
UEM	Eduardo Mondlane University
UP	Pedagogical University

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CHAPTER 1 BACKGROUND OF THE PROJECT

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1-1 Background of the Project

The Government of Mozambique has concluded that human resource development is indispensable for implementing the national development plan to maintain peace, to unify the country and to overcome poverty. Aiming at human resource development, the Government is implementing various policy measures giving top priority to "education" such as "massive access to the primary education", "quality improvement of education". This project is to be implemented with the aim of rehabilitating the Chibututuine Primary Teacher Training Institute to train schoolteachers for the primary education level, which has been closed in consequence of the civil war. Described below is the present state of primary teacher training in Mozambique, which forms the background of this project.

1-1-1 Educational Administration

(1) History of Education in Mozambique

Since 1975, when the country achieved independence from the Portuguese rule, the Government of Mozambique has been implementing various educational policies with particular emphasis on the massive access to primary education through the national literacy enhancement policy. In 1983, the country's literacy rate, which stood at only seven percent (7%) when the country became independent, increased to 34 percent, and the gross school enrollment rate increased to 83.7 percent from 47 percent. In consequence of the civil war subsequent to the independence, however, 60 percent of the country's schools were closed and the gross enrollment rate decreased to 55.9 percent in 1992. As of 1996, the number of schoolchildren attended first level primary education (EP₁) was a 50 percent increase over 1983, but the number of schools was still below the

1983 level.

The year 1983 marked the enactment of the Fundamentals of Education Act which guaranteed equal educational opportunity to the people of the country, and primary education became compulsory. However, the Act was amended in 1992 to include a revision that primary education is not compulsory.

(2) Educational System

In Mozambique, the foundation of the country's educational system was formed when the Fundamentals of Education Act was enacted in 1983. Under the law, the national educational system consists of general education, higher education, technical and professional education, adult education, and teacher training as shown below.

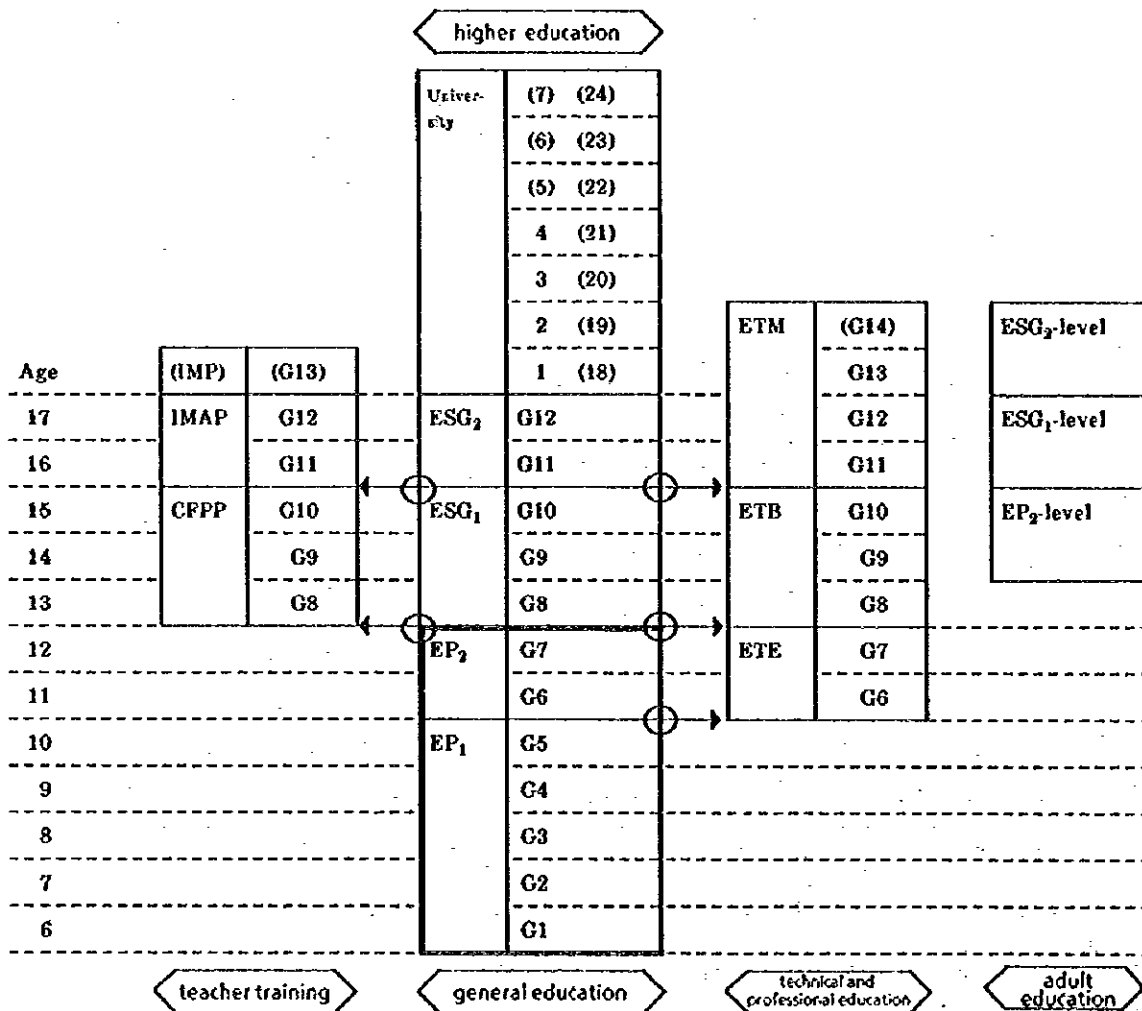


Fig. 1-1 Educational System

General education consists of seven years of primary education and five years of secondary education and is further divided into the following four categories.

① First Level Primary Education (EP₁)

This is a five-year course which age of six is standard to enter. School fee is principally free of charge. In this course, emphasis is placed on Portuguese, which is the official language of the country, as well as the rudiments of arithmetic and 20 to 25 hours of classes are given a week. In Mozambique, Bantu group languages are used widely, but there are practically no teaching materials written in these languages. For this reason, particular emphasis is given to the education in Portuguese. In this course, even the first year schoolchildren take classes using teaching materials written in Portuguese. Ministry of Education implement various education policies with a immediate target of making this course be compulsory. As of 1996, there was a total of 5,165 EP₁ schools, attended by a total of 1,573,957 pupils.

② Second Level Primary Education (EP₂)

This is two-year course which age of 11 is standard to enter. School fee is principally free of charge. In this course emphasis is placed on vocational training and preparation for the secondary education, in addition to Portugueses and such basic subjects as mathematics and geography. In this course, classes are given at a rate of 27 hours a week.

As of 1996, there was a total of 283 EP₂ schools, attended by a total of 180,077 schoolchildren.

③ First Cycle Secondary Education (ESG₁)

This is a three-year course after EP₂ which age of 13 is standard to

enter. ESG₁ schools are not many and most of them are concentrated in and around city area. Therefore, number of students enrolled in this course is not many. In this course English language is taught in addition to advanced Portuguese. Lessons in mathematics, physics, chemistry, biology, history and geography are also given as preparation for higher grade of education. Classes are given at a rate of 30 hours a week. Students who have completed this course are qualified to enter the primary teacher training institutes (IMAPs). There is a total of 54 (ESG₁ schools), attended by a total of 51,707 pupils.

④ Second Cycle Secondary Education (ESG₂)

This is a two-year course which age of 16 is standard to enter. This course is positioned as a preparatory course to higher education and therefore, schoolwork is relatively college-oriented. This course consists of three groups - the literary course, the engineering course and the science course which students choose depending upon major course they will take at colleges. Classes are given at a rate of more than 40 hours a week.

There is a total of 12 ESG₂ schools, attended by a total of 5,491 students.

(3) Administrative Organization

The Ministry of Education is mainly responsible for educational administration. Under the decentralization policy in educational administration, directorates of education are established in each local administrative province and district. These provincial and district directorates of education are responsible for the operation and management of local educational institutes and schools. The organization of the

Ministry of Education and the relationship between the ministry and these directorates are as shown in Fig. 1-2.

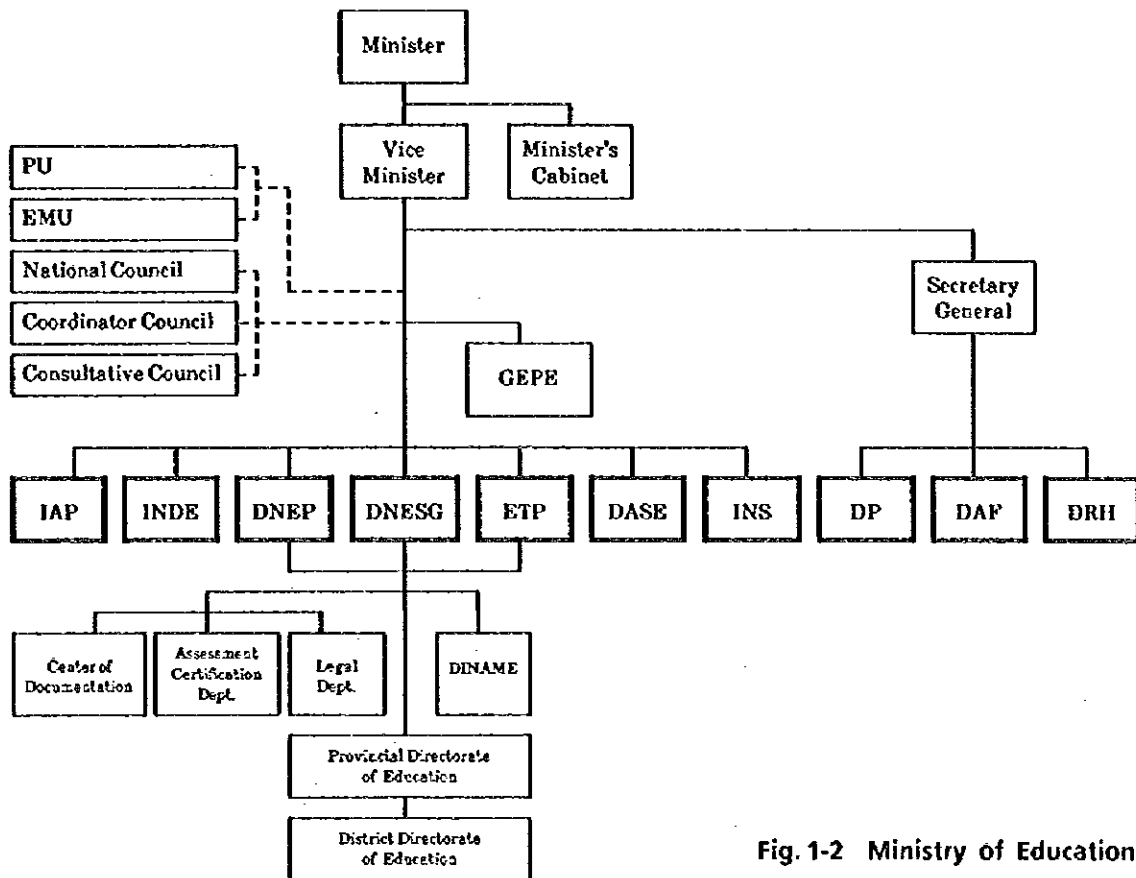


Fig. 1-2 Ministry of Education

The ministry has 10 directorates, of which National Primary Education Directorate (DNEP), National General Secondary Education Directorate (DNESG) and Technical and Professional Education Directorate (ETP) are positioned as three national organizations to directly supervise the provincial and district directorates of education and are therefore directly responsible for the country's educational administration.

On the other hand, the ministry has no directorate to be specially responsible for the teacher training. The primary teacher training institute (IMAP), for which this project is to be implemented, is operating under the control of the Ministry's National Primary Education Directorate (DNEP).

(4) Educational Budget

During the first half of the 1980s, educational budget accounted for about 18 percent of the total national budget. But the ratio was reduced to nine (9) percent as a result of the implementation of a national structural adjustment policy started from 1986 and the subsequent curtailment of the total budget for education. Later, however, a national development policy giving priority to "education" was implemented. In 1995, the total budget for education posted a 22 percent year-to-year increase, accounting for 15 percent of the total national budget.

① Percentage Composition of the Educational Budget by Category

Fig.1-3 shows the allotment by category of the budget for education. Reflecting the policy of the massive access to education, primary education represents about 50 percent of the total budget. On the other hand, teacher training makes up about 10 percent of the total.

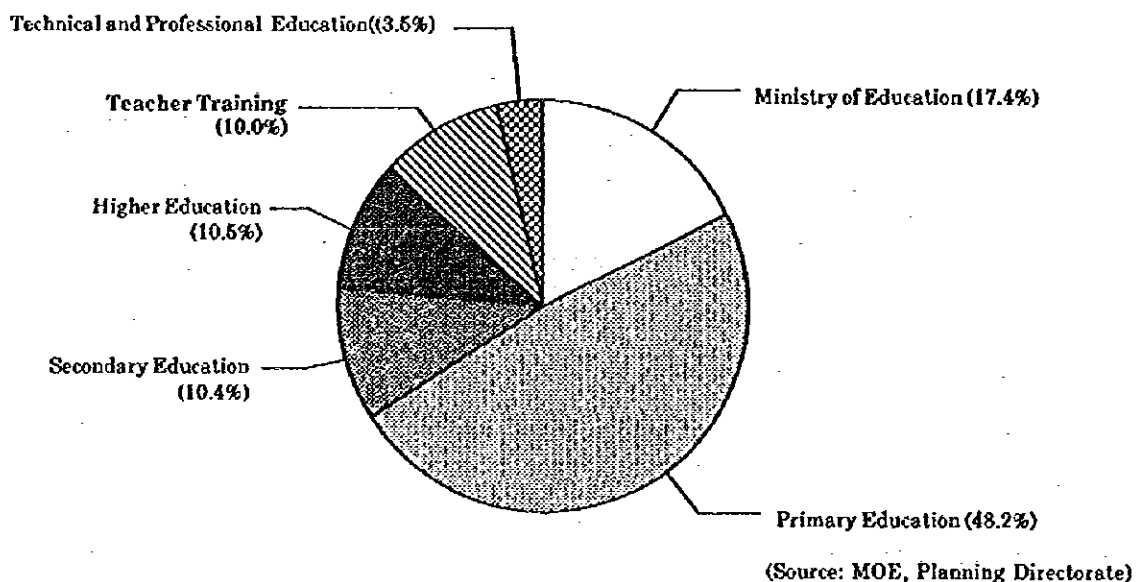
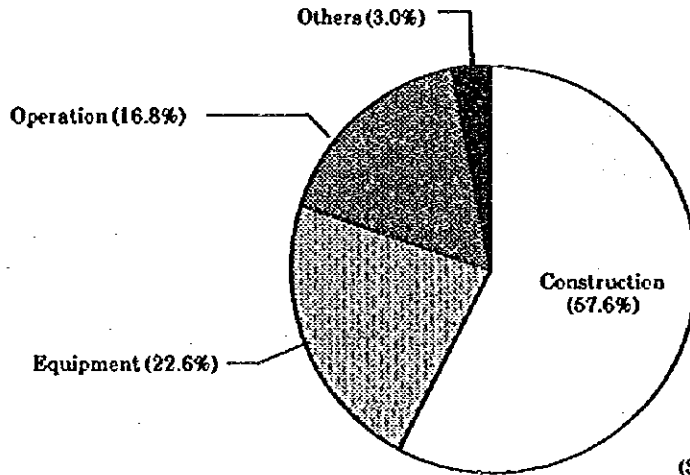


Fig. 1-3 Composition of Educational Budget (1993~95)

Fig. 1-4 shows a breakdown of the development budget of education by project type during the same period as above. Construction budget (mainly construction of school buildings) accounts for the greater

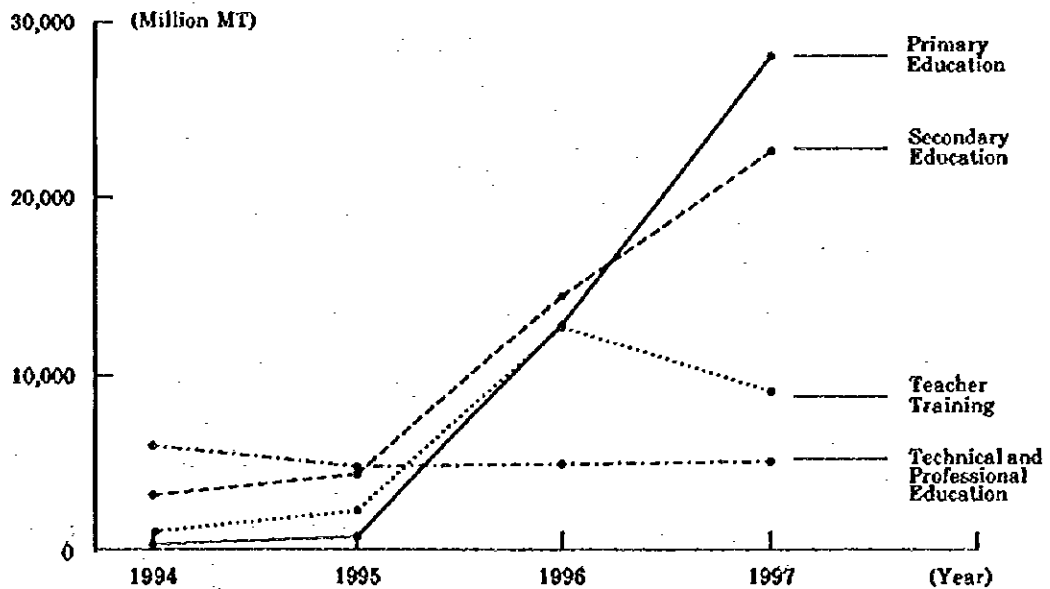
part of the educational development budget. In the background are the reconstruction of school buildings destroyed during the civil war and the construction of school buildings in rural areas which is aimed at promoting the massive access to primary education. All this explains how the Government of Mozambique is implementing educational policies with emphasis on the development of educational infrastructure.



(Source: MOE, Planning Directorate)

Fig. 1-4 Breakdown of Development Budget of Education (1993-95)

On the other hand, changes in the distribution of the development budget of education are as shown in Fig. 1-5, which also reveals a notable increase in the budget for primary education.



(Source: MOE, Planning Directorate 1996)

Fig. 1-5 Changes in Development Budget of Education

The Government of Mozambique is in the midst of carrying out educational policies with particular emphasis on primary education in an attempt to establish a compulsory education system across the country. It is expected, therefore, that primary education's share in the total educational budget will continue to increase.

② Budgetary Appropriations for Teacher Training

Teacher training accounts for only 10 percent of the total educational budget. In 1996, however, there was a sharp increase in the development budget for teacher training due to the construction of two (2) IMAPs, Quelimane IMAP and Inhamizua IMAP, with foreign financial assistance. As is clear from recent changes in the budgetary appropriations for teacher training, as is shown in Table 1-1, the budget for teacher training is increasing from year to year.

Table 1-1 Budget of Teacher Training

(Unit: million MT)

Budget		1994	1995	1996	1997
Development		229.00	760.00	12,766.50	9,000.00
Recurrent	Salary	(5,848.31)	(3,542.10)	(12,517.80)	(11,600.30)
	Maintenance	(1,532.99)	(6,920.30)	(3,310.70)	(15,678.40)
	Sub-total	7,381.30	10,462.40	20,828.50	27,278.70
Total		7,610.30	11,222.40	33,595.00	36,278.70

(Source: MOE, Planning Directorate)

In keeping with the implementation of national policies aimed at promoting the massive access to primary education, there has been a stronger demand for teacher training. It is expected, therefore, that budgetary appropriation for this field will increase from now on.

As is clear from the above descriptions, the greater part of the educational budget is appropriated for the construction of primary school buildings and their operation, reflecting the government's educational policy with particular emphasis on the dissemination of primary education.

1-1-2 Present State of Primary Education

When this project is implemented, the facilities of the Chibututuine Primary Teacher Training Institute will be rehabilitated, and primary schoolteacher training will start. Given below is the outline of the present state and problems of the primary education in Mozambique.

(1) Total Enrollments

Although Ministry of Education is making effort to make the five-year EP₁ education be compulsory, a full-fledged compulsory primary education system is yet to be realized in the country due to the delay in establishing the educational infrastructure. Table 1-2 shows a breakdown by age of the total enrollments as of 1996. The average net enrollment rate at the relevant school year of the children who had reached school age (those aged 6 to 10) was about 36 percent.

Table 1-2 Total Enrollment

Age	Population			Enrollment EP ₁			Net enrollment rate (%)
	Male	Female	Total	Male	Female	Total	
6	270,404	269,054	539,458	35,673	32,433	68,106	12.1
7	261,876	260,876	522,752	105,157	88,844	194,001	34.1
8	255,137	254,415	509,552	118,992	95,898	214,890	37.7
9	247,079	246,862	493,941	116,128	88,328	204,456	35.8
10	242,920	243,116	486,036	137,298	96,800	234,098	39.8
total	1,277,416	1,274,323	2,551,739	513,248	402,303	915,551	35.9

(Source: MOE, Planning Directorate 1996)

On the other hand, Table 1-3 shows the gross enrollment rate (the ratio of the number of schoolchildren attending primary schools to the total population of school age) for each grade. The average gross enrollment rate for all grades is about 62 percent.

Table 1-3 Gross Enrollment Rate

Grade	Standard age	Population by age	Attendance by grade	Gross enrollment rate(%)
1-grade	6	539,458	550,258	102.0
2-grade	7	522,752	394,029	75.4
3-grade	8	509,652	296,292	58.1
4-grade	9	493,941	195,519	39.6
5-grade	10	486,036	137,859	28.4
Total		2,551,739	1,573,957	61.7

(MOE, Planning Directorate 1996)

As shown in Fig. 1-6, the main reason why the gross enrollment rate for 1-grade schoolchildren exceeds 100 percent is because 550,258 of attendance includes schoolchildren ranging 6 to 15 in age. In other words, 1-grade schoolchildren vary in age of 6 to 15 in Mozambique.

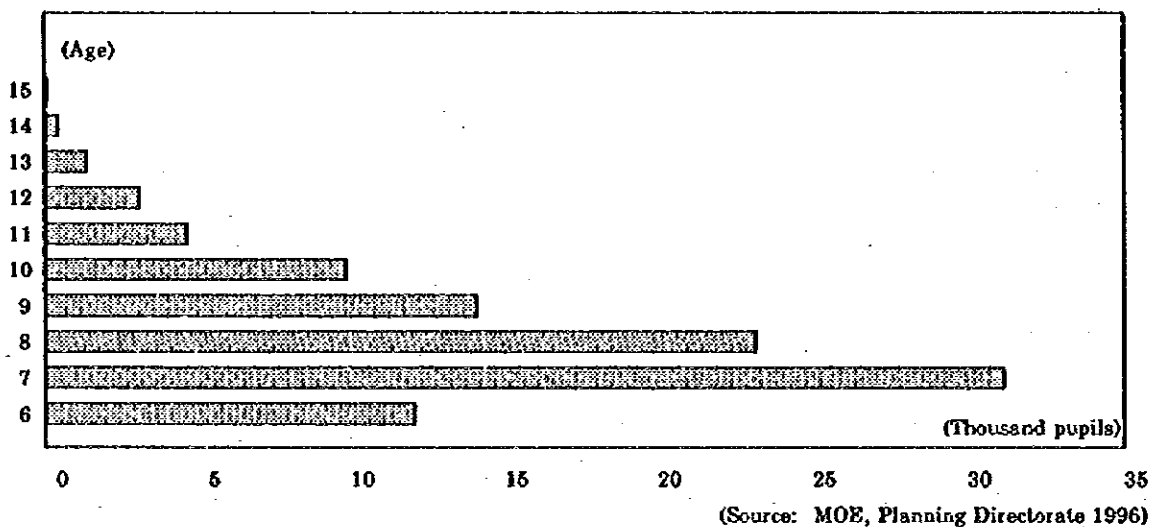


Fig. 1-6 Population by Age in 1-grade schoolchildren

The Government of Mozambique is in the process of developing educational infrastructure with the aim of promoting the massive access to primary education. As Fig 1-7 shows, the total enrollment has been on the increase since 1992. However, the gross enrollment rate for 1996 was almost the same as that for 1990, reflecting the relatively high rate of increase in the number of population of school age (3.7 percent).

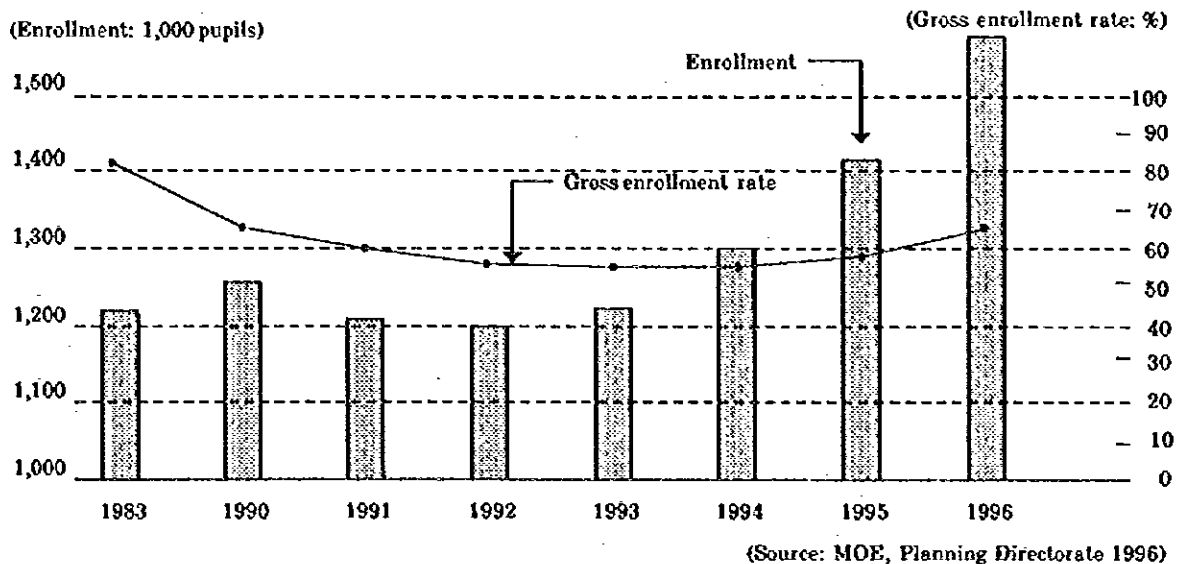
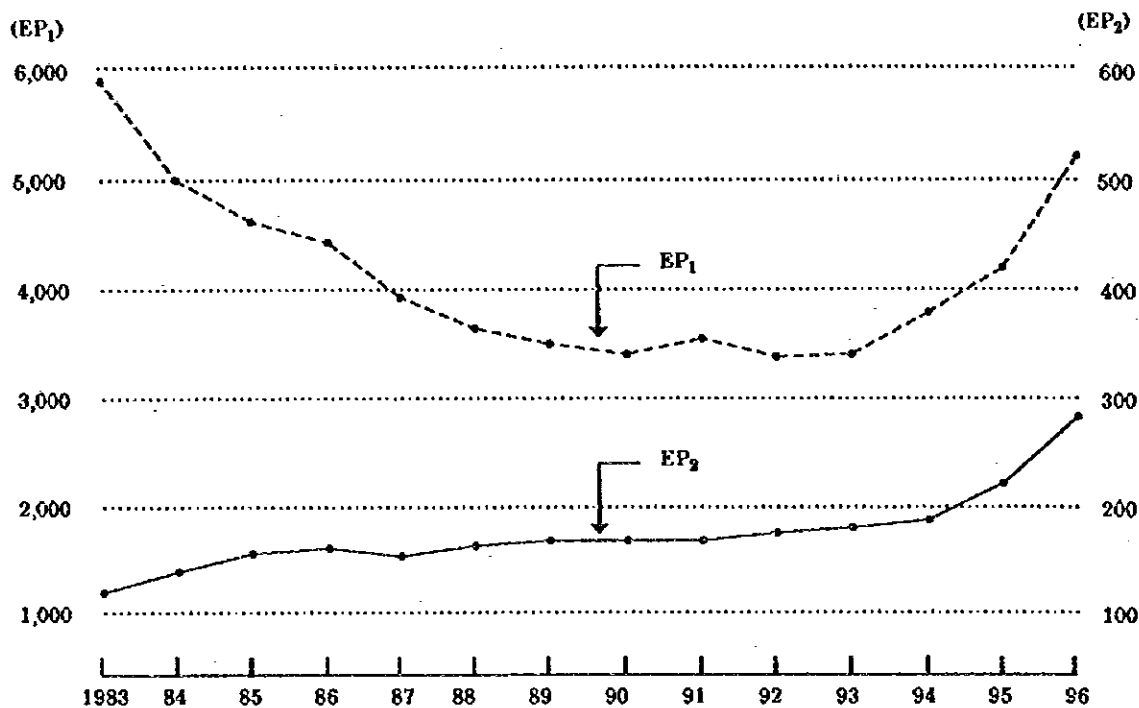


Fig. 1-7 Enrollment and Gross Enrollment Rate

Increasing the gross enrollment rate for primary schools is one of the greatest challenges facing the Government of Mozambique in its efforts to promote its national development plan.

(2) Number of Schools

One of the main reasons why the gross enrollment rate for the first level primary education remains at a level of about 60 percent is the shortage of primary school facilities. In sparsely populated areas, in particular, primary schools are not located within walking distance for schoolchildren, which makes it difficult to disseminate primary education system in the country. The fact that 60 percent of the total number of primary schools (5,886 as of 1983) were either closed or destroyed in consequence of the civil war was one of the main factors to cause the shortage of primary school facilities. Fig. 1-8 shows changes in the total number of EP1 schools. In 1996, the total number of these schools had increased to 5,165 which was 90 percent of that for 1983.



(Source: MOE, Planning Directorate 1996)

Fig. 1-8 Number of School Facilities

The number of classrooms is on the increase in keeping with the increase in the number of the school facilities newly constructed, but the rate of increase in the number of classrooms still lags behind that for the number of enrollments to primary education. According to the 1994 data, for example, the total number of classes given at EP₁ schools was 27,702, of which 1,911 (about 7 percent or the number of classes for 93,500 schoolchildren) were given without any classrooms.

In view of the prospect of further increases in the population of school age, the Ministry of Education is speeding up its effort to implement an educational policy giving top priority to the reconstruction and rehabilitation of school facilities in order to promote primary education, particularly first level primary education. Under such circumstances, enhancing the quality of teacher training of schoolteachers who teach at the newly opened primary schools is one of the next challenges facing the Ministry.

(3) Schoolteachers

The number of schoolteachers has been on the rise since 1983 in keeping with the increase in the enrollments shown Fig. 1-9, but the rate of increase in the number of schoolteachers still lags behind that for schoolchildren.

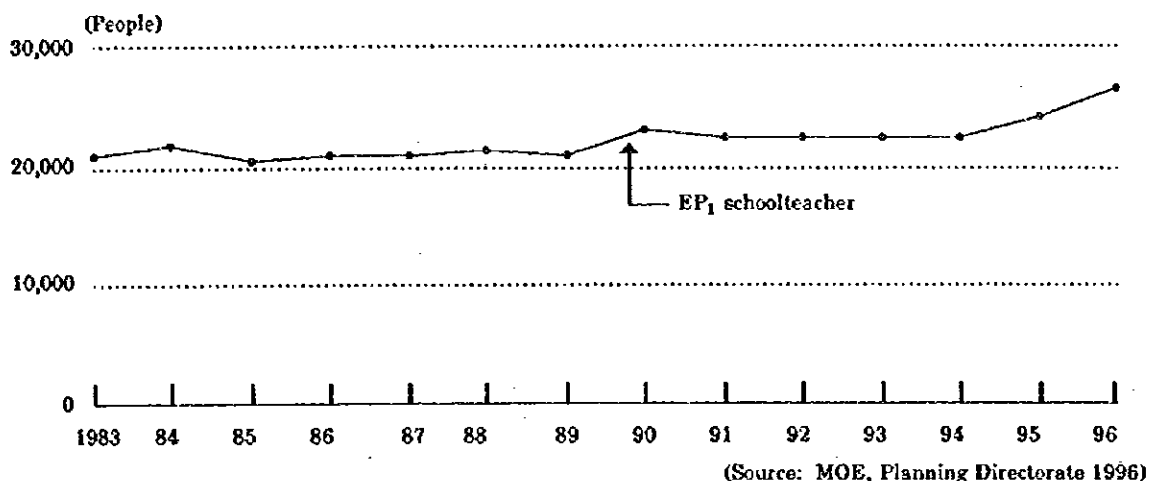


Fig. 1-9 Number of Schoolteacher

On the other hand, the average ratio of schoolchildren to schoolteacher in the entire country was 59.4 as of 1995. As is shown in Table 1-4, the ratio differs widely from region to region. In urban areas in the southern region of the country, the average ratio of schoolchildren to schoolteacher was 80, revealing a serious shortage of schoolteachers in these region. Especially in Maputo province, where this project is planned to be implemented, the ratio is 80.7 which indicates the province suffers most shortage of teachers in the country. Maputo province is close to Maputo city, the capital of the country, and therefore population is large with people who are aware of importance of education. As a result, limited number of schools have to accept many schoolchildren resulting serious shortage of teachers.

Table 1-4 Schoolchildren per teacher (1996)

Region	Province	Number of teachers	Number of schoolchildren	Schoolchildren per teacher
North	01 Cabo Delgado	2,193	103,588	47.2
	02 Niassa	1,300	63,241	48.6
	03 Nampula	4,765	227,695	47.8
Central	04 Tete	2,280	116,805	51.2
	05 Zanzbezia	4,768	318,699	66.8
	06 Manica	1,502	81,919	54.6
	07 Sofala	1,827	94,226	51.6
South	08 Inhambane	2,170	142,090	65.5
	09 Gaza	2,036	162,800	80.0
	10 Maputo	1,464	118,149	80.7
	11 Maputo-City	2,198	144,845	65.9
Total		26,503	1,573,957	59.4

(Source: MOE, Planning Directorate 1996)

As is shown in Table 1-5, there are various types of primary school teacher qualifications in Mozambique. In other words, a unified teacher qualifications system is yet to be established. In addition, about 25 percent of the EP₁ schoolteachers are unqualified.

Table 1-5 Teachers Qualification

Category	Qualifications
EP ₁	1. Those who were licensed by the authorities of Colonial Administration with 4-year re-education and 4-year practical training
	2. Those who received practical training at university/college before the country became independent or within one year after independence.
	3. Those who have completed the Primary Teachers Training Centre (CFPP) -- with 3-year training after EP ₂ -- with 1-year training after 6 grade of primary education -- with 6-month training after 6 grade of primary education
EP ₂	1. Those who have completed Mid-Level Pedagogical Institute (IMP)
	2. Those who have received 3-year practical training after ESG ₁

In an effort to train new schoolteachers, whose shortage is serious especially in the southern region, and to establish a unified teacher qualifications system, the Ministry of Education issued "Education Plan for IMAP" in August 1996. Under the plan, the present primary teacher training system will be unified to IMAP which is planned to establish in each administrative province.

(4) Problems in the Field of Primary Education

Due to the ongoing increase in the population of school age and to the shortage of schools and schoolteachers, various problems have surfaced in the field of primary education. Given below is the outline of the main problems facing primary education in Mozambique.

① Delay in the Establishment of Compulsory Education System

As of 1996, the gross enrollment rate for first level primary education (EPI) was 61.7 percent. Despite the fact that the education is given free of charge, the establishment of compulsory primary education is being delayed which the Ministry of Education aims at. The main reason for this situation is the lack of schools located within walking distance of schoolchildren. In the northern region where schools are not properly placed, the gross enrollment rate is low and compulsory primary education is far to be realized. This fact confirms the close correlation between placement of schools and the gross enrollment rate. It is important challenge for the Ministry of Education to construct additional school facilities and to train schoolteachers to be assigned to these newly opened schools.

② Two/Three shifts in Primary School

In Mozambique, classes are generally given in two shifts to make up for the shortage of school facilities and schoolteachers. In part of the southern region where the ratio of schoolchildren to schoolteacher is very high, classes are given in three shifts. The following table shows the number of school hours by subject given at two/three shift schools. In case of three shift schools, school hours have to be shorter than that of two shift schools because of limited time.

Table 1-6 Study Plan for two/three Shifts Schools

(Unit: Lessons/week)

Subject	shift	2-shift						3-shift					
	grade	1	2	3	4	5	6	7	1	2	3	4	5
Portuguese		12	11	10	10	8	6	5	12	11	9	8	6
Mathematics		6	6	6	6	6	5	5	6	6	5	5	5
Natural Sciences		—	—	2	2	2	—	—	—	—	2	2	2
Geography		—	—	—	—	2	3	3	—	—	—	—	2
History		—	—	—	2	2	3	3	—	—	—	2	2
Physical Education		2	2	2	2	2	2	3	1	2	2	1	1
Working Education		2	3	3	3	3	4	4	1	1	2	2	2
Biology		—	—	—	—	—	3	4	—	—	—	—	—
Total		22	22	23	25	25	26	27	20	20	20	20	20
		117						53		100			

(Source: Ministerial Instruction No. 1/1996)

The Ministry of Education admits that no shift is ideal but actually has no alternative. The Ministry plans to promote the massive access to primary education premising two shifts in view of the increase in the population of school age and the present status of educational infrastructure.

③ Internal Efficiency of Primary Education

Fig 1-10 shows a breakdown of the school population by grade as of 1996. As is clear from this table, the gross enrollment rate varies inversely with the grade. This is because a number of schoolchildren drop out from school or remain in the same class. These ratios vary from grade to grade, but the average ratio of schoolchildren who go on to a higher stage of education for all grades is 46 percent. Drop-out occupies 21 percent and the repeater occupies 33 percent. Of the total number of schoolchildren who entered EP1 schools, only 15 to 20 percent complete EP1.

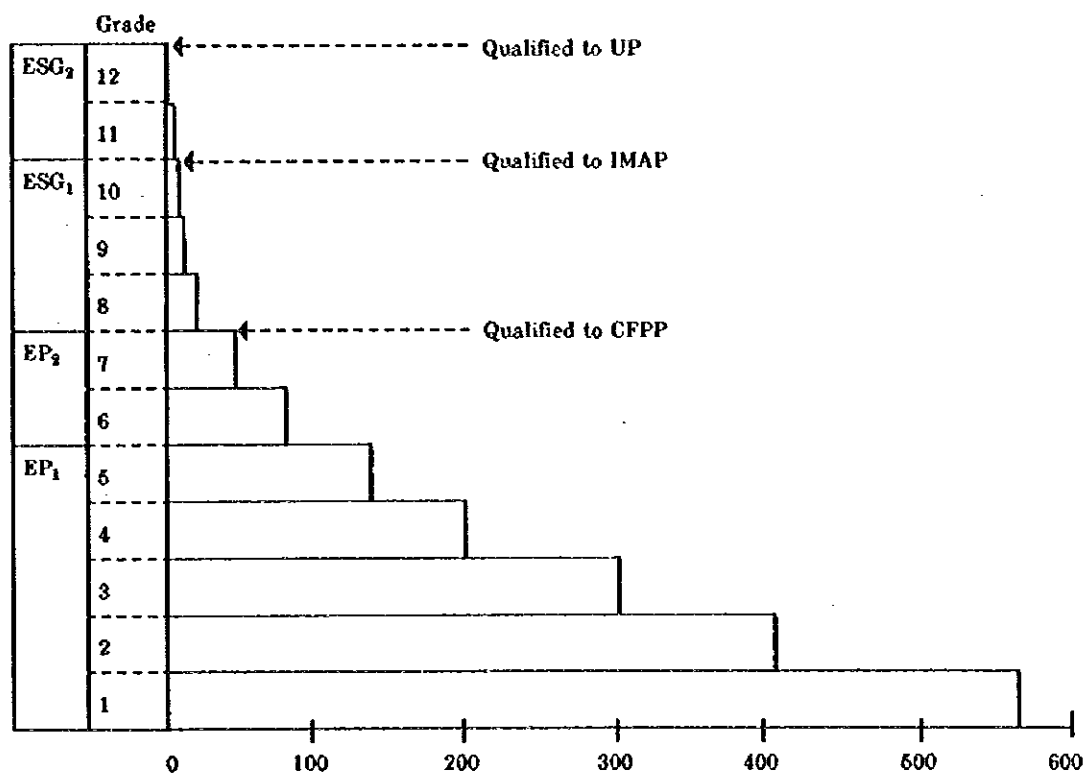


Fig 1-10 School Population by Grade

(1,000 pupils)

It is expected that the number of school population enrolled in schools will increase in keeping with increase in the total population of school age and decreases in the number of drop-outs reflecting the accelerated diffusion of primary education. The Ministry of Education targets the percentage of school attendance for 86% by the year 2000. The Ministry estimates necessary number of primary school teachers to be 8800 to achieve this target on the premise that classes will be conducted in two shifts.

1-1-3 Teacher Training

(1) Teacher Training System

In Mozambique, training of teachers is currently being conducted under five (5) teacher training systems as shown in table 1-7. The

relationships among these five teacher training systems are as shown in Fig. 1-11.

Table 1-7 Teachers Training Courses

Course	Qualification	Term	License	Remarks
CFPP	EP ₂ graduates	3 years	EP ₁	14 CEPPs in the country
IMP	ESG ₁ graduates	3 years	EP _{1/2}	3 IMPs in the country
IMAP	ESG ₁ graduates	2 years	EP _{1/2}	1 IMAP in 1 province
UP	ESG ₂ graduates	4.5 years	ESG _{1/2}	1 UP in the country
IAP	Unlicensed teacher	2~4 years	EP ₁	in-service training

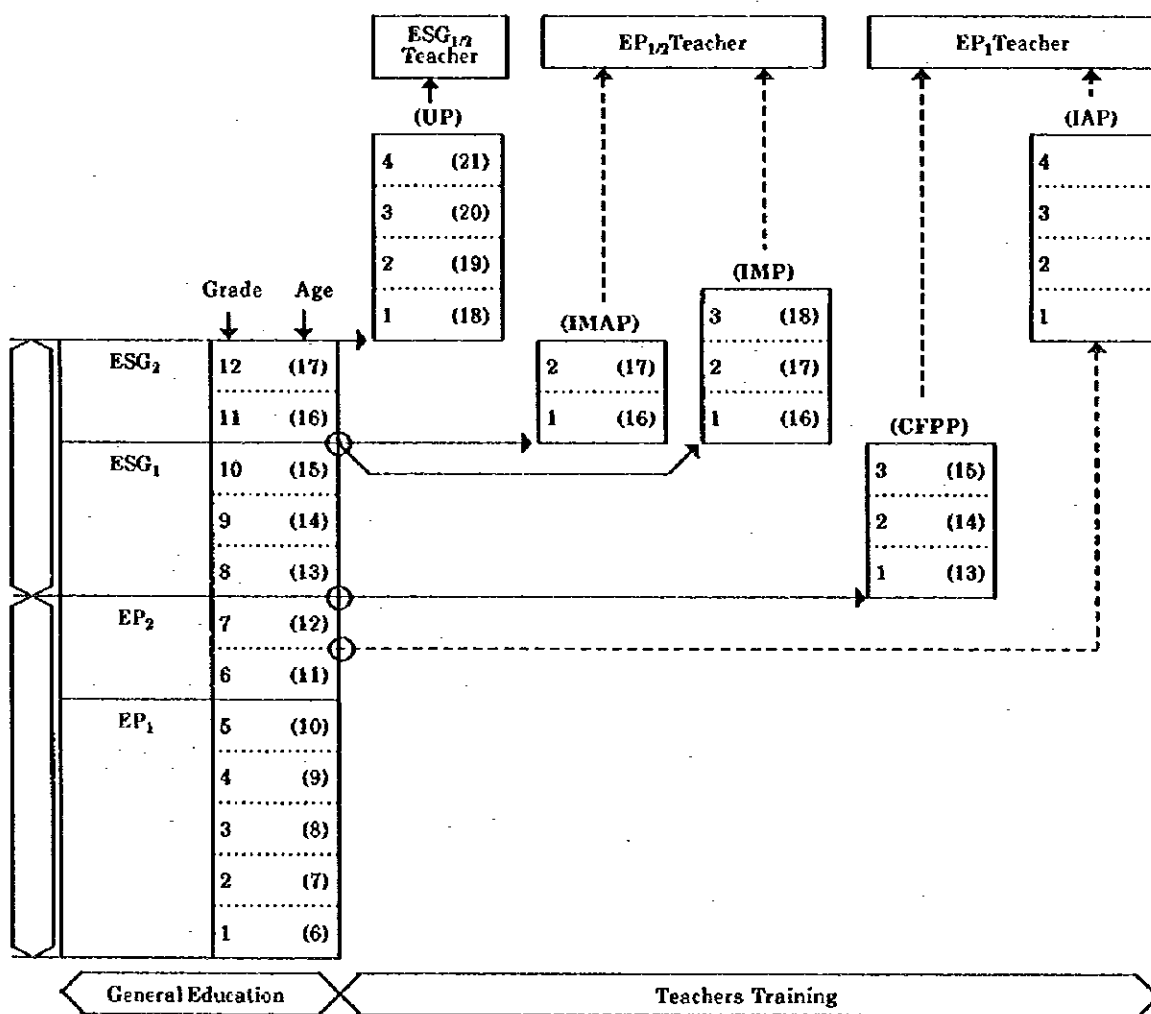


Fig. 1-11 Teacher Training System

① Primary Teachers Training Centre (CFPP)

CFPPs offer a three-year course for those who have completed primary education (EP₁, EP₂). Graduates of CFPPs are qualified to teach at first leave primary education (EP₁). As of 1995, there was a total of

14 CFPPs in the country, attended by a total of 3,793 students, of which 1,954 were female students. The annual number of graduates of CFPPs is about 1,200. For the 14 CFPPs, the combined total number of teachers was 241 and the combined total number of classrooms was 99. The Ministry of Education has announced its intention to abolish the CFPPs and to convert their existing facilities into teachers reeducation facilities, primary/secondary school facilities or teacher training facilities under the new system.

② Mid-Level Pedagogical Institute (IMP)

IMPs offer a three-year course for those who have completed the first cycle secondary education (ESG₁) course. Graduates of IMPs are qualified to teach at second level primary education (EP₂). As of 1996, there was a total of three (3) IMPs - Nampula IMP, Sofala IMP and Maputo IMP. At present, Sofala IMP is closed and Maputo IMP has already been switched to an IMAP offering a two-year course. Therefore, Nampua IMP is now the country's only one IMP. It is attended by a total of 239 students. The annual number of its graduates is about 70. IMPs are to be abolished or switched to IMAP in due order.

③ Primary Teacher Training Institute (IMAP)

IMAPs offer a two-year course for those who have completed the first cycle secondary education (ESG₁). Graduates of IMAPs are qualified to teach at primary schools (EP₁/EP₂). At present, Munhuana IMAP, which was formerly Munhuana IMP has been offering a three-year course, and the Quelimane IMAP and the Inhamizua IMAP were opened in 1997. The Ministry of Education has plans to abolish the existing CFPPs and IMPs and to unify the primary school teacher training systems to the IMAP system. Establishment of 6 IMAPs have been decided so far, of which 3

IMAPs are already being in operation. Preparations for opening of others are underway. Chibututuine-IMAP, for which this project is to be implemented, is going to be the country's seventh IMAP.

④ Pedagogical University (UP)

UP is the country's only one pedagogical university. Those who have completed the second cycle secondary education (ESG2) are qualified to enter this university. Graduates of UP, which offers a four and half-year course, are qualified to teach at secondary school (ESG1, ESG2), as well as at primary teacher training institute (IMAP). The annual number of graduates of UP is about 150. The Ministry of Education is examining the possibility of increasing the number of its students to 250 by extending the scope and depth of its course for training teachers to work at primary teacher training institutes.

(2) Primary Teacher Training Institute (IMAP)

① Location of Existing/Planned IMAPs

When this project is implemented, former Chibututuine IMP will be rehabilitated and function as an IMAP. Establishment of 6 IMAPs have been decided so far, of which Munhuana IMAP in Maputo city has already been in operation and Quelimane IMAP and Inhamizua IMAP are opened in 1997, but others are still in course of preparation. Shown below are the outline and locations of these IMAPs.

Fig. 1-8 Outline of IMAPs

IMAP	Location	Student	Established	Donner	Present condition
1. Quelimane	Zambezia	420	1997	BAD	opened in 1997 with 140 students
2. Inhamitua	Sofala	420	1997	BAD	under construction
3. Matola	Maputo	420	1998	BAD	under construction IMAP of Maputo-city
4. Nampula	Nampula	420	1998	BAD	under construction open in 1998
5. Ulongue	Tete	350	1998	Denmark	under rehabilitation as IMAP
6. Munhuana	Maputo-City	400	1996	--	being in operation as an IMAP with 400 students
7. Chibutuine	Maputo	400	1999	JICA	this project

(BAD: African Development Bank)

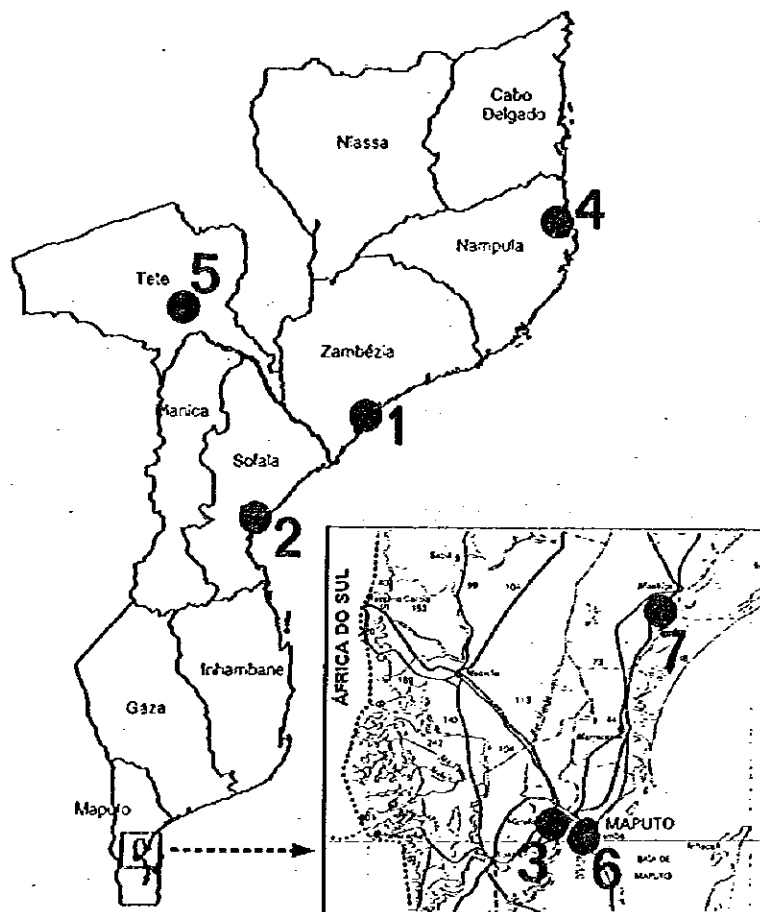


Fig. 1-12 Location of IMAPs

The Ministry of Education has plans to establish an IMAP in each of the 11 administrative provinces. At present, however, no concrete plans have been drawn up except for the above-mentioned seven (7) IMAPs.

② Operation

Each of the IMAPs to be established in the administrative provinces are to be controlled by the provincial directorates of education, under the guidance of the Ministry of Education's National Primary Education Directorate. The operation costs of these IMAPs are to be defrayed by the respective province (or the city) through the ministry's budget allotment.

Since at present the teacher training systems are being converted into a single IMAP system, there is no past record of budgetary appropriations under the new system. Therefore, the amount of budget allotment for each of these IMAPs has not yet been decided.

Table 1-9 shows the 1996 maintenance and management budget for Munhuana IMAP in Maputo-city. This may present an example of budget allotment to teacher training institutes.

Table 1-9 Operation Budget of Munhuana IMAP (1996)

Item	Budget (MT)	
1. Transportation	35,000,000	(350,000F7)
2. Furniture/Fittings	30,000,000	(300,000F4)
3. Consumables	58,000,000	(580,000F7)
4. Fuel	30,000,000	(300,000F7)
5. Communication	16,000,000	(160,000F7)
6. Electricity	15,000,000	(150,000F7)
7. Equipment	16,000,000	(160,000F7)
8. Dormitory's Expense	180,000,000	(1,800,000F7)
9. Others	20,000,000	(200,000F7)
Total	400,000,000	(4,000,000F4)

(Source: Munhuana IMAP)

Munhuana IMAP, which has functions of both CFPP and IMAP at present, has an enrollment of 900 students and a staff of 48. In light of the scale of this institute, it is assumed that its annual maintenance and management budget of 400 million MT (about ¥4 million) is considered far from sufficient.

When this project is implemented, the Chibututuine IMAP is to be operated with the budget from Maputo Provincial Directorate of Education. As seen in the case of Munhuana IMAP, budget allotment to IMAPs is insufficient though educational budget is increased. Therefore, it is necessary to watch the budget allotment to other IMAPs which are opened in 1997. Students of IMAPs are exempted school fees including for meals.

③ Curriculum

The IMAP curriculum (subjects and class hours) is specified in the "Educational Plan for IMAP" promulgated in November 1996 by the Ministry of Education's National Primary Education Directorate. Each IMAP is therefore to conduct teacher training under such common curriculum. For example, the curriculum has already been applied to teacher training at Munhuana IMAP. Under the curriculum, classes are to be given in two (2) terms a year, 22 weeks of in each term, 33 hours a week. In other words, the students are to take classes at a rate of 6 to 7 hours a day. Shown below are the contents of the curriculum to apply to the Chibututuine IMAP.

Area	Discipline	1st Year				2nd Year				Total	Discipline included in Primary Education
		1st sem. 22 weeks		2nd sem. 22 weeks		1st sem. 22 weeks		2nd sem. 22 weeks			
		Lecture 20 weeks	Practice 2 weeks	Lecture 18 weeks	Practice 4 weeks	Lecture 16 weeks	Practice 6 weeks	Lecture 10 weeks	Practice 12 weeks		
Educational Science	History of Education and General Didactics	3hr		3hr		3hr		2hr		182hr	
	Educational Psychology	3		3		3		2		182	
	Sociology in Education	2		2		—		—		76	
	School Organization and Supervision	—		—		2		2		52	
	Teaching Method of Portuguese	5		5		5		5		320	○
Communication and Expression	Teaching Method of Physical Education	—		2		2		—		68	○
	Teaching Method of Musical Education	2	Observation Practice	2	Teaching Practice	—	Teaching Practice	—	Teaching Practice Evaluation	76	
	Teaching Method of Visual and Technological Education	—		—		2		2		52	
	Bantu Language	3		—		—		—		60	
	English	3		3		—		—		114	
Teaching Method of History	3	3		—		—		114		○	
Social Science	Teaching Method of Geography	—		—		4		4		104	○
	Civil Education	2		2		2		2		128	
	Health and Hygiene in Education	—		—		3		3		78	
Science, Mathematics and Nature	Teaching Method of Mathematics	5		5		5		4		310	○
	Teaching Method of Natural science and Biology	2		2		2		2		128	○
Seminar	(Topics and hours are individually decided by school)										
Labour Activity	(Topics and hours are individually decided by school) Ceramics, Metal/Wood working, Sewing, Weaving, Cooking and Gardening are planned for this project										○
Class Hrs./Week		33	15	32	15	33	25	28	25	Total Lectures 2044	
class Hrs. for Practice/semester			30		60		150		250	Total Practice 490	

Facilities and equipment of new IMAPs, which are under preparation to open, are planned in accordance with the above curriculum.

As is described above, the Government of Mozambique is in the process of integrating the present teacher training systems into a single system and preparing educational infrastructure such as constructing new teacher training institutes and unifying the teaching training curricula. All of these efforts are based on the conclusion that teacher training is indispensable for dissemination of primary education in the country.

As outlined above, the total number of school attendance and the gross enrollment rate of primary education are on the increase as the result of the implementation of Government of Mozambique's policy giving top priority to "education". On the other hand, it is considered essential to construct new school facilities and appoint the necessary number of new teachers to these schools in order to increase the gross enrollment rate, the total population of school age is expected to increase. In an effort to promote a full-fledged compulsory primary education system, the Government of Mozambique has decided to institute a new teacher training system aimed at training new teachers and unifying qualifications for schoolteachers while constructing school facilities with foreign donors' assistance.

This project was requested by the Government of Mozambique, in order to rehabilitate the facilities of former Chibututuine IMP, which were destroyed during the civil war, and to reopen it as an IMAP under the new teacher training system.

1-2 Contents of the Request

The Government of Mozambique requested the Government of Japan to implement this project with the contents outlined below. The contents of the request presented at the time of the basic design study were almost the same as those confirmed through the preliminary study in December 1996. Given below is the outline of the contents of the request.

(1) Objective

To rehabilitate the former Chibututuine Mid-Level Pedagogical Institute, which have been closed since 1985 in consequence of the civil war, to reopen it as an IMAP for training primary school teachers.

(2) Project Implementing Organization

Planning Directorate, Ministry of Education is to be responsible for the implementation of this project.

(3) Facilities

Existing facilities are to be rehabilitated and new additional facilities are to be constructed necessary for operating as IMAP.

Table 1-10 Requested Facilities

Facilities	Priority	Construction	Rehabilitation
1. Classroom	A		○
2. Laboratory	A		○
3. Library	A		○
4. Elevated Water Tank	A		○
5. Student Dormitory	B		○
6. Administration	B		○
7. Sewer System Drainage	B	○	
8. Canteen	B		○
9. Kitchen	B		○
10. Teachers' Accommodation	B	○	○
11. Sports Field	B	○	
12. Multi Purpose Hall	B	○	
13. Covered Passage	B		○

(4) Equipment

The following items of equipment are to be procured and installed under this project.

① Educational equipment

1. Science
2. Art and craft
3. Music
4. Physics
5. Common use

② Furniture/Fittings

1. Classroom
2. Dormitory
3. Canteen and Kitchen
4. Beds and desks for teachers accommodation

③ Vehicles

1. Minibus
2. Pick-up truck

CHAPTER 2 CONTENTS OF THE PROJECT

CHAPTER 2 CONTENTS OF THE PROJECT

2-1 Objective of the Project

The Government of Mozambique is implementing various policies in the field of education positioning "the massive access to primary education and quality improvement of education" as the first priority in its national development plan, and plans to increase the gross admission rate of first level primary education (EP₁) from 66.7 percent in 1995 to 86 percent by the year 2000. In this connection, the Government of Mozambique estimates that additional 7,500 classrooms and additional 8,800 schoolteachers are necessary to achieve the target. In regard to the second level primary education (EP₂), the Ministry of Education expressed its intention of disseminating it successively but has not yet presented practical target figures.

In this connection, the Ministry of Education of Mozambique has made public its policy to integrate the existing teacher training systems into a single system and to establish one primary teacher training institute (IMAP) in each province. Establishment of 6 new IMAPs has already been decided.

This project is aimed at rehabilitating the facilities of the Chibututuine Mid-level Pedagogical Institute (IMP) in Manhiça of Maputo Province, which lies in ruins now, and procuring necessary equipment to reopen the institute as a primary teacher training institute (IMAP). The Chibututuine IMAP will be operated under the Maputo Provincial Directorate of Education, and aims at training 200 students annually.

2-2 Basic Concept of the Project

2-2-1 Overall Plan

(1) Teacher Training Plan

The Ministry of Education plans to carry out the teacher training program for the Chibututuine IMAP as follows.

Goal : Teacher training for primary education (EP₁/EP₂) given to those who have completed first cycle secondary education (ESG₁)

Period of training : 2 years

Number of students : 200/year, 400 in total

① Rationale for Deciding the Number of Students

The number of students of 200 per year (400 in total) was decided for the following reasons.

1. The Ministry of Education has decided that the standard total number of students to be enrolled in each IMAP should be approximately 400 as shown below.

Table 2-1 Number of Students in IMAPs

IMAP	Province	Enrollment	Present Condition
1. Quelimane	Zambézia	420	Opened in 1997
2. Inhamitua	Sofala	420	Opened in 1997
3. Matola	Maputo	420	Under construction (by Dec. 1997)
4. Nampula	Nampula	420	Under construction (by Dec. 1997)
5. Ulongue	Tete	350	Under construction (by end of 1997)
6. Munhuana	Maputo-city	400	IMAP-Course opened in 1996 using the existing facilities

2. The Chibututuine Mid-level Pedagogical Institute, for which this project is to be implemented, was established as the country's first IMP and had an enrollment of 400 at that time.

② Enrollment of Students

In light of the circumstances as stated below, the school will be able to enroll 400 students.

1. Qualified students living in Maputo Province, Maputo City (an administrative district), Gaza Province and Inhambane Province are considered to be latent applicants for admission to the IMAPs. The total number of graduates of first cycle secondary schools (ESG₁) in this area was 4,810 (Maputo Province: 645, Gaza Province: 642, Inhambane province: 802, Maputo City: 2,723) in 1996. A total of three IMAPs are to be established in four provinces. Therefore, a total of 600 graduates of ESG₁ will be enrolled in IMAPs per year in this area. Accordingly the ratio of the enrollment in these IMAPs (600) to the total number of ESG₁ school graduates in this area (4,810) will be about 12.5 percent.
2. Unlike other vocational training courses which are positioned as the same level as IMAP, students at IMAPs are charged no school expenses (including food expenses) and therefore many graduates of ESG₁ schools are expected to apply for admission to IMAPs. In 1996 at Munhuana IMAP, for example, the ratio of total applicants was 200 percent.
3. Since IMAP students are guaranteed teaching jobs after graduation and it is possible for them to work in provincial areas, there are many applicants who desire to become teachers, especially in provincial areas. Many rural areas are suffering from a shortage

of teachers and therefore teachers are given preferential treatment in such areas, such as being provided with lodgings by community residents.

4. The Chibututuine Mid-Level Pedagogical Institute, former body of this project, had given satisfactory results to enroll 400 before it was closed.

(2) Operation Plan

The Chibututuine IMAP is to operate under the following system.

Operation : To operate as a Primary Teacher Training Institute (IMAP) under Maputo Provincial Directorate of Education.

Teaching staff : 29 (qualifications: graduate of UP)

Clerical/administrative staff

: clerks: 10, general staff: 20, 30 in total

Budget : Special clause for this institute to be layed down in the Maputo Provincial Directorate of Education's budgetary appropriations. The budget allotment for this institute will be disbursed by Ministry of Education to this clause.

① Teachers

Teachers of this institute are to be recruited mainly from the qualified staff members of the Ministry of Education and new graduates of UP. The necessary number of teachers and specialized subjects were worked out on the basis of the curriculum specified in the "Educational Plan for Primary Teacher Training Institute" promulgated in November 1996 by the Ministry of Education's National Primary Education Directorate. The number of teachers was calculated on the basis that at least one teacher is needed for each subject specified in the curriculum and that the school hours of each teacher per week

should not exceed 20 (the standard being 15). As shown in the following table, the school is to have a teaching staff of 29. Classes are to be given on a home room basis, and teachers transfer home rooms for teaching their subjects.

Table 2-2 Necessary Number of Teachers

Subject	Training Hours per week				Total	Nos. of Teacher
	1st Grade (hour)X(class)=sub-total		2nd Grade (hour)X(class)=sub-total			
Pedagogy	3	× 7 = 21	3	× 7 = 21	42	3
Educational Psychology	3	× 7 = 21	3	× 7 = 21	42	3
Sociology in Education	2	× 7 = 14		—	14	1
Methodology of Portuguese	5	× 7 = 35	6	× 7 = 35	70	4
Physical Education		—	2	× 7 = 14	14	1
Music	2	× 7 = 14		—	14	1
Arts		—	2	× 7 = 14	14	1
Bantu Linguistics	3	× 7 = 21		—	21	1
English	3	× 7 = 21		—	21	1
Methodology of History	3	× 7 = 21		—	21	1
Methodology of Geography		—	4	× 7 = 28	28	2
Civil Education	2	× 7 = 14	2	× 7 = 14	28	2
Health and Hygiene		—	3	× 7 = 21	21	2
Methodology of Mathematics	5	× 7 = 35	6	× 7 = 35	70	4
Methodology of Science	2	× 7 = 14	2	× 7 = 14	28	2
Total		231		217	448	29

② Staff Members

This institute is to have staff members of 30 in total, of which 4 senior officers, including a Head Master and an Pedagogical Head, are to be appointed by the Ministry of Education. Other clerical and non-clerical staff members are to be recruited by the provincial directorate. In light of the present employment situation in the country, there will be no problem with recruitment and assignment of these staff members. The following table shows a breakdown by type of job of the staff members planned for this institute and a comparison with that of the Munhuana IMAP.

Table 2-3 Clerical and Common Staff

(Unit: person)

Classification	Position	Chibututuine	Munhuana
Clerical Staff	Head Master	1	1
	Administration Head	1	1
	Pedagogical Head	1	1
	Superintendent	1	1
	Accountant	2	2
	documentation	1	2
	Public Relation	1	1
	Assessment	1	1
	Typist	1	2
	(Sub-total)	10	12
Common Staff	Guard	} 20	} 36
	Janitor		
	Laundry		
	Cook		
	Maintenance		
	Others		
	(Sub-total)	20	36
Total		30	48

2-2-2 Facility Plan

(1) Design Standard for IMAP Facilities

The Ministry of Education of Mozambique has drawn up a plan to establish one IMAP (Primary Teacher Training Institute) in one administrative province and totaling seven IMAPs, including the Chibututuine IMAP in Maputo province, have been practically decided to be established. Out of these seven IMAPs, Matola, Nampula, Quillimane and Inhamizua IMAPs are funded by the African Development Bank to be designed in accordance with the common design standards. The Ministry of Education holds this as the common design standards for all IMAP facilities.

The above-mentioned design standards was drawn up on the basis of the common curriculum for the IMAPs, and the Ministry desires that the standards be applied as a guideline for the design of the facilities of this project. Given below is the outline of the facilities of the Quilimane IMAP, which construction was completed this year.

Table 2-4 Outline of the Facilities of Quilimane IMAP

Name of rooms		Area (m ²)	Remarks
Administrative office		417.0	Headmaster's room, office, meeting room
Classrooms		725.8	14 rooms (51.8m ² /rooms)
Laboratory	Music lab.	91.0	for 28 students
	Science lab.	103.7	ditto
	Art lab.	91.0	ditto
Labour activity workshop	Sewing workshop	51.8	Note: Each institute can select fields of labour activities and their hours.
	Weaving workshop	51.8	
	Ceramics workshop	51.8	
	Kitchen	25.9	
	Metal/wood workshop	51.8	
Library	Reading room	82.1	
	Office, store	54.9	
Multipurpose hall		367.2	Used for physical education and assembly.
Canteen	Canteen	476.0	Accommodating capacity of 240.
	Kitchen, store	474.0	
Central laundry		155.5	Washing and pressing of dormitories linen.
Dormitories		2400.0	Accommodating capacity of 240. Toilets, shower, washing are provided for every 20 students.
Teachers' accommodation		2160.0	32 units (67.5m ² /unit)
Total		7831.3	Excluding common area (corridors etc.)

The facilities of the Quilimane IMAP shown above indicate standard facilities of IMAP required for the common curriculum. But it does not necessarily mean that all the IMAPs established with funds from the African Development Bank will have identical facilities, since each IMAP is set with different condition of class formation, students accommodating system, and the contents of labour activity. The Quilimane IMAP is located within Quilimane City, and it will be possible for its students

and staff to find their accommodation outside the institute. For this reason, its dormitories are not designed to accommodate all of 420 students.

Following special conditions for this project are needed to be taken into consideration in complying with the design standard.

1. Since this project is to rehabilitate existing facilities, the layout of the existing buildings and the existing structures impose limitations on planning of the facilities.
2. The project site is located 70km away from Maputo City and 6km away from Manhiça Village. In addition, there are few accommodation facilities around the project site. Therefore, student dormitories should have a capacity to accommodate all the students.
3. Teachers of this institute are to be recruited from new graduates or transferred from other institutes. But there are few private houses to let lodgings around the institute. And it is inconvenient for its teachers to commute to the Institute from Manisa Village. For these reasons, it will be necessary to secure teachers' accommodation within the premises of the institute.

(2) Basic Concept of the Facility Plan

As a result of the examination of the request for facilities as well as field survey of the existing facilities, the following basic concept of the facility plan was drawn up.

① Utilization of the Existing Facilities

As the strength of the existing concrete structures has been confirmed, the existing facilities can be utilized effectively to implement this project. On the other hand, it is unknown whether the

underground structures, such as the foundations and the footing beams, have sufficient strength to spare for extra loadings. Therefore, floor plans shall be worked out without relocation of the existing concrete block walls even where an adjustment is desirable. Because relocation of existing walls can cause a change of loading condition.

② Administrative Facilities

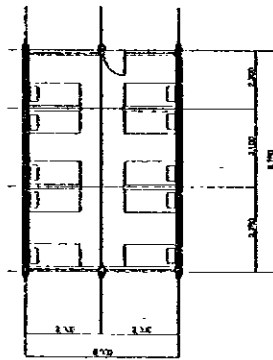
The staffing plan prepared by the Ministry of Education for the administrative department of this institute is considered appropriate in light of the present staff members of the Munhuana IMAF which is presently operated. Under this project, therefore, necessary facilities for the administrative department are to be planned in accordance with the IMAF design standard giving due consideration to the present conditions of the Munhuana IMAF. From the standpoint of facility management, all the administrative related rooms are to be laid out to occupy one of the existing classroom buildings so that they may function being independent.

③ Educational Facilities

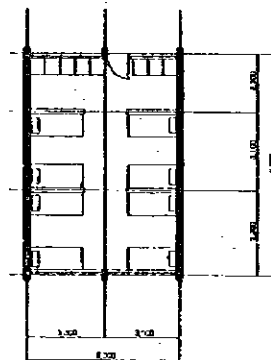
In accordance with the IMAF design standards, general classrooms, laboratories (science, music and art), labour activity workshops, library, multipurpose hall etc. are necessary to conduct academic activities required by the common curriculum. The existing classroom buildings and the laboratory building are to be utilized for those rooms. In case the existing buildings are not sufficient to accommodate all the necessary educational facilities, additional new buildings are to be constructed.

④ Accommodation facilities

Student dormitories shall accommodate a total of 400 students. In case only the existing four dormitories are utilized, it is needed to accommodate 10 students in one bed room. This condition leaves no space for personal storage in each bed room and is worse than the living condition when the institute was founded, which is to accommodate 8 students in one bed room. Therefore, two of the existing classroom buildings shall be rehabilitated as dormitories for 100 male students in addition to the existing dormitories. Since sanitary system are no longer usable, existing toilets are to be converted into bed rooms and toilet buildings are to be newly constructed.



10 students in one bed room



8 students in one bed room

⑤ Canteen

The existing canteen is to be repaired without its scale being enlarged.

⑥ Teachers' accommodation

Since teaching staff are not yet assigned, it is unknown how many families and single people will live in the accommodation. The necessary units of teachers' accommodation are therefore to be calculated on an assumption, and the shortfalls are to be newly constructed.

2-2-3 Utility Plan

Neither sanitary fittings nor electrical fixtures are left in the existing buildings. And existing pipings are no longer usable. Therefore, utility rehabilitation work will be on a scale comparable to that of the work to newly install utility systems. As to the existing underground water pipes in the lavatories of the existing classroom buildings and dormitories, will require reconstructing the existing structures, which results in considerable construction costs. For these reasons, utility plan is to be drawn up on the basis that no existing utility systems will be reused under this project and new lavatory buildings are to be constructed to accommodate toilets, shower, washing etc.

There is no electric power line installed around the project site, and therefore it is necessary to install a new electric line from the substation located near Manhica Village, 5.6km away from the project site. Since the lead-in work of the new power line to the project site is to be carried out outside the project site, such work should be carried out by the Mozambican side as the preparation for this project. For the following reasons, however, it is judged appropriate that the procurement of materials necessary for wiring shall be included in the work to be carried out by the Japanese side.

1. This institute is to be a boarding school and therefore will require 24-hour power supply. For instance water needs to be supplied using electric pumps to the kitchen and the toilets, power supply is indispensable for the normal operation of this institute.
2. The cost of the work to wire a new power line to the project site is estimated at about 730 million MT by Electricity of Mozambique, which is comparable to the total cost of two years of operation and management of the Munhuana IMAP. This amount will cause a heavy

financial burden on the Ministry of Education. (When the materials are provided under this project, the amount to be defrayed by the Mozambican side will be about 330 million MT.)

3. This project is to be implemented with a target to open the institute in February 1999. In case power supply is delayed due to a shortfall of budgetary appropriations, the planned facilities will not be able to be opened. In addition, if the facilities are managed poorly while they remain closed, they may suffer from pilferage and damage as well. According to Electricity of Mozambique, lead-in of electricity at a distance of 5.6km will not cause any troubles, such as voltage drop and power shortage, because power capacity is only 300kVA and the line will be exclusively for this institute.

2-2-4 Equipment Plan

(1) IMAP Standards for Equipment

Equipment for the IMAPs, which are presently under construction, are planned in accordance with the design standards in the same manner as the building facilities. The Government of Mozambique, therefore, expects that this IMAP standards also applied to this project. Shown below is the outline of the equipment planned for the Inamizua IMAP.

Table 2-5 Outline of IMAP Standard for Equipment

Classification	Room/Department	Principal equipment
General use equipment	Classroom	Student's desk/chair, Teacher's desk/chair, Blackboard, Drawing instruments for blackboard
	Library	Bookshelf, Library counter, Reading table/chair, Card cabinet, Reference books
	Administration	Work desk/chair, Side desk, Desk lamp, Filing cabinet, Photocopier, Duplicating machine, Type writer, Book binding machine, Puncher, Stapler, Calculator
	Faculty room	Work desk/chair, Desk lamp, Side desk, Storage cabinet
	Health unit	Boiling sterilizer, Sphygmomanometer, Stethoscope, Consultation bed, Bed, Consulting/surgery instrument, Weighing scale, Stainless cabinet
	Kitchen/Pantry/Food store	Electric oven/range, Refrigerator, Freezer, Electric boiler, Fryer, Weighing scale, Sink, Cooking ware, Storage cabinet
	Canteen/Buffer	Dining table/chair, Tableware, Thermos bottle
	Dormitory	Bed, Mattress, Blanket, Pillow, Sheets, Towel, Tableware, Cooking ware
	Teachers' accommodation	Bed, Mattress, Blanket, Pillow, Sheets, Towel, Tableware, Cooking ware, Iron
	Laundry	Iron, Ironing board
	Recreation	TV, VTR, Cassette tape recorder, Table tennis set, Table soccer
Vehicle	Minibus, Pickup truck, Light vehicle	
Educational equipment	Pedagogy	Bookshelf, Cassette tape recorder, Record player, Amplifier, Microphone, TV, VTR, Overhead projector, Slide projector
	Mathematics/Information	Drawing instruments, Mathematical demonstrating devices, Geometrical forms, Calculator, Personal computer system
	Science education (Common)	Laboratory table, Fume hood, Refrigerator, Table balance, Analytical balance, Shaker, Sterilizer, Muffle furnace
	Science education (Physics, chemistry)	Calorimeter, Experiment set for electrostatic/electromagnetism/electric conduction, Experiment set for heat expansion, Oscilloscope, Whetstone bridge, Battery charger, Experiment set for energy conversion, Demonstration model for hydraulic pressure, Magdeburgh hemisphere, Thermograph, Autoclave, Power dynamometers, Vacuum pump, Chromatography kit
	Science education (Biology)	Aquarium, Dissecting instruments, Plant collecting set, Anatomical human body, Slide prepared for microscope
	Art education	Drawing board, Drawing machine, Drawing instruments, Easel, Template set, Pin board, Paper guillotine, Stapler
	Music education	Cassette tape recorder, Organ, Guitar, Recorder, Drum set, Conga, Metronome
	Physical education	Trampoline, Soccer goal/ball, Basketball post/ball, Table tennis set, Badminton set, Hurdle, Traction rope
	Labor activity (Metal/woodworking)	Electric drill, Circular saw, Grinder, Engraving machine, Hand tools, Bench vice, Measuring instruments
	(Cooking)	Refrigerator, Gas/electric range, Cooking ware, Tableware, Mixer, Meat mincer, Kitchen timer
	(Sewing)	Sewing machine, Iron, Cloth spreading table, Sewing instruments, Mannequin, Mirror
	(Ceramics)	Muffle furnace, Potter's wheel (manual, electrical), Knife
	(Weaving)	Weaving machine (manual), Scissors
Subsidiary school	Amplifier, Microphones	

The contents of the equipment planned for the Inamizua IMAP should serve as a guideline required to implement the common IMAP curriculum. However, in order to make use of the equipment effectively according to the common IMAP curriculum and thereby minimize the cost of maintenance and management, it is necessary to re-examine their appropriateness for this project.

(2) Examination of the Appropriateness of IMAP Standards of Equipment

As a result of the discussions with the Mozambican side, it was concluded that some items of equipment for science education should be excluded from this project, though they are listed in the IMAP standards, with the reasons shown in Table 2-6.

Table 2-6 Examination of IMAP Standards for Equipment

Reasons for exclusion	Equipment
Not specified in the curriculum for experiments. specified as lectures.	Calorimeter, Experiment set for heat expansion/electrostatic/electromagnetism/electric conduction, Multimeter, Whetstone bridge, Experiment set for energy conversion, Demonstration model for hydraulic pressure, Power dynamometers, Magdeburgh hemisphere, etc.
General-purpose equipment but are unlikely to be used effectively because of undefined purpose of uses.	Analytical balance, Sterilizer, Muffle furnace, Shaker, Oscilloscope, Vacuum pump, chromatography kit, Autoclave, etc.
Can be replaced with other means such as printed materials.	Slide film materials, etc.

The common IMAP curriculum requires 2-hour class of Methodology of Science a week, and the contents of experiments using equipment are limited to the basic ones. In addition, the details of the curriculum for science experiments emphasizes on rather the topics on chemistry, optics and biology than dynamics and electricity. For those reasons, it was concluded that experiment classes can be carried out without above items. As the necessity of other items has been confirmed, in principal, it was decided to make a further examination on their quantity.

(3) Basic Concept of the Equipment Plan

Since no equipment remains in the existing facilities, it is necessary to newly procure all necessary items of equipment to implement this project. In working out the equipment plan, the following basic concepts are to be considered as the criteria, and the appropriate grade and quantities should be examined based on the tentative equipment list presented by the Mozambican side.

1. The grade of the equipment should meet the requirements of the common IMAP curriculum. Unnecessarily advanced items should not be selected.
2. Equipment should be planned to be shared by different departments to avoid duplication.
3. Equipment which can be operated manually and does not consume much electric power should be selected to minimize maintenance and operation cost.
4. For the purpose of cost reduction as well as easy maintenance, local procurement or procurement in the third countries such as South Africa should be given priority. Especially a photo copier, personal computer systems and vehicles are to be procured locally since such equipment require maintenance services.
5. Necessary spare parts of the equipment should be planned for approximately 2 years.

2-3 Basic Design

2-3-1 Design Concept

The following design concepts were formulated for the facility/equipment plans as results of the study on the nature conditions in Mozambique, the present state of the project site, the situation of the local construction industry, the objectives of this project and the present situation of the Mozambican implementation organization responsible for the project.

(1) Design Concepts Concerning the Nature Condition

The southern part of Mozambique, where the project site is located, has a semitropical climate. The average annual temperature is 18 to 26°C and the average annual humidity is 65 to 75 percent. The average annual rainfall in that part of the country is 900 to 1,000mm. Since the climate in and around the project site is mild throughout the year, air-conditioning of the planned facilities is principally not to be included in this project. The project site is located at lat. 25°25's. and sunlight from the north is strong. For this reason, the northern walls of the existing buildings are provided only with transom windows, while the southern walls provided with large windows. The same design principle should apply to the facilities of this project. In consideration of the radiation of sunlight, the roofs of the planned facilities should be sufficiently insulated.

(2) Design Concepts Concerning the Present State of the Project Site

The project site is flat land without ups and downs. The existing buildings are located deep inside the project site about 300m from the highway which the project site borders on the north. There are trees growing thick in the space between the existing buildings and the highway.

There are also several huts built by those who are currently staying in the project site without permission. This area is good to be utilized as a playground for its extent. However, felling of trees and clear of the illegal occupants away from the project site need to be done by the Mozambican side. Therefore, it is concluded that the construction of the playground shall not be included in this project.

(3) Design Concepts Concerning the Situation of the Local Construction Industry

Construction materials which are produced in the country are mainly basic ones such as roof tiles, bricks, concrete blocks and wooden furniture. Steel frames and reinforcing bars are also produced in the country but variety of their sizes are limited. Industrial products, such as aluminum window frames and mineral acoustic ceiling tiles, are imported mainly from South Africa. It is economical and is common practice that contractors order such materials to the suppliers in South Africa directly in case the order is large enough.

In consideration of the conditions of the local construction industry as described above, building design shall be made in accordance with construction methods used widely in the country. And construction materials are to be selected giving due consideration to the common practice of procurement in the country.

(4) Design Concepts Concerning Capabilities of the Executing Agency in Terms of Facility/Equipment Maintenance and Management

Judging from the past budgetary records of other institutes, there are restrictions on budgetary appropriations for the operation and management with considerable food expenses accounting for the greater part of the budgetary appropriations. Therefore, it will be imperative to work out

building plans to minimize heating and lighting expenses and maintenance expenses which shall not impose a heavy financial burden on the institute.

(5) Design Concepts Concerning the Range and Grades of the Facilities and Equipment

This project is positioned as a part of the national plan to establish IMAPs envisaged by the Ministry of Education. Contents of the education given at all IMAPs are to be based on the common curriculum. Facilities of four IMAPs, which are funded by the African Development Bank, are designed in the same design standards. The Ministry of Education desires that this design standards should also be applied to all other IMAP facilities. Under this project, therefore, the range and the grades of the facilities will be based on the said IMAP design standards. However, there are some difficulties to conform the standards to this project since there is physical restrictions of the existing structures. Building design documents and soil survey data had been lost in the confusion of the civil war and therefore allowable maximum bearing capacity of the existing foundations is unknown. For this reason, building plans shall be arranged based on the principle not to relocate existing partitioning walls to avoid changing initial loading condition. When the facility plan for this project is worked out without changing the existing partition walls, the degree of freedom in determining the location and floor area of each room will not be as high as in the case of construction of new facilities. Consequently, some rooms may possibly be a little larger than required area. In any case, top priority is to be given to safety whereas special emphasis is to be placed on effective use of the existing facilities. Construction materials, such as asbestos-based materials, which are increasingly being banned in many parts of the world are not to

be used under this project even if they are specified in the IMAP design standards.

(6) Design Concepts Concerning Project Implementation Period

The Mozambican side plans to open the institute in February 1999 so that this project must be completed in advance of this due date. Therefore, construction plan has to be set up in consideration that the work will not be caused any delay.

2-3-2 Basic Design

(1) Site Plan

The project site borders the national highway on the north and a church and a private path leading to the church on the east. Since it has been made clear through the basic design study survey that the private path to the church is not included in the project site, the access to the project site is to be from the national highway on the north. And a inner road leading to the facilities, which are located about 300m from the highway, is to be constructed along the boundary line on the western side of the project site. New facilities such as lavatory buildings and teachers' accommodations are to be arranged to form a cluster together with the existing buildings so that spaces for a playground and farm can be secured on the northern side of the project site. However, construction of the playground is not to be included in this project since such work will involve the felling of the trees and the clear of the illegal occupants in the project site which shall be done by the Mozambican side.

(2) Architectural Plan

The floor plan of the facilities is drawn up on the basis of the following examination.

① Administration related facilities

To conform the IMAP design standard, head master's office, secretary room, administration head office, accounting office, clinic etc. will be planned in one of the existing classroom building.

② Teachers rooms

A total of three teachers' rooms are planned consisting of one room for five teachers and two rooms for 12 teachers each in one of the existing classroom buildings. A office for the pedagogical head is planned next to the teachers rooms.

③ Classrooms

It is planned to organize 14 classes in total. Each class consists of 29 students and will be assigned a home room. In accordance with this class formation, 14 classrooms are planned in the existing classroom buildings.

④ Laboratories

To conduct classes of the special subjects, a science lab, a music lab and an art lab are planned in the existing laboratory building. In general, an average unit area of 3.0m^2 per student is used for planning the science, music and art laboratories. However, in the case of this project, these laboratories are fixed with larger unit area than this average.

Given the unit area of $3m^2$, the required area for each laboratory (each with a seating capacity of 29) is $87m^2$. When laboratories of $87m^2$ are laid out in the existing laboratory building, width of each room is 10 meters which is equivalent to 3.5 spans of the building. This situation requires relocation of the existing partition walls to the center of the span. As there is no underground beams to support the load of the wall in this position, however, it is structurally dangerous to place the wall. It is therefore judged appropriate from the standpoint of safety not to relocate the existing partition walls although it will result in larger rooms by about $10m^2$ than the calculation result. For the same reason, the partition walls of the classrooms are not to be moved either. Thus all these rooms are to be designed a little larger than the required area.

⑤ Labour activity workshops

As indicated in the curriculum, all IMAPs are required to hold courses of labour activities. This activity is aimed primarily at helping IMAP students build up their character by having them voluntarily participate in labour activities. In addition, this activity is considered important in the operation of IMAPs because it brings farm products and incomes to IMAPs through the production activities. Each IMAP can select fields of activities from juvenile literature, photography, cooking and sports, as well as handicraft, sewing and horticulture etc.

Students participate in circles of different fields which are organized under the guidance of the teachers. At this institute, six courses in metal & wood, cooking, sewing, ceramics, weaving and gardening are planned to be conducted. Workshops are planned to be newly constructed for each of metal & wood, sewing, ceramics

and weaving courses close to the laboratory building and classroom buildings under this project. Floor area of each workshop is 51.5m² in accordance with the IMAP design standards. Cooking course is not provided with a kitchen since the kitchen of the canteen can be utilized. As for the gardening course, a gardening store is provided in the laboratory building to keep gardening tools.

The following table shows courses of labour activities at different IMAPs.

Table 2-7 Courses of labour activities at different IMAPs

Name of IMAP	Courses	Workshops provided	Equipment provided
This institute	Metal & wood, cooking, sewing, ceramics, weaving, gardening	Metal & wood, sewing, ceramics, weaving	Metal & wood, sewing, ceramics, weaving, gardening
Inhamizua	Metal & wood, cooking, sewing, ceramics, weaving	All of courses	All of courses
Quelimane	Metal & wood, cooking, sewing, gardening, weaving	All of courses	All of courses

⑥ Multipurpose hall

A multipurpose hall is planned under this project to be used for physical education and assemblies such as graduation ceremonies. Its floor area is to be in accordance with the IMAP design standards. The following table shows a comparison in floor area between the IMAP design standards and the Japanese design standards for gymnasiums.

Table 2-8 Floor area comparison of gymnasium

Standards	Hall	Attached facilities	Total
IMAP design standards	266 m ²	103 m ²	369 m ²
Lower secondary school standards of Japan	420 m ²	80 m ²	500 m ²
High school standards of Japan	640 m ²	150 m ²	800 m ²

While the standard size of gymnasiums of lower secondary schools in Japan is determined on the basis of the size of the volleyball court, the standard size of IMAP gymnasiums is determined on the basis of the sizes of the transpoline and table tennis. As a result, the latter is smaller than the former. When the multipurpose hall is used for assemblies, it will be able to accommodate about 300 persons. Shower rooms for male and female students are provided in the IMAP standard multipurpose hall. Under this project, however, the students are to use the shower rooms in the dormitories and therefore the multipurpose hall of this institute is to be provided with no shower rooms. On the other hand, in consideration of multipurpose use of the hall, storage space of the IMAP design standard is not enough. Therefore, under this project three store rooms are planned for different storage purpose, namely outdoor sports equipment, indoor sports equipment and assembly furniture.

⑦ Library

The total number of books to be housed in this institute is not yet decided. Therefore, conforming the present condition of the Munhuana IMAP, which is currently organized as an IMAP, one of the existing classrooms is to be converted into a library equipped with fourteen bookshelves and five reading tables for twenty people.

⑧ Recreation rooms

In the IMAP design standard one recreation room is provided for one unit of dormitory which accommodate 20 students. Under this project, however, two recreation rooms, one for male students and the other for female students, are planned for the entire

dormitories since it is difficult to provide recreation rooms in the existing dormitories as is discussed in "⑩ dormitories".

⑨ Canteen/kitchen

The existing canteen building is to be rehabilitated with no expansion. The canteen has a total floor area of 308.0m² and is capable of accommodating about 200 persons. For this reason, the students (400 in total) are to take meals at the canteen in two shifts. The existing electric cooking room and the charcoal cooking room, both of which are attached to the existing kitchen of the canteen, are to be no longer used and therefore be removed. And a laundry building for washing of the dormitories linens is to be newly constructed on their location.

⑩ Dormitories

Dormitories are planned to accommodate all of 400 students since it is concluded that all the students will reside in the premises of the institute of this project. Given the present ratio of 3:1 of male and female EP₁ schoolteachers in Mozambique, it is estimated that the IMAP's total number of male students will be 300, and that of female students will be 100 in this institute. In view of the fact that the ratio of female teachers is on the increase with the advance of educational opportunity for women, however, the total number of male students is set as 250, and that of female students 150 under this project. The four existing dormitories have a combined total of 32 bed rooms and 8 toilet/shower rooms. The toilet/shower rooms are to be converted into dormitory bed rooms since their sanitary system is judged impossible to be rehabilitated. Under this project, therefore, two existing dormitory buildings are allocated for male students

to accommodate a combined total of 150 male students and two existing dormitory buildings for female students to accommodate a combined total of 150 female students. And, in addition, two of the existing classroom buildings located on the northern side of the canteen building are to be converted into dormitories for male students to accommodate a combined total of 100 male students. In this way, all of 400 students will be accommodated within the premises of the institute.

① Teachers' accommodation

Teachers' accommodation needs to have a capacity of accommodating 32 staff members consisting of 29 teachers, one administration head, one pedagogical head and one superintendent of the student dormitory. On an assumption that 16 will be single out of 32 staff members and two unmarried staff members are to share one accommodation unit, the necessary number of accommodation units is calculated to be 24. Since there is a total of 12 existing accommodation units in two buildings, the shortfalls (12 units) are to be newly constructed. According to the IMAP design standard, the standard size of teachers accommodation is $67.5\text{m}^2/\text{unit}$. Under this project, however, the size of the units to be newly constructed is the same as that of the existing ones ($52.5\text{m}^2/\text{unit}$).

The required rooms and their respective floor areas are as shown in the following tables.

Table 2-9 Floor Plan

Name of rooms	No. of rooms	Floor area	Remarks
ADMINISTRATION BLDG. (Rehabilitation)			
Head master's office	1	46.5 m ²	Office for the headmaster
Secretary	1	21.6 m ²	Waiting room
Administration head office	1	34.0 m ²	Office for the administration head
Computer room	1	17.0 m ²	Personal computer: 4sets
Reproduction room	1	17.0 m ²	Production of teaching materials
Teaching material store	1	16.4 m ²	Storage for teaching materials
Administration office	1	69.1 m ²	Altogether 5 staff of record, public relations, admission and typists
Accounting office	1	34.0 m ²	Two accountants
Clinic	1	34.0 m ²	Two hospital beds and medicine cabinet etc.
Meeting room	1	66.4 m ²	Accommodating teachers and senior staff
Pantry	1	5.2 m ²	Tea serving
Toilet (M)	1	24.9 m ²	WC: 3, urinal: 4, basin: 3
Toilet (W)	1	21.6 m ²	WC: 4, basin: 3
Corridor		122.5 m ²	
Total		529.2 m²	
LABORATORY BLDG. (Rehabilitation)			
Science Lab.	1	98.0 m ²	For experiment classes
Science prep. room	1	49.0 m ²	Storing experimental equipment
Music Lab.	1	98.0 m ²	For Music classes
Music prep. room	1	12.3 m ²	Storing musical instruments
Art Lab.	1	98.0 m ²	For art classes
Art prep. room	1	12.3 m ²	Storing art equipment
Gardening store	1	49.0 m ²	Storing gardening tools
Corridor		121.2 m ²	
Total		537.8 m²	
CLASSROOM BLDG. 1 (Rehabilitation)			
Pedagogical head office	1	33.1 m ²	Office for the pedagogical head
Teachers' room 1	1	33.1 m ²	Office for 5 teachers
Teachers' room 2, 3	2	68.1 m ² /rm	Office for 12 teachers each
Classroom 1~3	3	68.1 m ² /rm	Classroom for 29 students each. Desks, chairs and blackboard to be installed
Corridor		122.5 m ²	
Total		529.2 m²	
CLASSROOM BLDG. 2 (Rehabilitation)			
Classroom 4	1	66.2 m ²	Classroom for 29 students each. Desks, chairs and blackboard to be installed.
Classroom 5~9	5	68.1 m ² /rm	Ditto

Name of rooms	No. of rooms	Floor area	Remarks
Corridor		122.5 m ²	
Total		529.2 m ²	
CLASSROOM BLDG. 3 (Rehabilitation)			
Classroom 10~14	5	68.1 m ² /rm	Ditto
Library	1	66.2 m ²	20 browsing seatings.
Corridor		122.5 m ²	
Total		529.2 m ²	
LABOUR ACTIVITY BLDG. 1 (New)			
Ceramics workshop	1	51.5 m ²	Ceramics equipment and work tables to be installed.
Metal & Wood workshop	1	51.5 m ²	Metal/wood working equipment and work tables to be installed.
Corridor		42.3 m ²	
Total		145.3	
LABOUR ACTIVITY BLDG. 2 (New)			
Sewing workshop	1	51.5 m ²	Sewing equipment and work tables to be installed.
Weaving workshop	1	51.5 m ²	Weaving equipment and work tables to be installed.
Corridor		42.3 m ²	
Total		145.3 m ²	
LAVATORY BLDG. 2 (New)			
Toilet (M)	1	32.4 m ²	WC: 5, urinal: 6, basin: 4
Toilet (W)	1	32.4 m ²	WC: 10, basin: 4
Total		64.8 m ²	
CLASSROOM BLDG. 1 (Rehabilitation)			
Toilet (M)	1	32.4 m ²	WC: 5, urinal: 6, basin: 4
Toilet (W)	1	32.4 m ²	WC: 10, basin: 4
Total		64.8 m ²	
Connecting Corridor (New)	1	152.8 m ²	
MULTIPURPOSE HALL (New)			
Hall	1	263.5 m ²	Used for physical training and ceremonies. Accommodating 300 for ceremonies
Toilet (M)	1	20.7 m ²	WC: 4, urinal: 4, basin: 3
Toilet (W)	1	13.0 m ²	WC: 2, basin: 3
Teachers' toilet	1	7.2 m ²	WC: 1, urinal: 1, basin: 1
Store 1	1	13.5 m ²	Storing hurdle, rope, post and bar for high jump, etc.
Store 2	1	12.9 m ²	Storing trampoline, ping pong table, etc.
Store 3	1	25.9 m ²	Storing platform, chairs, etc. for ceremonies
Corridor		144.4 m ²	
Total		501.1 m ²	

Name of rooms	No. of rooms	Floor area	Remarks
DORMITORY (M) 1 (Rehabilitation)			
Recreation room 1	1	66.4 m ²	Accommodating 10 students. Beds and cabinets to be installed.
Bed room	5	68.1 m ² /rm	
Corridor		122.5 m ²	
Total		529.2 m ²	
DORMITORY (M) 2 (Rehabilitation)			
Recreation room 2	1	66.4 m ²	Accommodating 10 students in each room. Beds and cabinets to be installed.
Bed room	5	68.1 m ² /rm	
Corridor		122.5 m ²	
Total		529.2 m ²	
DORMITORY LAVATORY (New)			
Toilet	2	28.4 m ² /rm	WC: 16, urinal: 22
Washing	2	14.2 m ² /rm	basin: 22
Shower	1	28.4 m ²	booth: 12
Wash house	1	18.9 m ²	wash tab: 12
Corridor		59.2 m ²	
Total		191.7 m ²	
CANTEEN BLDG. (Rehabilitation)			
Canteen	1	308.0 m ²	Accommodating 200. Tables and chairs to be installed.
Pantry	1	44.0 m ²	Preparation of meals and collection of dishes
Kitchen	1	132.0 m ²	Preparation of three meals a day for 400 students
Office	1	12.0 m ²	
Resting room	1	16.8 m ²	
Food store	1	27.2 m ²	Storing ingredients
Toilet/shower	1	19.0 m ²	WC: M, W Shower: M, W
Corridor		273.0 m ²	
Total		832.0 m ²	
LAUNDRY BLDG. (New)			
Washing room	1	51.8 m ²	wash tab: 6, basin: 3
Pressing room	1	51.8 m ²	Pressing linens
Linen store	1	19.4 m ²	Storing linens
Corridor		6.5 m ²	
Total		129.5 m ²	
DORMITORY (M) 3 (Rehabilitation)			
Bed room	10	52.5 m ² /rm	Accommodating 8 students in each room. Beds and cabinets to be installed.
Corridor		150.0 m ²	
Total		675.0 m ²	

Name of rooms	No. of rooms	Floor area	Remarks
DORMITORY (M) 4 (Rehabilitation)			
Bed room	10	52.5 m ² /rm	Accommodating 8 students in each room. Beds and cabinets to be installed.
Corridor		150.0 m ²	
Total		675.0 m ²	
DORMITORY LAVATORY (M) 2 (New)			
Toilet A	1	28.4 m ²	WC: 8, urinal: 12
Toilet B	1	37.8 m ²	WC: 11, urinal: 15
Washing A	1	14.2 m ²	Tap: 12
Washing B	1	18.9 m ²	Tap: 15
Shower	1	42.5 m ²	booth: 18
Wash house	1	28.3 m ²	wash tab: 18
Corridor		66.0 m ²	
Total		236.1 m ²	
DORMITORY (W) 1 (Rehabilitation)			
Bed room	10	52.5 m ² /rm	Accommodating 8 students in each room. Beds and cabinets to be installed.
Corridor		150.0 m ²	
Total		675.0 m ²	
DORMITORY (W) 2 (Rehabilitation)			
Bed room	10	52.5 m ² /rm	Accommodating 8 students in each room. Beds and cabinets to be installed.
Corridor		150.0 m ²	
Total		675.0 m ²	
DORMITORY LAVATORY (W) (New)			
Toilet	2	28.4 m ² /rm	WC: 12/ each
Shower	1	42.5 m ²	booth: 18
Washing	2	28.4 m ² /rm	tap: 19/ each
Wash house	1	28.3 m ²	Wash house: 18
Corridor		62.9 m ²	
Total		247.3 m ²	
TEACHERS' ACCOMMODATION 1 (Rehabilitation)			
Bed room 1	} 6 units	12.0 m ² /unit	Family type. In case of singles, 2 peoples will be accommodated in one unit.
Bed room 2		12.0 m ² /unit	
Living room		17.4 m ² /unit	
Kitchen		5.6 m ² /unit	
Toilet		3.4 m ² /unit	
Wash		2.1 m ² /unit	
Total		315.0 m ²	

Name of rooms	No. of rooms	Floor area	Remarks
TEACHERS' ACCOMMODATION 2 (Rehabilitation)			
Bed room 1	6 units	12.0 m ² /unit	Family type. In case of singles, 2 people will be accommodated in one unit.
Bed room 2		12.0 m ² /unit	
Living room		17.4 m ² /unit	
Kitchen		5.6 m ² /unit	
Toilet		3.4 m ² /unit	
Wash		2.1 m ² /unit	
Total		315.0 m²	
TEACHERS' ACCOMMODATION 3 (New)			
Bed room 1	6 units	12.0 m ² /unit	Ditto
Bed room 2		12.0 m ² /unit	
Living room		17.4 m ² /unit	
Kitchen		5.6 m ² /unit	
Toilet		3.4 m ² /unit	
Wash		2.1 m ² /unit	
Total		315.0 m²	
TEACHERS' ACCOMMODATION 4 (New)			
Bed room 1	6 units	12.0 m ² /unit	Family type. In case of singles, 2 peoples will be accommodated in one unit.
Bed room 2		12.0 m ² /unit	
Living room		17.4 m ² /unit	
Kitchen		5.6 m ² /unit	
Toilet		3.4 m ² /unit	
Wash house		2.1 m ² /unit	
Total		315.0 m²	
CENTRAL CORRIDOR	Rehabilitation	1,134.1 m ²	Connecting buildings
	new	180.0 m ²	
INCIDENTAL FACILITIES (New)			
Electrical Bldg.	1	40.0 m ²	Transformer, distribution board and emergency generator to be installed.
Elevated water tank	1	32.0 m ²	Water supply to toilets etc.
Total		72.0 m²	
Grand Total		11,769.8 m²	Rehabilitation: 9,009.1 m² New: 2,760.7 m²

(2) Sectional Plan

Since sunshine from the north is strong in the southern part of Mozambique, where the project site is located, the northern walls of the existing buildings are provided only with transom windows, while the southern walls are provided with large windows. Under this project, also, the northern walls are to be provided only with transom windows for minimum lighting and ventilation. As the existing structures are to be reused under this project, 3.0m floor height of the existing buildings will not be changed, which is sufficient to secure functional ceiling height. And this floor height is also applied to the facilities to be newly constructed.

In principle, rehabilitation of the existing buildings are to be in accordance with the same specifications that applied at the time of the founding of the institute. However, asbestos corrugated sheets are not to be used as roofing materials since they are considered harmful to the human bodies. And insulated sandwich panel, which are highly resistant to radiant heat, are to be used instead.

(3) Structural Plan

① Rehabilitation of the existing structure

The rehabilitation plans for the existing structures are as shown in the following table.

Table 2-10 Rehabilitation Plans for Existing Structures

Portion	Rehabilitation plan
Roof truss	Blocks on RC cross beams and remaining steel frames are all to be removed and steel frame trusses are to be newly installed. Components of trusses to be angle (L-60x60x6) which are easily procured locally.
Cross beam	Cross beams which are partially damaged are to be concreted anew. Concrete blocks on the beams are to be replaced with new ones for installation of the new steel roof trusses.
Column	Columns which are damaged beyond the allowable limits are to be concreted anew. Those which look intact are to be used without any repairs.
Floor	Some cracks have been generated but do not show subsidence. Therefore, it is judged that the ground bearing condition is settled. The existing floor will be concreted anew on it with welded wiremesh.
Wall	Since the details of the structure below the floor slabs are unknown, the existing walls are to be left as they are, in principle. Where additional partition walls are needed to be installed, those shall be of light wooden frame.
Foundation/ foundation girder	Since the details of the bearing capacity of soil, the size of the foundations and so on are unknown, the weight of the new facilities shall not exceed that of the initial ones in principle.

As for structure of the new buildings, same system as the existing ones will be applied. Columns, cross beams, foundations and floor slabs are of reinforced concrete and roof trusses are of steel structure. Shown below is the outline of the structure of the facilities to be newly constructed.

② Structure of the new buildings

• Outline of the structure

Number of stories : one-story
 Story height : 6.0m (multipurpose hall)
 3.0m (other facilities)
 Structure : reinforced concrete (below cross beams)
 steel (roof truss)
 Footing : continuous footing

- Load and external forces

Live load : In accordance with the Japanese Building Act

(Kg/m²)

Category	For slabs, beams	For columns, girders
Classrooms	230	210
Offices	300	180
Bed rooms	180	130
Roof	60	60

Wind force : Following formula to be employed in accordance with the Japan Building Act

$$\text{Wind force} = q \cdot c$$

$$q = 60\sqrt{h},$$

c = wind pressure coefficient

h = height from ground

Seismic force : Not considered

- Materials

Concrete : Fe=250Kg/cm² (4 week compressive cube strength)

Steel bar : BS4449, Grade 460/425

Steel section : BS4848 (equal steel angle)

(4) Electrical Facility Plan

A power intake pedestal is to be installed near the road boundary line within the project site to receive 3-phase, 3-line, 33kV electric power. The electric wiring to the electrical room, which is planned near the laboratory building, from the pedestal is to be underground. After transformed down to 415-249V through the transformer in the electrical room, power is to be distributed via the power distribution panel. As it is expected that there will be two or three power failures a month, each lasting about one hour, a 100kVA generator is to be installed to supply

electric power to the security lighting fixture, the refrigerator in the kitchen of the canteen and the pumps during power stoppage.

Procurement of materials to wire the power line from the substation about 5.6km away from the project site is to be included in this project. Such wiring materials shall be procured by the Japanese side and be turned over to the Mozambican side at the project site. After these materials are turned over, the construction work to wire the electric power line to the project site shall be carried out by electricity of Mozambique under the supervision of the Ministry of Education and the consultant.

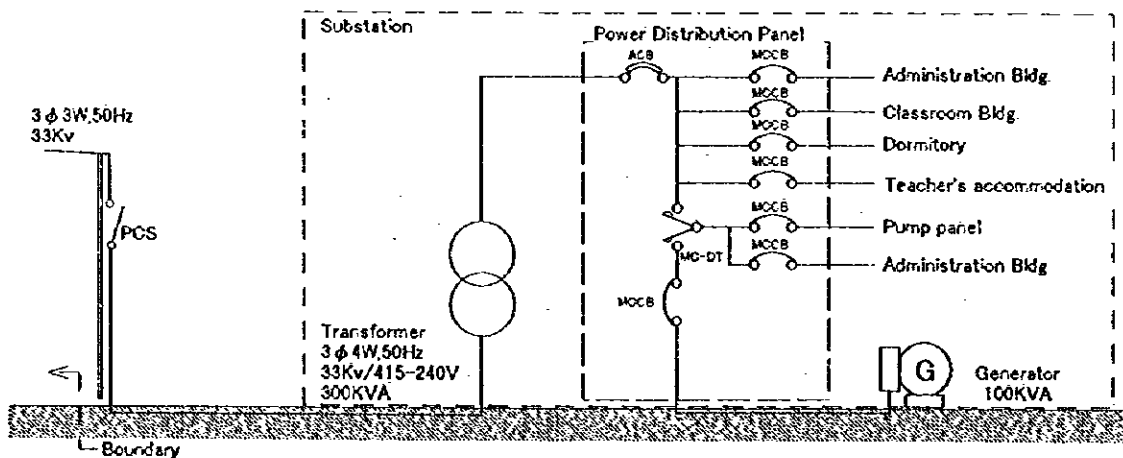


Fig. 2-1 Power Supply System Diagram

(5) Telephone Facility Plan

A switchboard will be installed and telephone sets are provided in the administration building. The switchboard will have a capacity for 6 city office lines and 16 extension lines assuming that three city office lines will be intaken to the institute and in consideration of future expansion as well. Extensions are to be installed only in the administrative building.

(6) Plumbing Plan

A tube well of 120 meter deep is to be dug as the water source of the facilities. Well water is to be stored in a reservoir tank and be pumped up to an elevated water tank, which is 15 meters tall, and is then supplied to the toilets, the shower rooms, kitchen etc. Hot water is to be supplied only to the teachers' accommodations from solar water heaters which may save the running cost.

Water consumption and tank capacity are calculated as follows;

- Water consumption

student	$400\text{persons} \times 80\ell/\text{day}\cdot\text{person}$	$= 32,000\ell/\text{day}$
staff members	$77\text{persons} \times 120\ell/\text{day}\cdot\text{person}$	$= 9,240\ell/\text{day}$
teachers accommodation	$80\text{persons} \times 100\ell/\text{day}\cdot\text{person}$	$= 8,000\ell/\text{day}$

Total $49,240\ell/\text{day} \rightarrow 50\text{m}^3/\text{day}$

- Reservoir capacity

Same amount as the one day consumption	50m^3
Detritus tank	30m^3

- Elevated water tank

for two hour consumption at the busicast time 10m^3

(7) Sewerage System

Ordinary waste water and sewage will be treated in septic tanks and then discharged through soak pits. Septic tanks will have a capacity for 50 persons and 17 numbers of them will be installed. Location of septic tanks and soak pits shall be determined to avoid troubles to the living environment caused by odor and insanitary discharge. Storm water is also to be made to permeate the soil in principle.

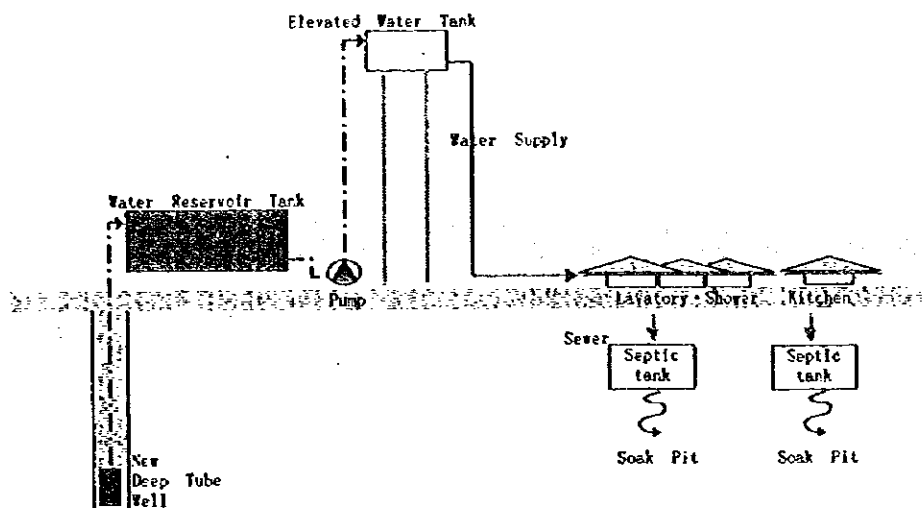


Fig.2-2 Piping System Diagram

(8) Construction Materials Plan

Criteria for selection of construction materials is to make the facilities match the local climatic conditions, local customs and the local construction methods. And due consideration shall also be given to the durability of the materials and easy procurement in the local market for the future maintenance.

① Structural Materials

Shown below is a list of structural materials selected.

Table 2-11 List of Structural Materials

Portion	Material	Remarks
Cross beam Column Concrete slab Foundation girder Foundation	Reinforced concrete	Mixed at site. In the country slump test value of site mixed concrete is low and quality is satisfactory.
Roof truss	Steel angle truss	Steel frame is expensive and only small section items can be available in the country. Though large section items are produced in South Africa, they are seldom imported to Mozambique. Common local practice is that even long span roof truss is made of steel angles by means of welding

② Exterior Finishing Material

Shown below is the list of materials selected.

Table 2-12 List of Exterior Finishing Materials

Portion	Material	Remarks
Roof	Pre-painted insulated sandwich panel	Pre-painted. Insulated sandwich panel to be used for office, classrooms, accommodation etc. Corridors, toilets and multipurpose hall to be covered with non-insulated sheet. Both types are produced in South Africa.
Exterior wall	Paint finish on mortar steel troweled concrete block	Common in the country. Existing buildings are also with this finishing.
Doors and windows	Wood	Wooden frames are locally produced. Various types of imported glass is available in the market.

③ Interior Finishing Material

Shown below is the list of materials selected.

Table 2-13 List of Interior Finishing Material

	floor	Wall	Ceiling	Remarks
Classrooms Dormitories	Plastic tile on concrete monolithic finish	Paint on steel troweled mortar	Paint on calcium silicate board	Durable, economical and easy for maintenance
Multipurpose hall	Parquet on steel troweled cement mortar	Ditto	No suspended ceiling	Safety during physical education is required. Standard for IMAP facility
Toilets	Mosaic tile	Paint on steel troweled mortar Wainscot to be ceramic tile	Paint on calcium silicate board	Durable, water resisting and easy for cleaning

(9) Equipment Plan

Items of equipment requested by the Mozambican side are examined as follows;

Quantities of the items of educational equipment were determined based on the assumption as shown below.

Table 2-14 Determination of Quantities of Educational Equipment

Classification of equipment	Grouping	Example of equipment
Teacher shows demonstration to the students using 1 unit (set) of the equipment	1 unit/a class (29 students)	Optical bench, DNA model, Human anatomical model, Hydrometer, pH indicator set, Earth revolution demonstrator
Every student occupies 1 unit (set) for practice	1 unit (set)/a student	Drawing instrument set
1 unit (set) is shared by a group for practice	1 unit (set)/3 students/group	Calculator, Recorder, Microscope
	1 unit (set)/6 students/group	Dissectioning set, Table balance, Guitar, Clay work board, Potter's wheel
	1 unit (set)/10 students/group	Plant collecting set, High jump set, Badminton set, Weaving machine, Easel

① Classroom Furniture and Equipment

Desks, chairs, blackboards, sets of drawing instruments for blackboard (rules, set squares, dividers, etc.) for the students and the instructors are planned to be procured. The total number 410 sets of desks and chairs are planned including 10 sets of spares.

② Administrative Equipment

Desks, chairs, filing cabinets and the like for 10 staff members are planned. Apart from the above furniture, necessary numbers of typewriters, simple printing/binding equipment (stencil printing machine, bookbinding machine and binder drill, etc.) and 2 sets of personal computers are also planned. However, an adhesive type bookbinding machine, which is listed in the IMAP standards, was decided to be excluded because procurement of applicable adhesive in Mozambique is difficult and a combo type binding machine can substitute it. Furthermore, general office equipment such as desk lamps and side cabinets are concluded to be prepared by the Mozambican side if necessary.

③ Clinic Equipment

Since the clinic is used for giving first aid to the students and

staff members, only the following items are planned to be procured. Those who require hospitalization or surgery are transferred to the nearby hospital.

- Examination bed • Boiling sterilizer • Sphygmomanometer
- Refrigerator (to store drugs)
- Examining/first aid equipment (stethoscope, sterilizing cotton can, kidney basin, scissors, tweezers, etc.)
- Consulting desk/chair • Cabinet

④ Kitchen Equipment

The kitchen utensils such as pots, frying pans and ladles and assorted tableware are planned. And other items such as electric ovens, refrigerator, freezer and cooking tables/sinks are planned to be installed under the building work.

⑤ Furniture for the Dormitory and Teachers' Accommodation

Beds, mattresses and lockers for a total of 400 students are planned for the dormitory. As regards the teachers' accommodation, a total of 48 beds (16 beds: one for each of the 16 single teachers, and 32 beds: two for each of the married teachers), as well as the necessary numbers of desks, tables and chairs, are planned.

⑥ Equipment for the Science Laboratory

Common items of equipment, such as laboratory tables and fume hood, are planned to be installed in the laboratory. General-purpose experimental equipment planned are those which are suited for use in basic experiments conducted at primary schools such as microscopes and assorted glassware are also planned. A drying oven, which is listed in the IMAP standards, was concluded to be replaced with a vinyl covered drying shelf (movable with casters) for easier maintenance.

⑦ Equipment for Art/Music/Physical Education

Items and respective quantities were determined principally in accordance with the IMAP standards. As regards the items for music education, an organ and an electric piano were examined as a keyboard instrument. Based on the examination, it was concluded that an electric piano has the advantage over an organ with the following reasons.

- Advantageous in making variation of sounds including organ sound.
- Advantageous in volume when used in the large space such as multipurpose hall.

Further, a vibraphone, which is listed in the IMAP standards, was concluded to be excluded whereas a marimba is included because of its easiness in playing.

⑧ Equipment for Labour Activities

Necessary equipment for five fields, namely, metal & wood, sewing, ceramics, weaving and gardening are to be planned under this project. No particular equipment is planned for the field of cooking since facility and utensils of the kitchen can be used for the activity.

⑨ Minibus

A minibus is necessary for transport of students to field trips and out-school practice at nearby primary schools, as well as transportation for the teachers. The IMAP common curriculum includes about 490 hours of out-school practices (90 hours in the 1st year and 400 hours in the 2nd year). As a rule, the students of the same class are assigned to take practices at the same primary school. Out-school practices are planned to be taken mainly at the following primary schools.

Manhiça Primary School

(EP₁ level; located about 7km away from the project site)

Chibututuine Primary School

(EP₂ level; located about 2km away from the project site)

Tinaquine Primary School

(EP₁ level; located about 3km away from the project site)

The frequency in use of a minibus is estimated about 380 times a year as follows in an assumption that one-third of the students who take out-school practice use it.

- Annual days of out-school practice for the 1st year students (daily practice hour: 6) → 90 hours/6 hours = 15 days
- Annual days of out-school practice for the 2nd year students (daily practice hours: 6) → 400 hours/6 hours = 67 days
- Total annual days of out-school practice → 82 days (times)/class
- Estimated annual frequency in use of a minibus
→ 82 times x 14 classes x 1/3 ≈ 380 times

The minibus planned under this project should be of standard type with a seating capacity of 30 and 3,200cc displacement diesel engine.

⑩ Pickup truck (Loading capacity: 1 ton)

A pickup truck is necessary to transport the materials educational materials, firewood/charcoal for the kitchen and cooking ingredients, etc. Judging from the storage capacity of the refrigerator in the kitchen, it will be necessary to carry perishables, such as meat and vegetable at least once a week. The planned pickup truck should be specified as four-wheel-driven (4WD) type considering flooded road condition in the rural area during the rainy season.

⑪ Personal Computer Systems

A total of four personal computer systems are necessary for the following purposes.

Administration:

- for management of the students' records/credits, equipment/documents and the school budget (1 unit)
- for documentation of the school (1 unit)

Education:

- for preparation and management of teaching materials (2 units)

A set of personal computer system is to consist of a main unit, a printer and a UPS. Application software are planned to include word processing software, tabulating software and databases. It will be possible to procure both hardware and software from the local distributors and to have after sales service for maintenance.

② Safekeeping and management of the equipment

Some small items such as glassware, stopwatch and tools for labor activity are to be procured under this project. Therefore, it is necessary to take measures against theft and loss of such items. For safety lockable storage cabinets are planned to be installed in the store, preparation rooms or teachers' rooms. Metal baskets with locks are also planned to be procured for storing balls.

The following table shows the purpose of uses of principal equipment planned for the project.

Table 2-15 Purpose of use of principal equipment

Equipment	Purpose of use
<General use equipment>	
(Administration department)	
● Personal computer system	For use in management of students' exam results, budget management and documentation
● Photocopier	For copying small quantity of office documents and teaching materials
● Stencil duplicator	For use in printing large quantity of teaching materials
● Consulting/first aid equipment	To be equipped in the clinic for giving first aid to students and staff members
● Minibus	For use in transportation service for students and staff members
● Pickup truck	For carrying educational materials, fuels for the kitchen and foods, etc.
<Educational equipment>	
(Pedagogy)	
● Monitor TV set	For use in teaching practice of the students
● Portable PA set	For use in ceremony and events in the multipurpose hall or outdoors
● 35mm camera set	For taking pictures for teaching materials and other educational purposes such as recording practice of the students
● Overhead projector	For showing transparency materials in the classroom
● Personal computer system	For preparing and storing data of teaching materials
(Science education)	
● Fume hood	To be installed in the laboratory for experiments in which toxic substances come out (IMAP standards requires to install this item in science lab.)
● Drying shelf	For drying glassware and supplies after washing
● Centrifuge	For use in manual separation of substances in liquids, such as acids and proteins
● Microscope/binocular microscope	For practical observation of animal/plant tissues
● Glassware and supplies	For use in basic chemical experiments
● pH indicator set	For measuring pH values of liquid with reagents

Equipment	Purpose of use
<ul style="list-style-type: none"> ● Dissecting tool 	Used for simple dissecting practice and preparation of samples for microscope
<ul style="list-style-type: none"> ● Slide prepared for microscope 	For use in observation of small tissues and cells of plants, animals or insects (ready-made teaching materials)
<ul style="list-style-type: none"> ● Anatomical human body 	To learn human vital organs
(Music education)	
<ul style="list-style-type: none"> ● Cassette tape recorder 	For listening to music, chorus practice, etc.
<ul style="list-style-type: none"> ● Guitar / marimba / conga 	For practice in playing
<ul style="list-style-type: none"> ● Electric piano 	For practice and also used for the meetings and events
(Physical education)	
<ul style="list-style-type: none"> ● Trampoline / soccer goal posts, etc. 	For physical practice
(Labour activity)	
<ul style="list-style-type: none"> ● Engraving machine 	For rough cutting of wooden pieces
<ul style="list-style-type: none"> ● Shear 	For cutting thin sheet metals
<ul style="list-style-type: none"> ● Sewing machine 	For sewing and repairing practice of clothing
<ul style="list-style-type: none"> ● Potter's wheel 	For production practice of pottery such as dishes and pots
<ul style="list-style-type: none"> ● Weaving machine 	For production practice of simple mats, tapestries, etc.

The items and the quantities of the equipment to be procured for this project are given in the following list. Priority of each item was given based on the following criteria as a reference.

- A: Item which is considered indispensable to carry out the project
 B: Item which is considered reasonable, however, necessity is judged comparatively lower than other items.

Table Equipment List

No.	Equipment	Priority	Qty
	<General use equipment>		
	1. Classroom		
A-1	Student's desk/chair (700×450×750mm, including spares)	A	410 sets
A-2	Teacher's desk/chair (800×450×750mm)	A	14 sets
A-3	Blackboard(3,600mm×1,200mm)	A	14 units
A-4	Drawing instruments for blackboard(Scale, triangles, compasses)	A	14 sets
A-5	Storage cabinet (900×450×1,800mm)	A	14 units
	2. Library		
B-1	Bookshelf (900mm wide, 5 shelves)	A	14 units
B-2	Newspaper rack	B	1 unit
B-3	Card cabinet	B	1 unit
B-4	Library counter (1,800×500×800mm)	A	1 unit
B-5	Reading table (1,600×700×750mm)	A	5 units
B-6	Reading chair	A	21 units
	3. Administration		
C-1	Work desk (A) (1,600mm×700×750mm, double pedestal)	A	4 units
C-2	Work desk (B) (1,400mm×700×750mm, single pedestal)	A	10 units
C-3	Work chair (A) (With armrest)	A	4 units
C-4	Work chair (B) (Without armrest)	A	25 units
C-5	Bench seat	B	2 units
C-6	Filing cabinet	A	11 units
C-7	Electric typewriter	A	1 unit
C-8	Manual typewriter	A	1 unit
C-9	Personal computer system(Including software, UPS)	A	2 sets
C-10	Calculator	B	2 units
C-11	Photocopier (A3 size)	A	1 unit
C-12	Stencil duplicator (B4 size, printing speed : 90sheets/min.)	A	2 units
C-13	Paper guillotine (Manual, desktop type)	B	1 unit
C-14	Binder drill	B	1 unit

No.	Equipment	Priority	Q'ty
C-15	Puncher	B	5 units
C-16	Binding machine (Combo type)	A	1 unit
C-17	Stapler	B	5 units
C-18	Storage cabinet (900×450×1,800mm)	A	39 units
C-19	Storage rack (900×450×1,800mm)	A	8 units
C-20	Work table (1,800×900×750mm)	A	1 unit
C-21	Counter (1,800×500×800mm)	A	1 unit
4. Teachers' room			
D-1	Work desk (B) (1,400mm×700×750mm, single pedestal)	A	29 units
D-2	Work chair (B) (Without armrest)	A	29 units
D-3	Filing cabinet	A	15 units
D-4	Storage cabinet (900×450×1,800mm)	A	29 units
5. Conference room			
E-1	Conference table(1,800×600×750mm)	A	8 units
E-2	Conference chair	A	33 units
6. Clinic			
F-1	Boiling sterilizer (600W)	A	1 unit
F-2	Sphygmomanometer	A	1 unit
F-3	Stethoscope	A	1 unit
F-4	Head mirror	A	1 unit
F-5	Examining/first aid equipment (Cotton can, kidney basin, etc.)	A	1 set
F-6	Examination bed/mattress	A	1 set
F-7	Bed/mattress	A	2 sets
F-8	Consulting desk/chair	A	1 set
F-9	Wagon	B	1 unit
F-10	Refrigerator (200 lit.)	A	1 unit
F-11	Storage cabinet (900×450×1,800mm)	A	1 unit
F-12	Partition	B	3 units
F-13	Stool	A	1 unit
7. Kitchen/canteen			
G-1	Meat mincer	A	2 units
G-2	Peeling machine	A	2 units
G-3	Slicer	A	1 unit

No.	Equipment	Priority	Q'ty
G-4	Weighing scale (150kg, 20kg, 10kg)	A	1 set
G-5	Tableware (Tray, dish, cup, fork, etc.)	A	1 set
G-6	Cooking ware (Frying pan, dish, ladle, etc.)	A	1 set
G-7	Wagon	B	5 units
G-8	Canteen table (1,800×700×750mm)	A	36 units
G-9	Canteen chair (Including spares)	A	220 units
G-10	Table/chair for resting room	A	1 set
G-11	Work desk/chair	A	1 set
G-12	Storage cabinet (900×450×1,800mm)	A	8 units
G-13	Storage cabinet (900×450×1,800mm)	A	8 units
G-14	Work table (1,800×900×750mm)	A	1 unit
8. Dormitory/Teachers' accommodation (Dormitory)			
H-1	Bed/mattress(Single deck, 900×2,000mm)	A	400 sets
H-2	Pillow/blanket/sheets (Including spares)	A	440 sets
H-3	Locker (Teachers' accommodation)	A	400 units
H-4	Bed/mattress(Single deck, 900×2,000mm)	A	48 sets
H-5	Pillow/blanket/sheets (Including spares)	A	72 sets
H-6	Work desk/chair	B	32 sets
H-7	Dining table/chair	B	24 sets
9. Laundry			
I-1	Iron/ironing board	A	4 sets
I-2	Work table (1,800×900×750mm)	A	4 units
I-3	Storage rack (900×450×1,800mm)	A	12 units
10. Recreation room			
J-1	Table(1,100mm dia.)	A	12 units
J-2	Chair	A	72 units
J-3	Monitor TV set(21 inch color TV with VTR, rack)	A	2 sets
J-4	Cassette tape recorder	B	2 units
11. Multipurpose hall			
K-1	Stacking chair	A	40 units
K-2	Stage	B	3 units

No.	Equipment	Priority	Qty
K-3	Storage cabinet (900×450×1,800mm)	A	2 units
K-4	Storage rack (900×450×1,800mm)	A	12 units
	12. Vehicle		
L-1	Minibus (Seating capacity: 30)	A	1 unit
L-2	Pickup (4-WD, loading capacity: 1 ton)	A	1 unit
	<Educational equipment>		
	1. Pedagogy		
M-1	Cassette tape recorder	A	4 units
M-2	Portable PA set (Amplifier, speaker, microphone)	B	1 unit
M-3	35mm camera set (Camera, tripod, case)	B	1 set
M-4	Overhead projector (Stage size: 285×285mm)	A	4 units
M-5	Slide projector	A	1 unit
M-6	Screen (Portable type, size: 1,200×1,200mm)	A	4 units
M-7	Transparency making kit	A	4 sets
M-8	Monitor TV set(21 inch color TV with VTR, rack)	B	1 set
M-9	Personal computer system(Including software, UPS)	A	2 sets
	2. Mathematics/Information		
N-1	Drawing instrument set (Compasses, dividers, triangles, etc.)	A	30 sets
N-2	Graph board (900×900mm, metric)	A	2 sets
N-3	Mathematical demonstration device (Decimal abacus, random number dice, pin board)	A	1 set
N-4	Geometrical forms (Cone, cube, sphere, etc.)	A	1 set
N-5	Measuring instruments (1 lit. cube, metric wheel, height measuring device)	A	1 set
N-6	Calculator	B	10 units
	3. Natural science		
	(Fittings and common equipment)		
O-1	Laboratory table (2,400×1,200×750mm)	A	5 units
O-2	Stool	A	30 units
O-3	Teacher's desk/chair (800×500×750mm)	A	1 set
O-4	Fume hood (900×650×1,800mm)	A	1 unit
O-5	Blackboard(3,600mm×1,200mm)	A	1 unit
O-6	Refrigerator (200 lit.)	A	1 unit
O-7	Measuring instruments (Measuring tape, rules, etc.)	A	1 set

No.	Equipment	Priority	Qty
O-8	Spring balance(1kg, 0.5kg, 4 each)	A	8 units
O-9	Table balance (Double pan type)	A	5 units
O-10	Weight set	A	1 set
O-11	Thermometer (Rod type)	A	1 set
O-12	Timer	A	2 units
O-13	Hydrometer (Arcometer type)	B	1 unit
O-14	Drying shelf (Basket type, with casters)	A	1 unit
O-15	Water bath (7 lit. 1kW)	A	1 unit
O-16	Hot plate (Plate size: 300×250mm, 1kW)	A	1 unit
O-17	Heating mantle (1 kW)	B	1 unit
O-18	Centrifuge (Manual type, for 2 tubes)	B	1 unit
O-19	Magnifying glasses	A	1 set
O-20	Microscope (40x - 600x)	A	10 units
O-21	Binocular microscope (20x - 60x, with lighting device)	B	1 unit
O-22	Glassware and supplies(Beaker, flask, measuring cylinder, etc.)	A	1 set
O-23	Maximum/minimum thermometer	A	1 unit
O-24	Work table (1,800×900×750mm)	A	2 units
O-25	Stool	A	8 units
O-26	Storage cabinet (900×450×1,800mm)	A	2 units
O-27	Storage rack (900×450×1,800mm)	A	3 units
	(Physics/chemistry)		
O-28	Optical bench (1,200mm, with light source, screen)	A	1 unit
O-29	Lens, prism set	A	1 set
O-30	Mirror set	A	1 set
O-31	PH indicator set	B	1 set
O-32	World map	A	14 sheets
O-33	Earth revolution indicator	B	1 unit
O-34	Magnetic compass	A	3 pcs.
O-35	Molecule model	A	1 set
O-36	Celestial globe	A	1 unit
	(Biology)		
O-37	Dissecting set (Knife, scissors, tweezers, tray, etc.)	A	5 sets
O-38	Plant collecting set (Field bag, Scissors, etc.)	B	1 set
O-39	DNA model	B	1 unit
O-40	Slide prepared for microscope (Plant, animal, plankton)	A	1 set

No.	Equipment	Priority	Q'ty
O-41	Specimens of fossil (Plant, animal, shell)	B	1 set
O-42	Anatomical human body (Common type for man/woman)	A	1 unit
O-43	Human skeleton model	A	1 unit
4. Art education			
P-1	Teacher's desk/chair (800×450×750mm)	A	1 set
P-2	Blackboard(3,600mm×1,200mm)	A	1 unit
P-3	Drawing board (A)(A1 size with parallel scale)	A	1 set
P-4	Drawing board (B)(A2 size)	A	3 units
P-5	Drawing instrument set (Composes, dividers, triangles, etc.)	A	5 sets
P-6	Paper guillotine (Manual, desktop type)	A	1 unit
P-7	Easel	A	3 units
P-8	Template set (Alphabet, figures)	B	2 sets
P-9	Blackboard (Movable type, board size:1,200×900mm)	B	1 unit
P-10	Flannel board (Board size:1,200×900mm)	A	1 unit
P-11	Canvas stretching tool (Hand vice, hammer)	A	1 set
P-12	Knife	A	1 set
P-13	Work table (1,800×900×750mm)	A	6 units
P-14	Stool	A	30 units
P-15	Storage cabinet (900×450×1,800mm)	A	2 units
P-16	Storage rack (900×450×1,800mm)	A	3 units
5. Music education			
Q-1	Student's desk/chair (700×450×750mm)	A	29 sets
Q-2	Teacher's desk/chair (800×450×750mm)	A	1 set
Q-3	Blackboard (3,600×1,200mm)	A	1 unit
Q-4	Cassette tape recorder	A	1 unit
Q-5	Music score blackboard (Board size:1,500×900mm)	A	1 unit
Q-6	Electric piano (76 keys, with stand)	A	1 unit
Q-7	Guitar (Classical guitar)	A	5 units
Q-8	Recorder (Alto, tenor, 5 each)	A	10 units
Q-9	Marimba (37 keys, with stand)	A	1 unit
Q-10	Tambourine (24cm dia.)	A	5 units
Q-11	Drum set	A	1 set
Q-12	Conga (Alto, with stand)	B	1 unit
Q-13	Score stand	B	3 units
Q-14	Metronome	A	1 unit

No.	Equipment	Priority	Qty
Q-15	Storage cabinet (900×450×1,800mm)	A	2 units
Q-16	Storage rack (900×450×1,800mm)	A	3 units
6. Physical education			
R-1	Trampoline	A	1 unit
R-2	Football goal posts (With net, balls)	A	1 set
R-3	Basketball goals (With net, balls)	A	1 set
R-4	Volleyball posts (With net, balls)	A	1 set
R-5	Handball goal posts (With net, balls)	A	1 set
R-6	Table tennis set (With table, net, rackets, balls)	A	3 sets
R-7	Badminton set (Racket, shuttle cock)	A	3 sets
R-8	High jump posts/bar	A	2 sets
R-9	Button	B	5 pcs.
R-10	Hurdle	B	10 units
R-11	Line marker	A	1 unit
R-12	Measuring tape (50m)	A	1 unit
R-13	Stop watch	A	2 pcs.
R-14	Traction rope (15m)	B	1 unit
R-15	Air pump	A	2 units
7. Labour activity			
(Metal/wood working)			
S-1	Electric drill (13mm, with drill bits)	A	2 units
S-2	Circular saw (205mm dia.)	A	2 units
S-3	Engraving machine (Portable type, with tips)	B	1 unit
S-4	Shear (Desktop type)	A	1 unit
S-5	Grinder (205mm dia. with grinding stone)	A	1 unit
S-6	Hand tools for metal work (Hacksaw, files, hammers, etc.)	A	5 sets
S-7	Hand tools for wood work (Saw, planner, mallet, etc.)	A	5 sets
S-8	Hand tools for electrical work (Driver, soldering iron, etc.)	A	5 sets
S-9	Measuring instruments (Vernier calipers, scale, etc.)	A	5 sets
S-10	Work table (1,800×900×750mm)	A	5 units
S-11	Stool	A	24 units
S-12	Storage cabinet (900×450×1,800mm)	A	4 units
(Sewing)			
S-13	Sewing machine (Home use, zigzag)	A	2 units

No.	Equipment	Priority	Qty
S-14	Dressmaking instruments (Measuring tape, curved scale, etc.)	A	5 sets
S-15	Iron/ironing board	A	3 sets
S-16	Mirror	A	1 unit
S-17	Mannequin (Man, woman, 3 sizes each)	A	6 units
S-18	Work table (1,800×900×750mm)	A	5 units
S-19	Stool	A	24 units
S-20	Storage cabinet (900×450×1,800mm)	A	4 units
	(Ceramics)		
S-21	Clay work board	B	5 units
S-22	Potter's wheel (Manual type)	A	4 units
S-23	Potter's wheel (Motorized type)	B	1 unit
S-24	Spatulas for clay work	A	5 sets
S-25	Work table (1,800×900×750mm)	A	5 units
S-26	Stool	A	24 units
S-27	Storage cabinet (900×450×1,800mm)	A	4 units
	(Weaving)		
S-28	Weaving machine (Manual type, with accessories)	A	3 units
S-29	Scissors	A	5 sets
S-30	Work table (1800×900×750mm)	A	5 units
S-31	Stool	A	24 units
S-32	Storage cabinet (900×450×1,800mm)	A	4 units
	(Gardening)		
S-33	Gardening implements (Shovel, hoe, plow, etc.)	A	10 sets