JAPAN INTERNATIONAL COOPERATION AGENCY

MINISTRY OF EDUCATION THE DEMOCRATIC SOCIALIST REPUBLIC OF SRI LANKA

THE MASTER PLAN STUDY

FOR THE DEVELOPMENT OF SCIENCE AND MATHEMATICS

IN THE PRIMARY AND SECONDARY LEVELS

IN THE DEMOCRATIC SOCIALIST REPUBLIC OF SRI LANKA

FINAL REPORT

SUPPORTING REPORT






FEBRUARY 2005

KRI INTERNATIONAL CORP.

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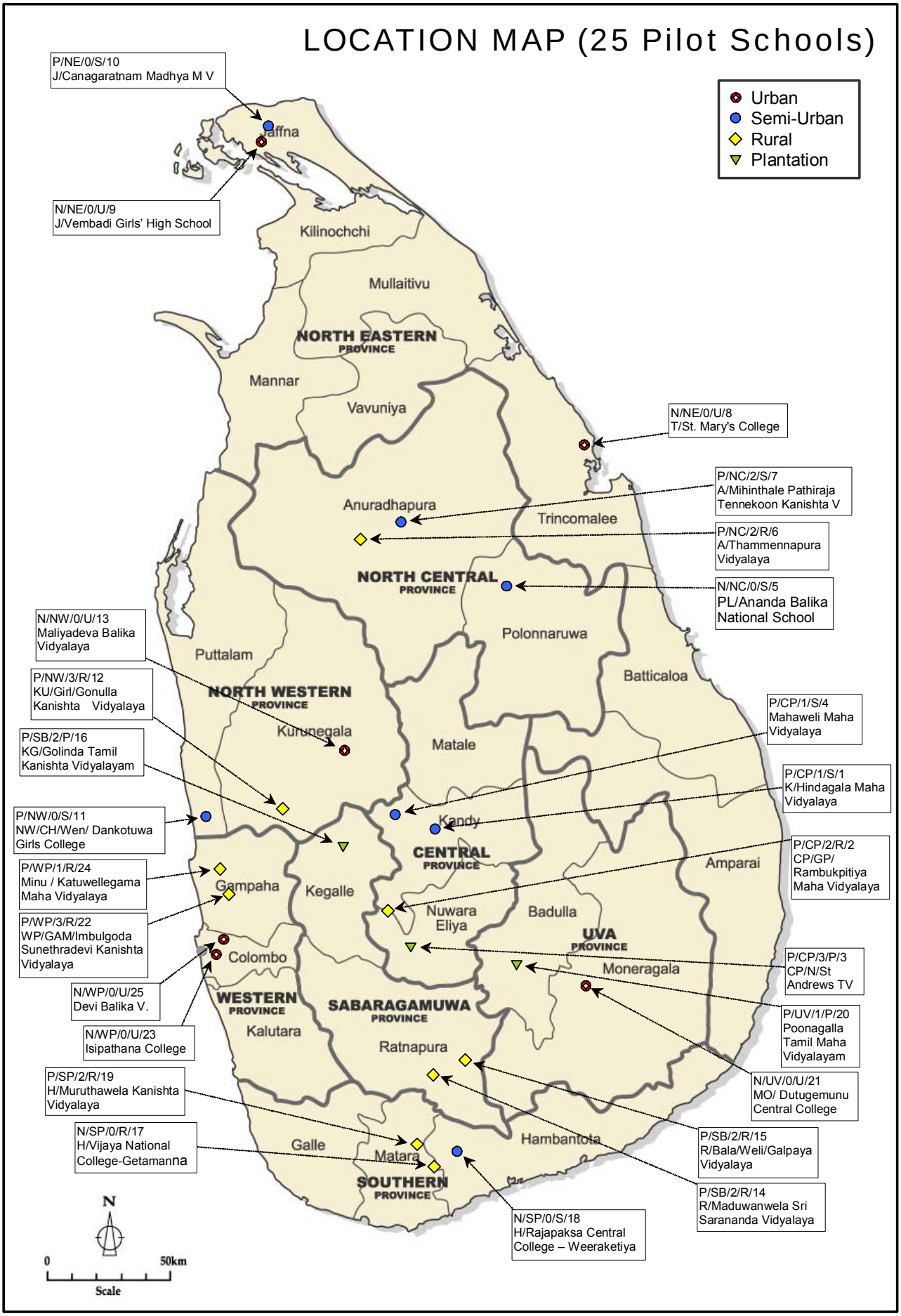
EXCHANGE RATE

(As of October 2004)

US$1.00 = ¥106.17= Rs.104.06

LOCATION MAP (25 Pilot Schools)



ABBREVIATIONS

AAT	Academic Ability Test
ADB	Asian Development Bank
ATS	Agency Testing Service
BESP	Basic Education Sector Program
BOI	Board of Investment
BS	Baseline Survey
CAL	Computer-Assisted Learning
CBG	Criteria Based Grants
CCD	Centre for Curriculum Development
CFS	Child Friendly School Program
CLC	Computer Learning Center
CRC	Computer Resource Center
DDE	Deputy Director of Education
DFID	Department for International Development - United Kingdom
GDP	Gross Domestic Product
DSD	Development of Schools by Division
EMIS	Education Management Information System
ERA	Environmental Related Activities
ERIU	Education Reforms Implementation Unit
GCE	General Certificate of Education
GCE A-Level	General Certificate of Education Advanced Level
GCE O-Level	General Certificate of Education Ordinary Level
GEP	General Education Project
GEP2	Second General Education Project
GER	Grass Enrollment Ratio
GNP	Gross National Products
GOJ	Government of Japan
GOSL	Government of Sri Lanka
GTZ	German Technical Assistance Agency
HPO	Head Plus One
ICDL	International Computer Driving License
ICT	Information and Communications Technology
ICTA	ICT Agency
IEA	International Association for the Evaluation of Educational Achievement
ISAs	In-Service Adviser
ISTE	International Society for Technology in Education
IT	Information Technology
JICA	Japan International Cooperation Agency
MOE	Ministry of Education
MSE	Ministry of School Education
MT	Master Trainer
MTET	Ministry of Tertiary Education and Training
NAPITSE	National Policy on Information Technology in School Education

NATE	National Authority on Teacher Education
NCOE	National College of Education
NEC	National Education Commission
NEIKA	National Educational Initiative of Kaizen Activities
NER	Net Enrollment Ratio
NETS	National Evaluation and Testing Service
NIE	National Institute of Education
NIIR	Net Initial Intake Rate
PDE	Provincial Director of Education
PESO	Primary Education Specialist Officer
PGDE	Post Graduate Diploma in Education
PIT	Provincial Information and Communications Technology Resource Center
PPA	Past Pupils' Association
PPS	Post Pilot Survey
PSDG	Province Specific Development Grants
Q & A	Questions and Answers
QE	Quality Education
QEC	Quality Education Circle
QS	Questionnaire Survey
SBA	School-Based Assessment
SBM	School Based Management
SDB	School Development Board
SDS	School Development Society
SEDP	Secondary Education Development Project
SEIKA	School Educational Initiative of Kaizen Activities
SEMP	Secondary Education Modernization Project
SIDA	Sweden International Development Agency
SIRUP	Small-scale Infrastructure Rehabilitation and Upgrading Project
SIU	Special Implementation Unit
SLIATE	Sri Lanka Institute of Advanced Technical Education
SWAp	Sector Wide Approach
TC	Teachers' Center
TEI	Teacher Education Institute
TETD	Teacher Education and Teacher Deployment Project
TIMSS	Third International Mathematics and Science Study
TIP	Teacher In-Service Project
TPR	Teacher-Pupil Ratio
TTC	Teachers' Training College
TVEC	Tertiary & Vocational Education Committee
UNF	United National Front
UNICEF	United Nations Children's Fund
UPFA	United People's Freedom Alliance
VERP	Vanni Education Rehabilitation Project
WB	World Bank
ZEIKA	Zonal Educational Initiative of Kaizen Activities
ZIT	Zonal Information and Communications Technology Resource Center

FINAL REPORT
SUPPORTING REPORT

PART I NATIONAL POLICY AND EDUCATION SECTOR

THE MASTER PLAN STUDY FOR THE DEVELOPMENT OF SCIENCE AND MATHEMATICS IN THE PRIMARY AND SECONDARY LEVELS IN THE DEMOCRATIC SOCIALIST REPUBLIC OF SRI LANKA

FINAL REPORT: SUPPORTING REPORT
PART I NATIONAL POLICY AND EDUCATION SECTOR

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CHAPTER 1 NATIONAL POLICY ON ECONOMY AND EDUCATION

1.1 New Economic Policy Framework: Creating Our Future, Building Our Nation

After the United People's Freedom Alliance (UPFA) headed by the President Chandrika Kumaratunga won against the United National Front (UNF) headed by the former Prime Minister Ranil Wickramasinghe in the parliamentary election held on April 2nd, 2004, UPFA government issued a new economic policy framework entitled Creating Our Future, Building Our Nation (or Rata Perata in Sinhalese, which means Country Forward) in July 2004.

This new policy framework criticizes the former UNF government for neglecting the public services (e.g. privatization and downsizing the public sector), the rural sector (e.g. small and medium enterprises and agriculture suffering from unfair import competition) and environmental protection (e.g. deforestation and soil erosion which resulted in shortage of water resources not only for drinking, but also for electricity), and emphasizes a more balanced, "pro-poor, pro-growth" development policy, which combines market-friendly and export-oriented income generation (which targets to achieve 6-8% annual GDP growth rate, primarily from domestic resource-based economic activities throughout the country) with socio-economic development, particularly rural development, environmental protection and poverty reduction. The new UPFA government committed to invest more for social and infrastructure development in the rural areas.

The new policy framework also puts a high priority to create a 21st century workforce through educational reforms, human resources and skills development, and improving productivity with a new ethic towards performance excellence and innovation. Education is recognized as being central to economic growth and poverty reduction, so the government committed to transform and modernize the education system through the education reforms which started in 1997, with the objective of equipping Sri Lankan children with the requisite knowledge, skills and attitudes suited to face the rapid changes occurring in the socio-economic and global landscape of the 21st century.

This objective is to be achieved (1) by improving access to education through eliminating disparities and ensuring equity, and (2) by strengthening the existing free, state education system of the primary, secondary and tertiary levels, through the following programs:

- Providing pre-service teacher training through the National Colleges of Education (NCOE) and in-service teacher training at zonal and divisional level in a comprehensive and systematic manner;

- Restructuring the public examinations (Grade 5 scholarship, GCE O-Level and A-Level examinations) and introducing the School-Based Assessment (SBA) system;
- Training principals and teachers on School-Based Management (SBM) in order to empower them to become good leaders and managers;
- Upgrading selected rural schools in all divisions through the Navodya Schools (previously called as Development of Schools by Division [DSD] Schools) Project;
- Strengthening national integration through the Amity Classroom initiative, through which children of all communities can study together;
- Introducing Information Technology (IT) into the secondary school curriculum;
- Providing various welfare measures at the school level, which include nutrition intervention at Grade 1, counseling and guidance for senior secondary school students, scholarships for the disadvantaged students, distribution of free books and uniforms;
- Strengthening English language teaching at all grades through training teachers at a dedicated institute for teacher training in English, NCOE and Technical College and providing the necessary English books;
- Strengthening the existing university system through increasing the student placements and improving the quality of teaching; and
- Improving the match between vocational education and training and the rapidly changing labor market demand through redesigning the Sri Lanka Institute of Advanced Technical Education (SLIATE), the Tertiary and Vocational Education Committee (TVEC), National Institute of Technical Education and Vocational Training Academy.

The policy framework also states that in order to revitalize the public sector, the government will train and recruit unemployed university graduates to become the change agents with a new work ethic and culture in the public sector, who are expected to build an efficient and modern public service culture. Based on this commitment, the government has already started Graduate Employment Scheme, in which a total of 41,305 unemployed university graduates are recruited and trained for 3-month management training at NIE before being assigned in the government offices and schools. Out of 41,305 graduates, around 10,000 to 12,000 are expected to become teachers (including school counselors, librarians, IT center staff, and special education teachers) in the government schools in order to solve the teacher shortage problem especially in rural and plantation schools.

1.2 Education Reform

1.2.1 NEC Recommendations 2003

The National Education Commission in 1997 published the paper 'Reforms in General Education'. This paper became the basis for education reforms that were implemented over the following five years.

The major thrust in these reforms was:

- Extending educational opportunity
- Improvement in quality of education

Both primary and secondary reforms were implemented by 2003. Particularly relevant our study is that the new primary mathematics curriculum for grades 1-5 (DFID project) is being successfully used island-wide. Secondary curricula reform also took place from grade six and at senior secondary levels.

In 2002 and 2003, NEC developed a new set of reform policy proposals that largely came about from the results of a series of research and evaluation studies (Study Series 1 - 23) commissioned by NEC and also extensive professional and community inputs. These proposals were published in December 2003 as the document: 'Envisaging Education for Human Development' - Proposals for a National Policy Framework on General Education.[1]

The document is now the blueprint for general education reform in Sri Lanka over the next five years and some of its proposals have already been implemented while others are still in the discussion stage at MOE and in various Education Institutions.

The reform proposals are presented in three related areas:

- Educational opportunity
- Renewal and relevance of curriculum related activities
- Efficiency through professionalism of educational personnel and management

The following are the major recommendations relevant to the JICA Study:

(1) Educational Opportunity – Equity and Excellence

1) School Structure and Classification

- Junior Secondary Education will consist of 4 years (grades 6-9) with grade 6 no longer a transitional year
- Classification of schools will be Primary (grade 1-5) Junior Secondary (grades 1-11, grades 6-11) and Senior Secondary (grades 1-13, grades 6-13)

[1] 'Envisaging Education for Human Development' - Proposals for a National Policy Framework on General Education NEC December 2003

- There will be established Provincial "center of excellence" schools that have already shown potential and these be administered by Provincial MOEs
- There will be 30-50 National (All Island) schools administered by Central MOE
- Competent and committed zonal committees in collaboration with local community-based organizations should identify small schools (less than 200 students) that should be supported/improved
- Small schools to be organized as "feeder" schools to the nearest large secondary school where possible to and have special staffing considerations

Rehabilitation Programs for schools in conflict areas be given high priority.

2) Medium of Instruction

- Medium of Instruction in primary grades to be Sinhala/Tamil plus a strengthening of Oral English skills
- Bilingualism be promoted with English as an optional medium of instruction in Mathematics, Science and Information Technology in secondary grades starting at grade 6. Sinhala/Tamil to continue as the medium of instruction in other subjects.
- Secondary students be given the option of studying any subject in the English medium at O-Level and A-Level (provided teachers are available)
- Secondary students may sit their GCE O-Level and GCE A-Level examinations in the medium of their choice
- Access to English be extended island wide over the next 5 years

(2) Curriculum Renewal, Quality and Relevance, Assessment

1) Curriculum Structure

- The 1997 Primary Curriculum (grades 1-5) to continue. Teacher training in mathematics be strengthened to raise levels of attainment.
- The following changes are proposed for Junior Secondary curriculum (grades 6-9)
- A new Science subject instead of Science & Technology subject
- Adding 'Computer Literacy'
- At least 20% of any subject grade be given on activity-based projects/practical skills assessed by SBA

See Table 1.2.1 for details of the recommended common curriculum.

Table 1.2.1 Recommended Subjects and Proposed Time Allocations For Grades 6 to 11

Subject	Number of 40 minute periods per week					
	G6	G7	G8	G9	G10	G11
Religion	2	2	2	2	3	3
First Language	5	5	5	5	5	5
English	8	5	5	5	5	5
Mathematics	8	6	6	6	6	6
Science	5	6	6	6	6	6
History	2	2	2	2	2	2
Geography	2	2	2	2	2	2
Civics	2	2	2	2	2	2
Aesthetic Subject	2	3	3	3	3	3
Technical Skills/Design and Technology	2	3	3	3	3	3
Sinhala/Tamil (2nd language)	1	2	2	2	1	1
Health and Physical Education	1	2	2	2	2	2
Total Number of periods per week	40	40	40	40	40	40

Source: NEC Framework 2003

The following changes are proposed for GCE O-Level curriculum (grades 10-11)

- A new 's*cience*' subject instead of the '*science & technology*' subject
- *'Information Technology'* as a new subject
- An activity based project/assignment approach with activities a compulsory part of each subject curriculum assessed by SBA

The following changes are proposed for GCE A-Level Curriculum (grades 12-13)

- Science students must reach a minimum standard in a practical examination and non-science students a minimum standard in an activity-based assignment to qualify to sit for the GCE A-Level examination – both examined by external panels

Information Technology be added as a new subject

2) Promotion of Mathematics, Science and IT Education at Secondary Level

All the following recommendations are most relevant to our study.

The three subjects should be strengthened and expanded by:

- Activity based student centered approaches in mathematics and science
- Provision of adequate laboratory and information technology facilities
- Strengthening SBA with respect to assessing practical work, projects and assignments
- Extending the option of English medium for science students
- Popularizing science education through the media, science centers, science parks, science camps
- Introducing computer literacy in the core curriculum for secondary schools and in teacher education

- Providing facilities for Information Technology as a subject for GCE O-Level and A-Level examinations
- Making facility improvements in the present Type 1C schools to upgrade them for the teaching of mathematics and science at GCE A-Level
- Establishing a science subject (grades 6-11) with a revised and expanded curriculum

3) Promotion of English Education

It is necessary to work towards the goal of providing equal opportunity to all segments of the society to learn English

- An optional bilingual approach to be implemented for from grades 6-13 in science, mathematics and IT.
- In grades 12-13, a scheme of additional finance and other incentives should be introduced for teachers of English, Mathematics, the Sciences and IT in schools in disadvantaged areas.

4) Student Assessment

Proposals and recommendations for future GCE O-Level and GCE A-Level examinations are:

Grade V Scholarship Examination

The Grade 5 scholarship examination be retained but modified

The GCE O-Level and GCE A-Level Examinations

The written examination component of both examinations to remain but be improved to test major concepts in subjects rather than trivia

Acceptance without reservation of the SBA component as an equal, legitimate and valid component of the examinations by ensuring it is effective, reliable, valid, comparable, able to be monitored and easy for teachers to use.

Design of SBA to include assignments, project work including group work projects, science practicals and field work (Environmental Field Study Centers)

School Based Assessment

- The Present system be reviewed and a common scheme devised for all grades
- The revised system be clear, coherent and simple, balanced in coverage of knowledge, skills, attitudes and behaviour and use a wide range of assessment modalities without reliance upon written tests
- The system be able to adapt to specific school contexts.
- SBA in A-Level subjects should consider science practicals; projects and assignments for grading and grades should be reviewed by external panels to avoid subjectivity.

5) Educational Technology

- A National policy and action plan be devised for technology enhanced education – trained teachers, post graduate training in Technology in Education and MIS (Management and Information Systems)
- Internet facilities be developed via an education Virtual Private Network (VPN) island wide where possible.
- ICT and MIS be used for school management and records in all schools

6) Text Books

- Education Publications Department (EPD) to invite applications (not tenders) for qualified writers to write textbooks in conformity with NIE syllabus outlines
- These textbooks be evaluated by subject panels
- EPD to call for tenders from printers to print books of high quality
- All approved textbooks be available in school libraries and for sale in bookshops

7) Private Tuition

- To overcome the growing tuition class industry, there must be quality improvement in teaching in schools.
- The following should be prohibited: Students attending school hours tuition classes; Teachers teaching at school hours tuition classes

(3) Efficiency through Professional Development and Management

1) Professional development of teachers and principals

- A Teacher Education Board be established in MOE to oversee all teacher education programs
- Goal of teacher education programs is to develop an all-graduate, quality teaching force
- A bilingual approach be adopted, starting immediately with Science and Mathematics courses and introducing English terms in other courses
- Continuing Teacher Education Programs be provided in: Teacher Education Centers, Teachers Centers, Regional English Support Centers and Computer Resource Centers

2) Recruitment, deployment and promotion of teachers and principals

- Teacher recruitment and transfer should be school-based
- Zonal panels be established to monitor and supervise recruitment and deployment of teachers within zones with an ‘appeal mechanism’ at provincial level
- Special incentives be provided to teachers and principals to serve in difficult areas
- The teacher promotion scheme should be reviewed to include promotion by merit

- Performance appraisal schemes for teachers and Principals be reviewed, amended if necessary and implemented without delay
- Procedures for the recruitment, deployment and promotion of Principals be reviewed and updated
- Principals be required have management training and a pool of prospective Principals to also have management training at NIE or Universities

3) Education Government/Management

The first three recommendations are particularly relevant to the JICA Study.

- Linkages, coordination and good relations be established between MOE and Provincial and Zonal authorities
- School-Based Management (SBM) be introduced to the school system as early as possible with training of principals and teachers and awareness programs for the wider educational system and the general public
- E-governance be introduced to the education system with the development of a National Education Information Network with major components:
- Education Management Information System (EMIS)
  - Financial Management Information System (FMIS)
  - Geographic Information System (GIS)
  - General Services including e-mail facility, internet and web-based services
- The role of NIE is clearly defined and its role in curriculum development and educational research strengthened.
- Divisional Offices be abolished and Zonal offices strengthened

4) Allocation of Resources for Education

- Education funding be increased from the current level of 3% of GDP to at least 4% to reach a long term target of 5% of GDP
- Government expenditure on education as a proportion of total government expenditure be increased from the present 9% level to 12% in the next three years with a target of 15% in the long term
- Private sector investment in education be facilitated, promoted and monitored for maintenance of standards
- More foreign aid be attracted to education with a target of at least 10% of foreign donor assistance be directed to the education sector
- Relevant Ministries should formulate foreign assistance funded projects to improve the quality and relevance of education
- Schools to generate funds from other sources and be given matching grants from government, these funds to be spent on quality improvement in their particular school
- For resource allocation, unit costs (norm-based) be employed for each category of school

- Principals with direction and advice from the School Development Board be given adequate financial autonomy for the financial management of their school

1.2.2 Sector Wide Approach (SWAp)

The World Bank and MOE have recently had discussions regarding a change in the nature of their assistance as an education development partner to Sri Lanka. These discussions took place early in 2004 with the release of the comprehensive Sri Lanka Sector Report (2004) and more recently in July/August 2004 when the Bank prepared an Aide Memoire[2] for the proposed Sri Lanka Education Sector Operation. This Memoire outlined an approach that re-focuses Bank assistance from individual projects to an education sector wide approach (SWAp). This was seen by the MOE as the most appropriate way to address the system-wide development issues faced by the Sri Lankan education system. Thus SWAp aims to integrate donor inputs and make the delivery of assistance to education more effective.

MOE considered the 'Proposals for National Policy Framework on General Education NEC 2003' and the results of wide ranging discussions amongst educators and GOSL officials as a basis for its decision to adopt SWAp.

The key characteristics of the proposed sector wide approach will consist of:

- GOSL and Donor partnership
- A comprehensive education sector development plan
- A multi-year education expenditure framework, and a long-term, output oriented education planning horizon
- Streamlined management system at Cental, provincial, and school level, including capacity building at each level
- Monitoring and evaluation of education outputs and outcomes

The sector program has four key development objectives:

(i) Promoting equity (ii) enhancing the quality (iii) strengthening the capacity and (iv) improving the institutional capability of the system.

The sector program will support the government education development framework strategies with strategies to strengthen the basic and secondary education system by assisting the country to:

- Promote equitable access to basic education
- Increase learning levels and orient the education system to the world of work
- Enhance the efficiency and equity of resource allocation and distribution
- Strengthen the quality of service delivery

2 WB Aide Memoire July 26-August 12 2004

MOE has already decided on a bottom-up approach to SWAp by making its first task the training of Principals on school level planning and the development of School Plans by the Principal and the wider school community. These will be five-year plans 2006-2010 and will include rolling annual plans. Then will follow the development of Zonal Plans, Provincial Plans and finally National Plans These activities have already commenced in August 2004 and are scheduled for completion in May 2005.

1.3 Education Development Plan

1.3.1 Primary Education Development Plans

(1) Primary Education Reform

Primary Education Reform constitutes the major part of the General Education Reform in 1997. Primary education is considered very important, because it is a formative period in the life of the child when the foundation is laid for physical, mental, emotional and social development, but learning achievement among primary students had been low according to the following two NIE studies:

In 1992, NIE conducted a national assessment of educational progress in language and mathematics for grade 4 and 5 students, and it revealed that "The actual performance is not up to standard in both mathematics and language in all the districts, even in the best schools."

In 1995, NIE conducted a subsequent study entitled "What Children Have Learnt After Five Years of Schooling?", and it indicated very low evels of mastery of learning achievements in literacy and numeracy amon grade 5 students.

Table 1.3.1 summarizes the major changes before and after the Primary Education Reform. Based on the curriculum change in the primary cycle, the grade 5 scholarship examination has also been changed to competency-based one.

From 1996 to 1997, the Presidential Task Force on Primary Education and Early Childhood Development organized its work around seven tasks – i) provision of qualitative inputs, ii) human resource development, iii) design of quantitative inputs, iv) awareness creation, v) implementation plans, vi) provision of quantitative inputs and vii) management. This committee designed Action Plan for the Primary Education Reform. A Special Implementation Unit (SIU) was established in MOE to supervise the implementation of a number of these actions at national and provincial levels. This unit has recently been renamed as the Education Reforms Implementation Unit (ERIU).

Table 1.3.1 Primary Education: Before and After Reform in 1997

Feature	Before Reform	After Reform
Duration	5 years	5 years
Primary Cycle Stages	Two stages: Lower Primary – Grades 1-3 Upper Primary – Grades 4-5	Three stages: Key Stage 1 – Grades 1-2 Key Stage 2 – Grades 3-4 Key Stage 3 – Grade 5
No. of Subjects	Grades 1-2 - 7 subjects Grade 3 - 8 subjects Grades 4-5 - 9 subjects	4 subject areas (Language, Mathematics, Religion, Environment Related Activities)
Curriculum	Subject knowledge-based	Competency-based
Introduction of English	Formal English – from Grade 3	Oral English – Grades 1-5 Formal English – from Grade 3
Second National Language (Sinhala/Tamil)	Introduced in Grade 5	Introduced in Grade 3 Continued in Grades 4-5
Co-curricular Activities	No allocation in time table	30 minutes per week allocated in time table in Grades 1-5
Child-interested Optional Subjects	No allocation in time table	30 minutes per week allocated in time table in Grade 5
Instructional Time	More Time for First Language and Mathematics than Environmental Studies	More time for Environment Related Activities (ERA) than First Language and Mathematics
Instructional Strategies	Activity-based (promoted, but little practiced)	Proper mix of Guided Play, Activities and Desk Work
Interaction with Older Children (Grade 6 or 5)	No special arrangements	Special arrangements available for Grade 1-2 pupils
Assessment of Pupils' Progress	More emphasis on formal methods such as written tests Child-child comparisons are promoted.	More emphasis on informal methods throughout, and formal methods occasionally Child-child comparisons are discouraged, and comparisons with targets and child's own previous performances are encouraged.
Mastery in Essential Learning Competencies	No special attention paid	Measures introduced to ensure mastery in Essential Learning Competencies
Assigning a Class Teacher	A teacher is assigned only for 1 year to be with a set of children.	Assigning a single teacher for 2 years in Key Stage 1 and 2 is encouraged.

Source: MOE

(2) Primary Education Development Plan 2000-2004 and 2005-2009

In 1999, MOE developed Five-Year Plan for Primary Education 2000-2004 with technical assistance from DFID to continue Primary Education Reform and improve primary education further. The summary of this plan and its progress in achieving target by mid-2004 are shown in Table 1.3.2.

This Five-Year Plan was implemented well with many donors' assistance such as the World Bank's Second General Education Project (GEP2) and Teacher

Education and Teacher Deployment Project (TETD), UNICEF's Child-Friendly School Project, JICA's Primary School Construction Project, GTZ's Basic Education Sector Program (BESP) including Teacher In-Service Project (TIP), and DFID's Primary Mathematics Project and Primary English Language Project.

The progress in achieving the targets set in 1999 is generally good in terms of (a) extension of educational opportunity: Sri Lanka has already achieved nearly universal (around 98%) participation rate in the primary education, without gender disparity. But there is still a need to expand Primary Education Reform to more schools in terms of (b) quality improvement in education, (c) professionalization of teachers, (d) better management of education, and (e) equitable provision of human and financial resources.

In terms of quality improvement in education, GTZ's TIP introduced "Joyful Learning" concept and activity-based teaching and learning methods in North-East Province and Central Province in 2000, which resulted in more active and enjoyable classrooms for primary students. In 2003, MOE officially adopted GTZ's "Joyful Learning" manual as one of teacher training and started to train primary school teachers in all provinces using this manual. DFID's Primary Mathematics Project and Primary English Language Project have contributed to updating the curriculum of mathematics and English with more activity-based contents and developing new mathematics and English textbooks based on the new curriculum.

Since Five-Year Plan for Primary Education 2000-2004 will end in the end of 2004, MOE is now preparing the next Five-Year Plan for Primary Education 2005-2009 by the end of 2004, using bottom-up planning mechanism, in which Zonal Offices prepare zonal plans first, then Provincial Offices prepare provincial plans by consolidating zonal plans, and finally MOE compiles a national plan by consolidating provincial plans.

In the next Five-Year Plan for Primary Education 2005-2009, MOE plans to continue educational reform in the primary cycle, mainly through the following measures:

- Encouraging the use of toys in primary education, through developing model toy units in some primary schools (toys will be selected and purchased locally together with students, and playing with toys can be a good introduction to hands-on activities in mathematics and science);
- Providing more home-like environment at school, especially for grade 1 children, through provision of new types of school furniture (plastic round tables and chairs);
- Introducing kid's library, a learning activity room, and a play area in primary schools;

- Improving teachers' teaching capacity on activity-based, learner-centered teaching through a) School-based Teacher Development Program using In-School Training, in which teachers receive in-service training at a school or "school family" (a group of 5 to 7 primary schools including 1 big school for helping each other) level, and b) Teachers' Quality Circles in the divisional level, in which teachers teaching the same grade in the division meet regularly, identify and solve their own problems together, exchange their teaching resources and experiences, and improve their knowledge and skills;
- Training teachers for small rural schools on multi-grade teaching, on which NIE has already prepared two manuals;
- Strengthening Monitoring and Evaluation Cells at 30 pilot zonal offices, and establishing a computer-based databank on primary schools by collecting school questionnaires annually, which cover not only a) quantitative aspects of the schools such as the school facilities and the number of staff, but also b) qualitative aspects of education such as teachers' use of activity-based teaching and learning methods, from 2005;
- Strengthening value education in order to improve children's dignity, cleanness (hygiene), and personal development;
- Improving health and nutrition situation for primary school students by providing adequate toilets, safe drinking water, hygiene and nutrition education in all primary schools, and conducting a school lunch program for some needy schools; and
- Introducing Child-Friendly Schools[3] in 30% of primary schools in selected 7 districts[4] in collaboration with UNICEF from 2005.

[3] Child-Friendly Schools (CFS) are characterized as having the following 12 key determinants: 1) guarantee of children's rights, 2) learning quality, 3) reducing students' dropouts and absenteeism, 4) protective environment for students, 5) health and nutrition including life skills education for adolescents, 6) water, sanitation and hygiene, 7) early childhood development, 8) trained and motivated teachers and primacipals, 9) sports and recreational activities, 10) gender sensitiveness, 11) inclusiveness, and 12) children's and parents' participation.

[4] Nuwara Eliya and Mathale (Central Province); Badulla and Moneragala (Uva Province); Hambantota (Southern Province); Anuradhapura (Northern Central Province); and Rathnapura (Sabaragamuwa Province)

Table 1.3.2 Summary of Five-Year Plan for Primary Education 2000-2004 and Its Achievements

No.	Strategy	Goal	Target	Progress in Achieving Target	Program
1	Extension of educational opportunity	To ensure the initial enrollment of all boys and girls at the official primary education entry age of 5+, by 2004, to lay the base for their completion of the primary education stage	1-1. Increase the net initial intake rate (NIIR) from 96.7% in 1998 to 100% by 2004	GER = 98.7% (2004) (no data for NIIR)	1.1. Enhancement of initial intake 1.2. Retention and completion 1.3. Improving access
			1-2. Ensure that the maximum distance to the closest available school from the residence of grade 1 child us 2 km by 2004	Successfully completed	
			1-3. Increase the 5-9 years old net enrollment ratio (NER) from 96.5% in 1998 to 100% by 2004	97.5% (2003)	
			1-4. Increase the completion rate for primary education from 94.4% in 1997 to 98% by 2004	96.5% (2003) 99.3% (2004 estimate)	
2	a) Quality improvement in education b) Professionalization of teachers	To increase the levels of learning achievement of all pupils in the 3 key stages of primary education by 2004	Pupils mastering essential learning competencies in all identified areas will reach at least 80% in the key stages 1, 2 and 3 in primary education by 2004	75% (2003) 80-82% (2004 estimate)	2.1. Curriculum development and educational material production 2.2. Teacher education and training 2.3. Home support
			The percentage of teachers qualified in primary education methods and teaching in grade 1-5 will be increased from 68% in 1998 to 100% by 2004	97% (2004)	
			2-3. Each ISA should make 100 school visits in 100 days per annum by 2001	50-70 school visits/ISA	
3	Better management of education	To improve primary education management at school, divisional field unit, zonal, provincial and national level by 2004	All new appointments to principal and primary section head positions in schools having grades 1-5 to be trained in primary education by 2004	98% (2004)	3.1. Deployment and training of supporting staff 3.2. Organization of primary education 3.3. Planning and information
			Principals and primary section heads with training in primary education management to be increased to 100% by 2004	97.8% (2004)	

			Appoint primary trained ISAs, competent in the relevant medium of instruction, to achieve an ISA: Primary Teacher ratio of 1:70 for both media, and 1:50 for areas of low population density by 2001	1:20-25 (Western Province) 1:40-45 (All Other Provinces)	system
			The maximum number of schools with grade 1-5 supported by a Primary Education Specialist Officer (PESO) to be 60 by 2001	Only 1 Zonal Primary Education Coordinator who work as PESO in each zone (average number of schools in zone = 100 schools)	
			All Divisional Field Unit Officers, Primary Education Specialist Officers (PESO), Zonal and Provincial Primary Education Officers to be trained in primary education management by 2004	Successfully completed	
			Establish an organizational structure for primary education with clear job descriptions, responsibilities and lines of authority by 2002	Successfully completed	
			3-7. Establish a primary education planning and EMIS system from national to school level by 2002	EMIS system has been established from national to zonal level only.	
4	Equitable provision of human and financial resources	To promote the equitable allocation of human and financial resources to primary	4-1. Improve the teacher-pupil ratio (TPR) in Sinhala medium from 1:28 in 1998 to 1:27 by 2001, and improve TPR in Tamil medium from 1:41 in 1998 to 1:27 by 2003	1:22 for Sinhala medium 1:38 for Tamil medium (2004)	4.1. Teacher deployment 4.2. Funding mechanism

		education by 2003	4-2. Formulate and implement a norm-based unit cost resource allocation mechanism for the supply of quantitative and qualitative inputs by 2001	Successfully completed	
			4-3. In addition to the normal allocation, 10% of the allocation of funds for consumables and capital quality inputs will be set aside for disadvantaged schools by 2001	Successfully completed	
			4-4. Separate budget programs for primary education to be established at the national, provincial, zonal and school levels by 2001	Successfully completed	

Source: Director of Primary Education, MOE

1.3.2 Secondary Education Development Plan 2004-2008

(1) Introduction

The document 'Reforms in General Education' NEC 1997 was accepted by GOSL and reform implementation commenced in 1998. In response to the document, a 'Five-Year Plan for Primary Education in Sri Lanka 2000-2004' was prepared to facilitate the reforms relevant to the Primary Cycle. However, there was no corresponding plan to implement the reforms in secondary education. The MOE has now released a document 'Five Year Plan for the Development of Secondary Education 2004-2008. This document outlines a plan to systematize the implementation of secondary reforms to achieve set targets. It does not take into account some of the NEC Recommendations 2003. Therefore, the reforms outlined for implementation in the 2004-2008 Plan are based largely on the 1997 Reform document, some of which have already been implemented.

(2) Identified Science and Mathematics Issues in Secondary Education

Issues on science and mathematics in Secondary Education are as follows:

- Overcrowded curricula content at both O-Level and A-Level, poor pass rates in O-Level and A-Level examinations
- University oriented, highly academic examinations at GCE A-Level
- Examination oriented teaching, limited student centred teaching-learning
- Problems with validity and reliability of SBA
- Access and equity for rural, plantation and other disadvantaged groups to:
- Lack of qualified teachers, good science infrastructure, teaching materials, information technology
- Poor teacher incentives and motivation

- Lack of adequate monitoring of school and teacher performance
- Varied quality of textbooks, limited reference material in Sinhala and Tamil language, insufficient use of local/low cost materials and practical applications
- Little use of ICT in science and mathematics course
- Restricted relationship between the four essential elements of the teaching process: curriculum, syllabus, public examination, teaching materials, teaching methodology
- Lack of vertical integration between O-Level and A-Level courses

(3) Planned Development for Secondary Education

Following are the intended developments outlined in the MOE 2004-2008 National Plan for Secondary Education:

1) Access to Secondary Education

- Problem
  - Large well equipped secondary schools at one end and small ill-equipped secondary schools at the other end – a key equity issue
- Planned Solutions
  - To provide secondary schooling for all students living in a geographic area
  - To ensure that class sizes of 40 in grades 6-11 and 30 in grades 12-13 are not exceeded in large schools and class sizes of 30 in grades 6-11 and 15 in grades 12-13 subjects are a minimum in other population areas

2) Deployment of Teachers

- Problem
  - Teacher excesses (e.g. in popular urban schools) and shortages (e.g. in rural schools) provide a teacher deployment problem. Teacher shortages are particularly noticeable in Physical Sciences and Mathematics A-Level subjects. There is generally a shortage of Tamil medium secondary teachers.
- Planned Solutions
  - Every school to have its correct quota of teachers and to be provided with funds to pay the quota of teachers
  - Teachers be recruited and/or deployed to schools on a subject-specific needs basis
  - Transfers, replacements of teachers to be monitored
  - Small schools in remote isolated areas be given positive discrimination in regard to staffing
- Problem
  - Many teachers in the system both graduate and to a lesser extent non-

graduates are untrained but are teaching science and mathematics. This is particularly true of Tamil teachers.

- Planned Solution
  - Recruit additional graduates to teach grades 12 and 13 and additional diplomates to teach grades 6 to 11
  - Provide extra continuing teacher eduction, initial training
  - Train 15 provincial trainers for O-Level subjects
  - Train A-Level teachers in activity based methodologies
- Problem
  - A Performance Appraisals program was introduced in 2002 but the program has not been uniformly implemented and there have been problems
- Planned Solution
  - Review the present program and produce a revised program for implementation in 2006

3) Teaching Materials and Equipment

- Problems
  - Delays in delivery of textbooks, curricular materials and other requirements to schools especially in difficult areas
  - Lack of remedial teaching materials
  - Equipment deficiencies at ICT Centres
  - Lack of suitable material for teaching in the English medium
  - Poor library facilities particularly in remote, difficult and conflict areas
- Planned Solutions
  - Ensure the provision of required textbooks and materials on time
  - Improve the capacity if teachers for designing and producing remedial teaching materials before 2005
  - Year by Year, prepare syllabuses, teachers guides, textbooks for English medium teaching in '*science and technology'* and m*athematics* grades 6-11
  - Before the end of 2005, prepare an action plan for materials production to improve teaching Science and Mathematics based on the secondary level recommendations of the JICA project
  - Implement Science programs in 30 schools with upgraded laboratories in 2004-2005 and expand the program to cover all schools with GCE A-Level classes

4) School Based Management

- Problem
  - School Based Management (SBM) although promised in the 1997 reforms has not yet been implemented. The present centralized education system hinders devolution of authority to the school level

- Planned Solution
  - Democratisation of school governance by empowering schools to play a greater role in school management
  - Increased participation of school communities in school management
  - Introduction of school boards
  - Gradual handing over of school management to school boards before the end of 2004
  - Training of Principals and teachers in SBM structures and processes
  - Conduct awareness programs for SBM in 2004 and 2005

5) Infrastructure

- To improve access and equity, a detailed year-by-year program for secondary school infrastructure requirements for 2004 –2008 is included in the Plan

Table 1.3.3 Infrastructure Requirements Plan 2004-2008

Inputs	2004	2005	2006	2007	2008	Total
A-Level Labs	111	128	93	87	93	512
O-Level Labs (new)	189	182	177	170	175	893
O-Level Labs (converted)	15	14	14	12	15	70
Lab Tables	1,212	1,186	1,162	1,137	877	5,574
Lab Stools	8,675	7,060	6,810	6,810	6,810	36,165
Science Rooms (new)	63	137	57	81	40	378
Science Rooms (converted)	10	10	20	20	20	80
Science Field Centres	0	2	2	2	1	7
Computer Rooms (New)	391	380	380	380	365	1,896
Computer Rooms (converted)	50	50	50	0	0	150
Computers	4,315	4,370	4,250	6,270	6,260	25,465
Personal Computers	2	13	13	13	13	54
Laptop Computers	2	2	2	2	2	10
Libraries (new)	325	311	314	307	302	1,559
Libraries (converted)	20	20	20	20	20	100

Source: National Secondary Education Plan 2004-2008

6) Costing, Financing and Monitoring

The total cost of activities included in the plan is approximately Rs.892 million. An amount of Rs.233 million can be allocated out of estimated budgetary provisions; an extra Rs.659 million has to be found to fund the plan.

The following table gives a year-by-year summary of the cost of planned activities.

Table 1.3.4 Total Cost of Activities for the Plan 2004-2008

Expenditure Category	Total Cost by Year (Rs.million)					Total 2004-2008
	2004	2005	2006	2007	2008	
Recurrent	109.1110	187.1929	220.4535	220.0150	144.2035	880.9758
Capital		10.7500				10.750
Total	109.1110	197.9428	220.4535	220.0150	144.2035	891.7258

Source: National Secondary Education Plan 2004-2008

CHAPTER 2 EDUCATION SECTOR

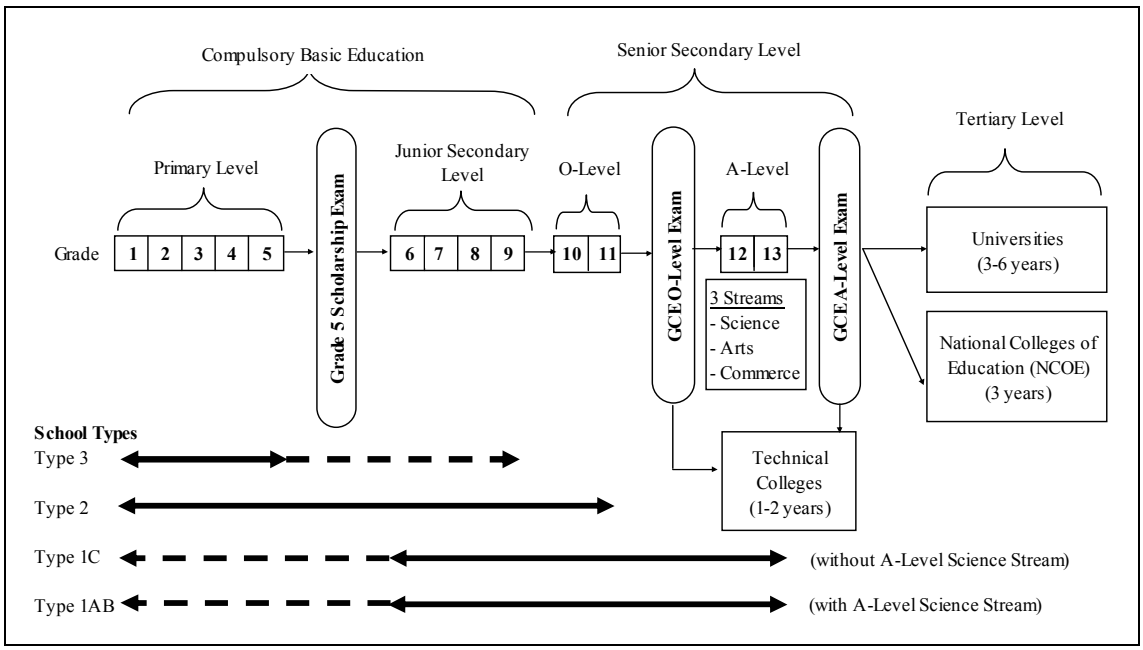
For the purpose of understanding the current situation of education sector, 'School Survey' and 'Market Survey on Industry and Manpower' (demand-side) has conducted during the 1st field survey period. The extracted results are presented in the following chapters. See Appendixes 1-1 and 1-2 for the detailed description of the survey results.

2.1 Review of the Education System

2.1.1 Education System

(1) School System

Sri Lanka's education system consists of 5-year primary level (grade 1 to 5), 4-year junior secondary level (grade 6 to 9), 4-year senior secondary level (grade 10 to 11 called as O-Level and grade 12 to 13 called as A-Level), as shown in Figure 2.1.1. The first 9 years are considered as compulsory basic education. Education in Sri Lanka is predominantly implemented by the state sector, and all education in government schools, from primary to tertiary, is free of charge.



Source: MOE

Figure 2.1.1 School System of Sri Lanka

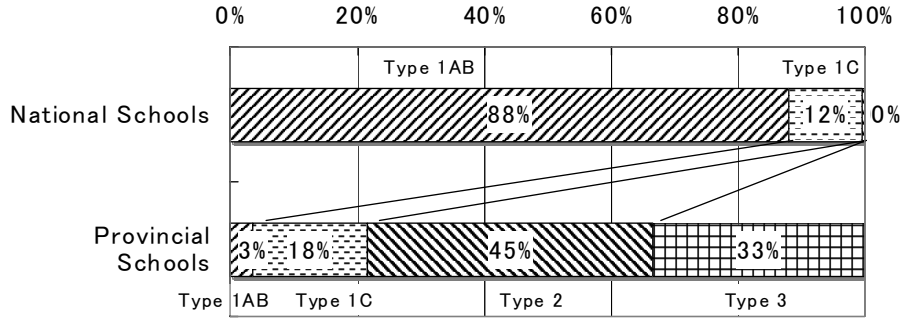
As shown in Figure 2.1.1, Sri Lankan education system is characterized by 3 national examinations: the grade 5 scholarship examination, GCE O-Level examination and GCE A-Level examination.

(2) School Type

Schools are classified into 4 types: Type 1AB school with class up to grade 13 including A-Level science stream; Type 1C school with class up to grade 13 without A-Level science stream; Type 2 school with class up to grade 11; and Type 3 school with class up to grade 5 (or grade 9 in some cases).

There are 10,475 schools in Sri Lanka in 2003, out of which 9,790 (93%) are government schools, 85 (1%) are private schools, and 600 (6%) are pirivenas, that is, schools for *bhikkus* (Buddhist monks), for which MOE pays salaries for teachers and other expenses.

Government schools can be divided into two categories: 1) 323 (3%) National Schools (including 25 Navodya Schools, which were formerly called as Development of Schools by Division (DSD) schools) managed by MOE, and 2) 9,467 (97%) provincial schools (including 372 Navodya schools) managed by 8 provincial councils. While 88% of National Schools are large-scale Type 1AB schools with good facilities, most of provincial schools are small-scale Type 2 (45%) and Type 3 schools (33%) as shown in Figure 2.1.2.



Source: School Census 2003, MOE

Figure 2.1.2 School Types of National and Provincial Schools

There are three types of private schools which are registered in MOE: 1) 42 (49%) non-fee-levying privately-managed and government-assisted schools, for which MOE pays salaries for teachers who are appointed by each school management with approval of MOE, purchases consumables, and provides free textbooks and school uniforms, 2) 26 (31%) fee-levying autonomous private schools (mainly missionary schools), for which MOE provides free textbooks, school uniforms and the fund for the purchase of the consumable items, but does not provide salaries for teachers and buildings, and 3) 17 (20%) special education schools which cater to the educational needs of disabled or retarded children, for which MOE pays salaries for teachers and non-academic staff and a few other expenses, but the buildings are constructed and managed by philanthropic organizations.

There are other types of private schools which are not registered in MOE: most notably, more than 100 of international schools have been established in the urban centers these years. These international schools are not registered in MOE, but instead registered as companies in the Board of Investment (BOI). They do not follow national curriculum and examination, but follow international curricula using English medium as a teaching language.

(3) Tuition Classes

The high competition in grade 5 scholarship examination, O-Level examination, and A-Level examination makes education in Sri Lanka more exam-oriented, and many students, especially those in urban areas, choose to attend private tuition classes after school hours (in some cases, even during school hours).

Table 2.1.1 Students Attending Private Tuition Classes

	No. of Schools Surveyed	Grade 5	Grade 10-11	Grade 12-13
Location				
Urban	61	51%	55%	77%
Rural	47	43%	54%	76%
Plantation	10	10%	20%	46%
Conflict	16	51%	68%	88%
Private	10	85%	37%	54%
Total	144	48%	52%	74%
Province				
Western	26	45%	56%	75%
Central	18	16%	37%	73%
Southern	16	36%	47%	74%
North-East	17	48%	27%	88%
North Western	15	62%	61%	79%
North Central	13	38%	61%	77%
Uva	12	52%	48%	61%
Sabaragamuwa	17	31%	43%	70%
Total (excluding private schools)	134	40%	47%	75%

Source: School Survey (2003), JICA Study Team

As shown in Table 2.1.1, the sample school survey conducted by JICA Study Team indicates that more than 70% of A-Level students and more than 50% of O-Level students attend tuition classes except in plantation and private schools. Some tuition classes even have facilities for science practicals. This is partly due to the fact that school hours are not long enough to complete the A-Level curriculum.

MOE prohibits private tuition classes on Sundays, because children need to attend religious schools on Sundays. MOE also prohibits government teachers from working in tuition classes during school hours, but many government teachers in the urban areas still teach in tuition classes after 2 pm when the school hours finish, in order to get additional income, which is one of the major reasons why many teachers do not want to work in rural schools.

2.1.2 Statistics of the Education System

(1) Number of Schools, Students and Teachers

Table 2.1.2 shows the number of schools, students and teachers by school type and province. It shows that, in 2003, there are 10,475 schools, 4,096,886 students and 196,590 teachers in Sri Lanka, out of which 9,790 (93%) schools, 3,941,685 (96%) students and 186,695 (95%) teachers are in the government sector.

Table 2.1.2 No. of Schools, Students and Teachers by School Type and Province

Province	Government Schools					Private Schools	Privenas	All Schools
	Type 1AB	Type 1C	Type 2	Type 3	All Government Schools			
No. of Schools								
Western	148	251	688	293	1,380	47	125	1,552
Central	73	287	527	592	1,479	11	88	1,578
Southern	90	232	558	254	1,134	9	136	1,279
North-East	117	258	628	824	1,827	7	17	1,851
North Western	67	253	646	270	1,236	3	80	1,319
North Central	28	133	352	266	779	1	47	827
Uva	38	150	373	270	831	5	41	877
Sabaragamuwa	45	189	495	395	1,124	2	66	1,192
Total	606	1,753	4,267	3,164	9,790	85	600	10,475
%	6%	17%	41%	30%	93%	1%	6%	100%
No. of Students								
Western	333,940	230,925	231,268	67,074	863,207	74,748	13,704	951,659
Central	129,063	198,608	141,586	60,879	530,136	9,469	7,379	546,984
Southern	184,423	151,434	132,556	51,502	519,915	4,260	12,159	536,334
North-East	149,756	177,443	205,679	90,891	623,769	7,791	1,374	632,934
North Western	127,405	174,843	144,128	23,928	470,304	682	7,535	478,521
North Central	57,002	95,355	89,770	19,926	262,053	115	3,780	265,948
Uva	62,479	108,934	98,946	20,083	290,442	2,249	3,435	296,126
Sabaragamuwa	87,341	127,946	124,456	42,116	381,859	162	6,359	388,380
Total	1,131,409	1,265,488	1,168,389	376,399	3,941,685	99,476	55,725	4,096,886
%	28%	31%	29%	9%	96%	2%	1%	100%
No. of Teachers								
Western	13,054	9,828	12,110	2,918	37,910	3,519	1,102	42,531
Central	5,813	9,680	8,071	3,219	26,783	508	689	27,980
Southern	7,522	7,740	8,753	2,531	26,546	290	1,194	28,030
North-East	5,828	6,728	8,218	3,791	24,565	307	90	24,962
North Western	5,506	8,412	9,030	1,652	24,600	85	726	25,411
North Central	2,140	4,114	4,926	1,381	12,561	16	314	12,891
Uva	2,670	5,086	5,595	1,262	14,613	160	339	15,112
Sabaragamuwa	3,691	5,994	7,151	2,281	19,117	21	535	19,673
Total	46,224	57,582	63,854	19,035	186,695	4,906	4,989	196,590
%	24%	29%	32%	10%	95%	2%	3%	100%
Average No. of Students per School								
Western	2,256	920	336	229	626	1,590	110	613
Central	1,768	692	269	103	358	861	84	347
Southern	2,049	653	238	203	458	473	89	419
North-East	1,280	688	328	110	341	1,113	81	342
North Western	1,902	691	223	89	381	227	94	363
North Central	2,036	717	255	75	336	115	80	322
Uva	1,644	726	265	74	350	450	84	338
Sabaragamuwa	1,941	677	251	107	340	81	96	326
Average	1,867	722	274	119	403	1,170	93	391
Student-Teacher Ratio								
Western	26	23	19	23	23	21	12	22
Central	22	21	18	19	20	19	11	20
Southern	25	20	15	20	20	15	10	19
North-East	26	26	25	24	25	25	15	25
North Western	23	21	16	14	19	8	10	19
North Central	27	23	18	14	21	7	12	21
Uva	23	21	18	16	20	14	10	20
Sabaragamuwa	24	21	17	18	20	8	12	20
Average	24	22	18	20	21	20	11	21

Source: School Census 2003, MOE

Type 1AB and Type 1C schools occupy only 23% in terms of the number of government schools, but 59% in terms of the number of students and 53% in terms of the number of teachers. This corresponds to the fact that average number of students per school is 1,867 for Type 1AB, 722 for Type 1C, 274 for Type 2 and 119 for Type 3, showing a large size difference among school types. Distribution of various types of schools is also unequal among provinces: large Type 1AB schools are found more in Western, North-East and Southern Provinces, and small Type 3 schools are found more in Central and North-East Provinces.

(2) Urban Popular Schools and Rural Schools

Table 2.1.3 indicates the difference between urban, semi-urban and rural schools. 91% of government schools are rural schools, and most of Type 1C, Type 2 and 3 schools are located in rural areas.

Table 2.1.3 Comparison between Urban, Semi-Urban and Rural Schools

School Location	No. of Government Schools					No. of Students	Student per School	No. of Teachers	Student-Teacher Ratio
	Type 1AB	Type 1C	Type 2	Type 3	Total				
Urban schools (located in municipal council areas)	149	126	206	75	556	586,737	1,055	24,837	24
Semi-urban schools (located in urban council areas)	100	67	109	52	328	335,635	1,023	13,881	24
Rural schools (located in pradeshiya saba areas)	357	1,559	3,952	3,038	8,906	3,019,313	339	147,977	20
% of Rural Schools	59%	89%	93%	96%	91%	77%	-	79%	-
Total	606	1,752	4,267	3,165	9,790	3,941,685	403	186,695	21

Sources: School Census 2003, MOE

It is generally observed that the schools with better facilities and better pass rates in the national examinations become popular among the students' parents and tend to receive more and more. While 76 (13%) of 606 Type 1AB schools enroll more than 3,000 students, 124 (3%) of 4,267 Type 2 and 1,313 (41%) of 3,164 Type 3 schools enroll less than 50 students. This disparity between big and popular Type 1AB schools mainly located in urban areas and small and unpopular Type 2 and 3 schools mainly located in rural areas seems to become wider and wider, because many wealthy or affordable parents prefer to send their children to big and popular schools even they are far away from their home.

Under School Rationalization Program, MOE is closing down some small government schools which do not have enough students and teachers, so the total number of government schools has decreased from 9,891 in 2001 to 9,790 in 2003. Table 2.1.4 shows the details of this change: while the number of urban schools has actually increased from 2001 to 2003, the number of semi-urban and rural schools (especially Type 3 schools) has decreased significantly.

Table 2.1.4 Change in the No. of Government Schools from 2001 to 2003

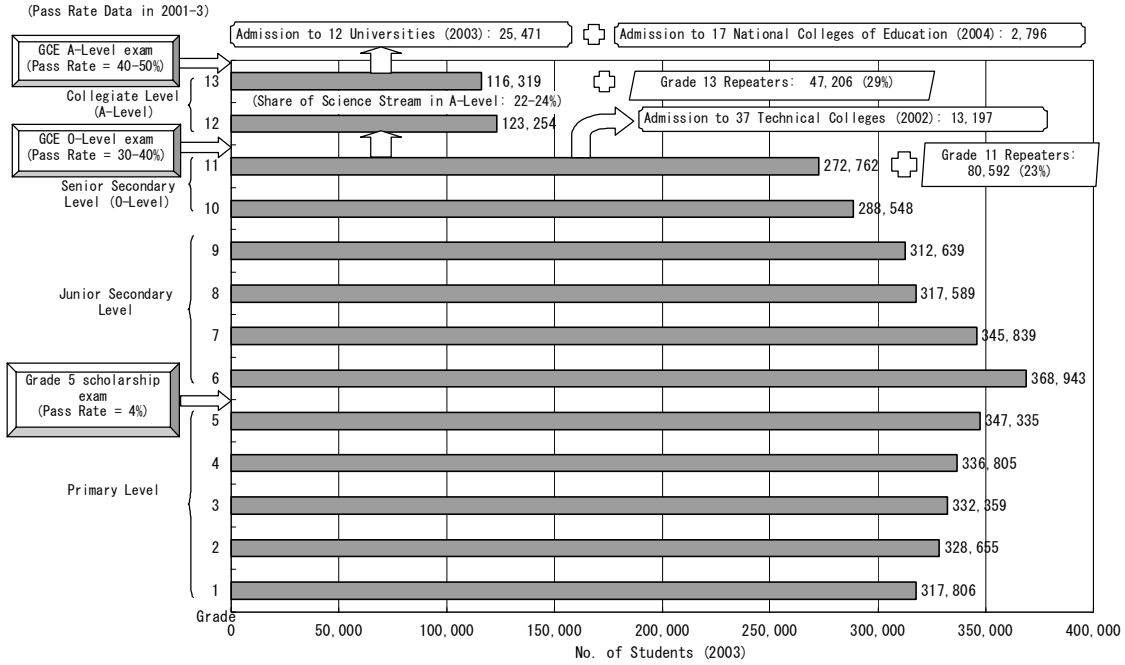
School Location	Change in No. of Government Schools from 2001 to 2003					Change in No. of Students	Change in No. of Teachers
	Type 1AB	Type 1C	Type 2	Type 3	Total		
Urban schools (located in municipal council areas)	+ 25	+ 23	+ 19	+ 15	+ 82	+ 76,980	+ 4,380
Semi-urban schools (located in urban council areas)	- 13	- 15	+ 4	- 20	- 44	- 87,703	- 2,599
Rural schools (located in pradeshiya saba areas)	- 6	- 23	+ 54	- 164	- 139	- 234,738	- 4,571
Total	+ 6	- 15	+ 77	- 169	- 101	- 245,461	- 2,790

Source: School Census 2001 and 2003, MOE

(3) Number of Students by Grade

Figure 2.1.3 shows the number of students in government schools by grade in 2003. There is a big gap between the number of students in grade 11 and those in grade 12. This is because the average pass rate in GCE O-Level examination is only around 30-40%. There are many repeaters in Grade 11, but if they pass their O-Level examination, they easily enter A-Level classes. There are some students who go to Technical Colleges after O-Level, but due to the limited job opportunities, many students in Technical Colleges continue to study for A-Level examination.

Figure 2.1.3 Number of Students in Government Schools by Grade (2003)



Source: School Census 2003, MOE

There is also a gap between the number of students in grade 13 and the number of admitted students in universities. In 2003, 43.9% of grade 13 students who sat for A-Level examination passed A-Level examination and become eligible for university admissions, but only 14.1% of these eligible students were actually admitted to the universities due to the small enrollment in universities. Students who are not admitted to the universities may repeat grade 13, attend one of 17 National Colleges of Education (NCOE) to become teachers, or go abroad to study at foreign universities if their family can afford to support the foreign study.

In Sri Lanka, enrollment ratio for general education is 63.1% for age 5-19 years old, but enrollment ratio for university education is only 2.5% for age 20-24 years old in 2003. This figure suggests that university students in Sri Lanka are the elite students selected through the O-Level and A-Level examinations.

(4) Distribution of Type 1AB Schools

Table 2.1.5 shows province-wise distribution of Type 1AB government schools, which clearly shows inequitable distribution of Type 1AB schools among provinces. More Type 1AB schools are found in Western, Southern and North-East Provinces which have more urban centers than other provinces.

Table 2.1.5 Province-wise Distribution of Type 1AB Government Schools

Province	Type 1AB government schools (2003)				Population (2001)	% of Type 1AB school students in population
	No. of schools	No. of students	No. of teachers	Student-teacher ratio		
Western	148	333,940	13,054	26	5,361,200	6.2%
Central	73	129,063	5,813	22	2,415,000	5.3%
Southern	90	184,423	7,522	25	2,277,100	8.1%
North-East	117	149,756	5,828	26	2,456,900	6.1%
North Western	67	127,405	5,506	23	2,157,700	5.9%
North Central	28	57,002	2,140	27	1,105,700	5.2%
Uva	38	62,479	2,670	23	1,170,800	5.3%
Sabaragamuwa	45	87,341	3,691	24	1,788,000	4.9%
Total	606	1,131,409	46,224	24	18,732,400	6.0%

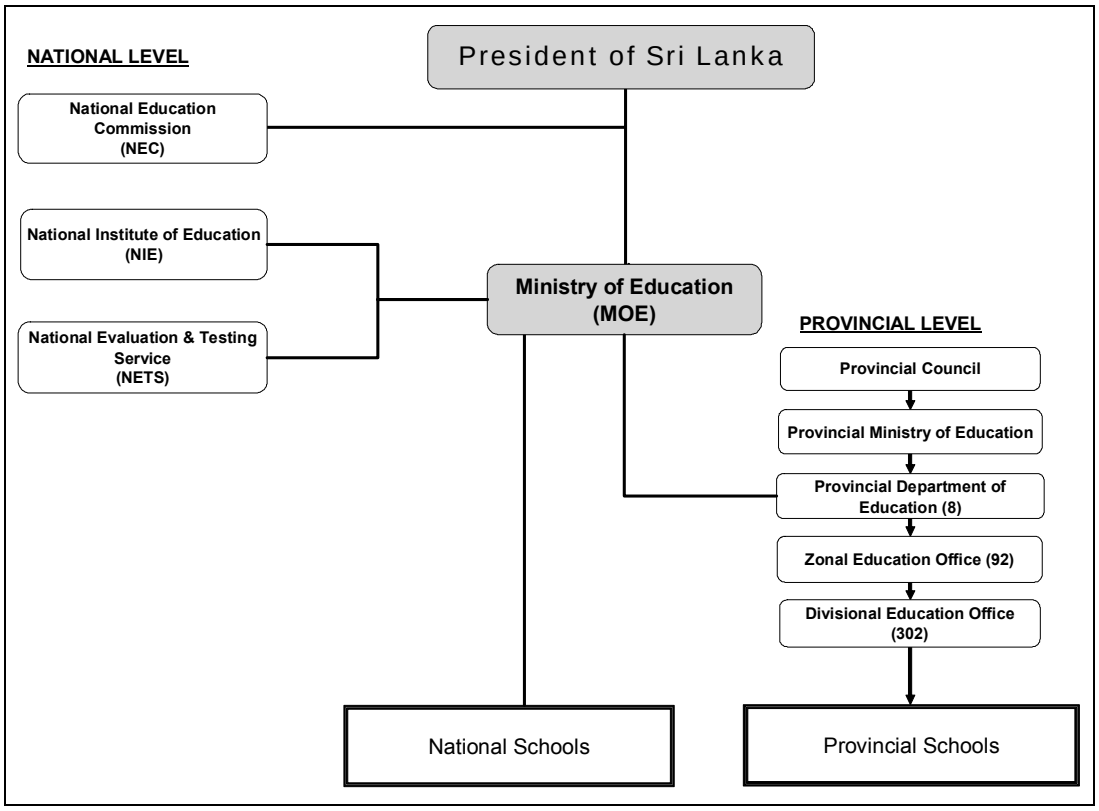
Sources: School Census 2003, MOE and Statistical Abstracts 2003, Department of Census and Statistics

2.2 Administrative Structure and Management

2.2.1 Administrative Structure

(1) Organizations Related to Education

Education is one of the devolved functions in Sri Lanka. The current devolved administrative structure became effective since the establishment of Provincial Council System in 1987. Figure 2.2.1 shows the overall structure of education administration, both at national and provincial level.



Source: MOE

Figure 2.2.1 Overall Structure of Education Organization

The following Table 2.2.1 summarizes the responsibilities of MOE and Provincial Education Administration (PEA).

Table 2.2.1 Responsibilities of the MOE and the PEA

Task	MOE	PEA
Educational Development Plan	• Monitoring and progress review of the implementation of annual provincial education development plans	• Preparation and implementation of the annual provincial education development plan
Education Administration	• Appointment of Provincial Boards of Education	• Establishment and supervision of school boards conforming to national specifications
Recruitment and Appointment	• Appointment of principals to Type 1AB and 1C schools	• Recruitment of those with diplomas and degrees from National Colleges of Education and Universities into the Teaching Service • Appointment of principals to Type 2 and Type 3 schools
School Management and Supervision	• Supervision and management of national schools • Supervision of private and Pirivena schools • Supervision and inspection of	• Supervision of the management of provincial government schools • Appraisal of the performance of principals, teachers and education officers

Task	MOE	PEA
	the management of provincial schools	
School Infrastructure and Facilities	• Design of school buildings and other infrastructure • Provision of facilities to national schools • Supply of free school uniforms to all schools	• Construction and maintenance of buildings, libraries and playgrounds in provincial schools • Provision of facilities to provincial government schools • Organization and development of school libraries
Teaching-Learning Materials and Equipment	• Design of educational equipment, textbooks and other teaching/learning materials	• Production and distributing school textbooks after approval by the Ministry • Procuring and distribution of teaching aids, visual aids and audio visual materials, furniture and other equipment, including science equipment
Curriculum	• Development and revision of curricula and approving provincial adaptations • Conduct of the Grade 5 Scholarship Examination	• Obtaining the approval of the National Institute of Education for local variations in the primary curriculum and implementing such local variations
Staff Training	• Pre-service training through the National Colleges of Education • Training of education officers and principals • Approving in-service training of teachers to be run by the Provinces	• Conducting in-service training programs for which prior approval of the National Institute of Education has been obtained
Others	• Management of special development projects	• Implementation of non–formal education programs

Source: MOE

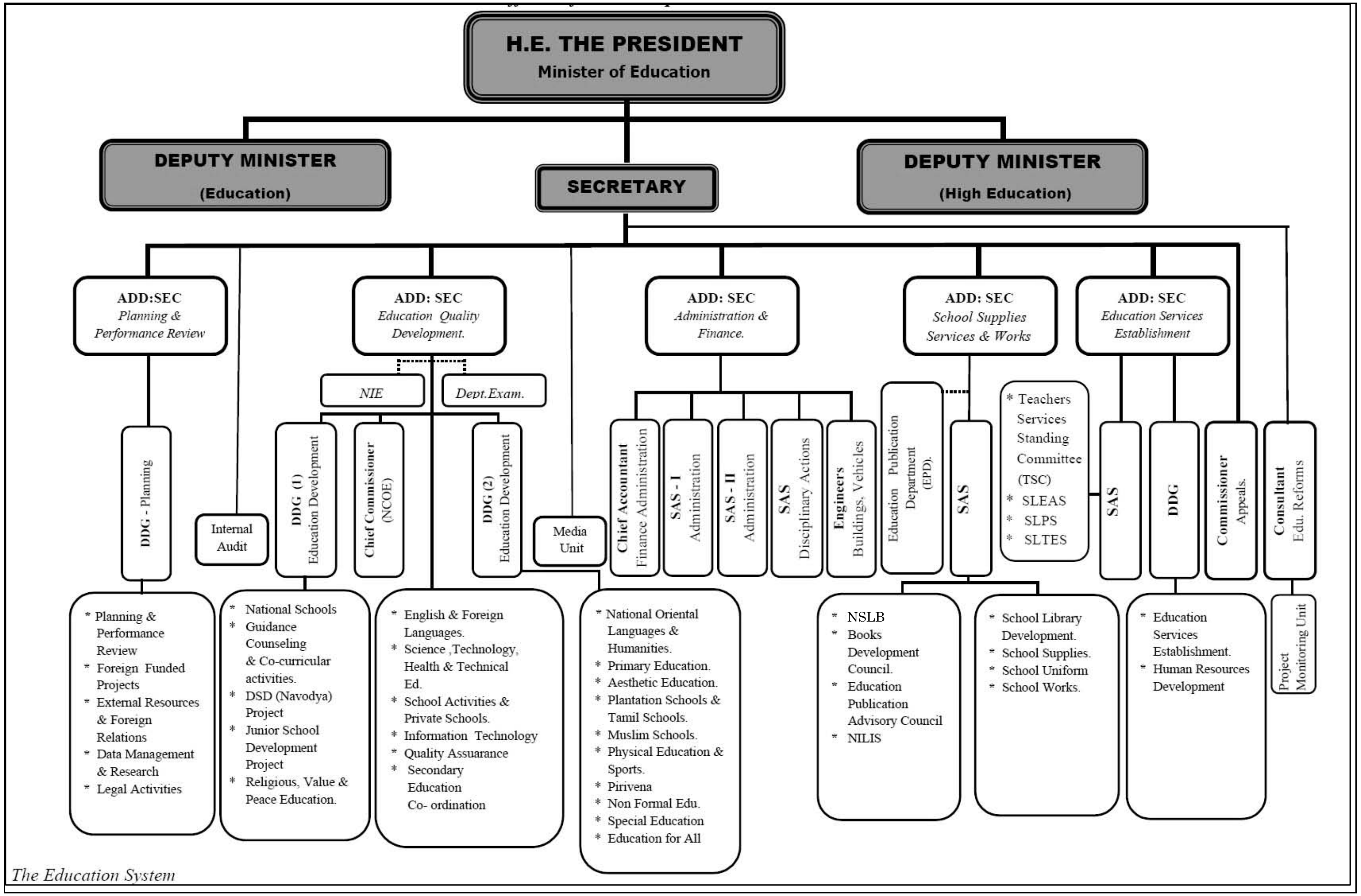
(2) Organization of MOE and Administration

In April 2004 the newly elected government restructured the MOE to be wholly responsible for the education sector from primary education to tertiary education including universities, by integrating previously divided three Ministries, namely the Ministry of Human Resource Development, Education and Cultural Affairs, the Ministry of School Education (MSE) and the Ministry of Tertiary Education and Training (MTET).

Under one Cabinet Minister and one Chief Accounting Officer (Secretary), MOE is now responsible for the whole education sector. Currently, the President herself holds the post of Minister of Education. Under the Minister there are two Deputy Ministers, one in charge of General Education and the other Higher Education.

In the current devolved education administrative system, MOE's main functions are in education policy, planning, programming, supervision and management. The general education sector of MOE consists of five main divisions headed by Additional Secretaries, i.e., Policy Planning & Performance Review, Education Quality Development, Human Resources Development of Education Services, Administration and Finance, and Supplies. Under each division are several branches and units as shown in Figure 2.2.2.

Although most of the government schools are administered by the Provincial Councils, there are a small number of National Schools and other specified schools which come directly under MOE. Currently there are 323 National Schools island-wide. Most of the National Schools are Type 1AB, which have A-Level science and mathematics streams, and they are, in general, better staffed and equipped than government schools administered by the Provinces.



Note: ADDSEC: Additional Secretary, DDG: Deputy Director General, NIE: National Institute of Education, SAS: Senior Assistant Secretary, SLEAS: Sri Lanka Educational Administrative Service, SLPS: Sri Lanka Principals' Service, SLTES: Sri Lanka Teacher Educators' Service, NSLB: National School Library Board, NILIS: National Institute of Library and Information System

Source: MOE

Figure 2.2.2 Organizational Structure of MOE General Education Sector

(3) Organization of National Education Institutes

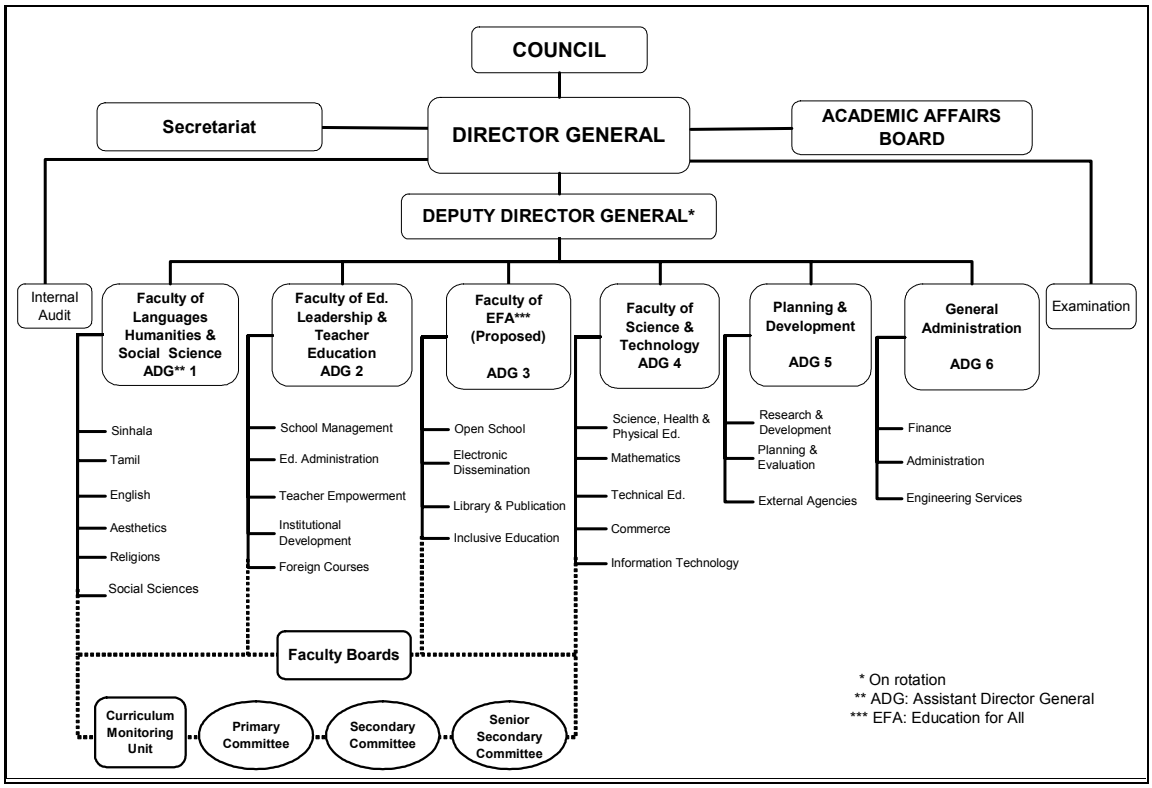
Besides MOE there are several national-level education bodies. The National Education Commission (NEC), the National Institute of Education (NIE) and the National Evaluation and Testing Service (NETS) are of importance for this study.

1) National Education Commission (NEC)

The National Education Commission (NEC) established in 1991 is a statutory body appointed by the President. NEC is responsible for the formulation of education policy for all sectors of the education system including universities. In addition, they periodically review and analyze the National Education Policy and Plans. In December 2003, NEC presented a set of policy proposals following a comprehensive review on General Education Reform introduced in 1997.

2) National Institute of Education (NIE)

The NIE, established as a semi-autonomous institution in 1986, now has over 500 personnel. NIE has been currently restructuring under the new Director General. Figure 2.2.3 shows the new organizational structure of NIE.



Source: NIE

Figure 2.2.3 New Organization of NIE

Under the Director General there are 6 faculties/departments charged by Additional Director Generals. Faculty of Languages, Humanities & Social Science and Faculty of Science and Technology are responsible for the design, review and revision of the school curriculum, production of all syllabuses and

teacher's guides for all subjects in the curriculum and in-service training in the use of such material for the subjects. Faculty of Education Leadership and Teacher Education is concerned with the on-going education of teachers e.g. post-graduate Diplomas in Education and Education Management and Masters Degrees in these disciplines. Faculty of Planning and Development provides academic research and library and information services for educational development, school-based initiatives and advice for the Ministry. General Administration provides services for the needs of NIE including examination services.

3) National Evaluation and Testing Service Institute (NETS)

The NETS and Agency Testing Service (ATS) (total staff 43) is under the Commissioner General of Examinations who is responsible for the conduct of Public Examinations and School Based Assessment Activities for Schools and also examinations for other Government Services.

The main function of NETS is the conduct and control of the three public examinations island-wide. These are the Grade 5 Scholarship examination, GCE O-Level examination and GCE A Level examination. Under the 1997 Reforms, NETS also administers School Based Assessment procedures for O-Levels and is developing SBA for A-Levels. University Staff, education officials and teachers set and assess the examination papers in collaboration with NETS officers. From there, the complete process - printing, distributing and collection of papers, marking and compiling results and statistics is the responsibility of NETS. This is a large exercise each year as there are 600,000 papers being distributed to and collected from 9,000 O-Level centers and 6,000 A-Level centers island-wide. The public examination system uses the latest technology and is very secure.

(4) Provincial Education Administration Structure

In accordance with the government's decentralization policy, education responsibilities were devolved to Provincial Councils in 1987. The majority of government schools in the country, except National Schools, are administered by the Provincial Councils. According to the School Census in 2003, there are 9,467 functioning government schools under the Provincial Councils.

Under the Provincial Ministry of Education and its Secretary, the Provincial Department of Education is the apex of the provincial education administrative system. Each Province is divided into several educational zones, which are headed by Zonal Directors. There are currently 92 educational zones in the country. Each educational zone is further divided into several educational divisions. Each division normally consists of 30-40 schools.

The organization and function of each office is summarized below:

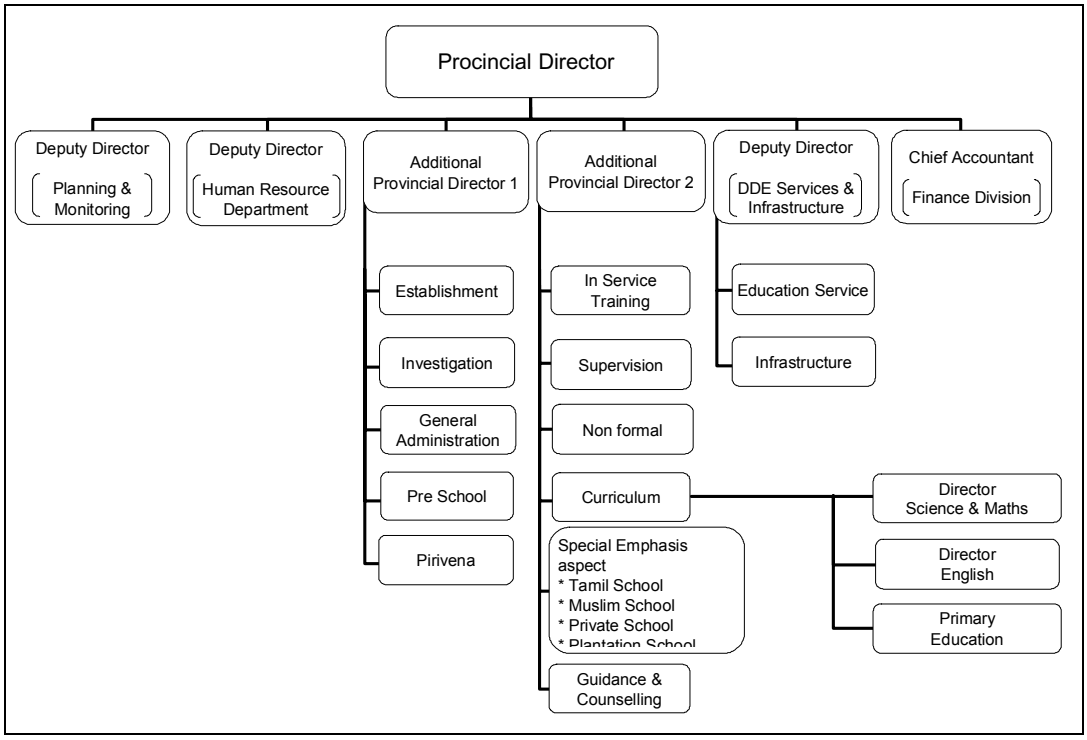
1) Provincial Department of Education

The Provincial Department of Education, headed by the Provincial Director of Education, is responsible for the management and administration of all education programs in the province. The Provincial Director of Education is appointed by the Secretary of MOE, though he is directly answerable to the Education Secretary of the Provincial Ministry. The Provincial Director, therefore, has dual responsibilities both to MOE and to the Provincial Ministry of Education. It is reported that there are some conflicting orders from MOE and from Provincial Ministry, which has created inefficiency in the system.

The main functions of the Provincial Department include: planning and budgeting of education in the Province; general administration of zonal and divisional offices; education development of schools through zonal and divisional offices.

The administrative structure of a Provincial Department differs slightly from Province to Province. Figure 2.2.4 shows an example of the organizational structure of a Provincial Department of Education.

The Provincial Directors attend monthly meetings at MOE where necessary information is exchanged and pertinent issues are discussed with the Additional Secretaries and Branch Directors of MOE. The Provincial Director, in turn, organizes a regular meeting with all the officers at the Provincial Department and Zonal Directors.



Source: Provincial Education Office, Southern Province

Figure 2.2.4 Structure of Provincial Department of Education

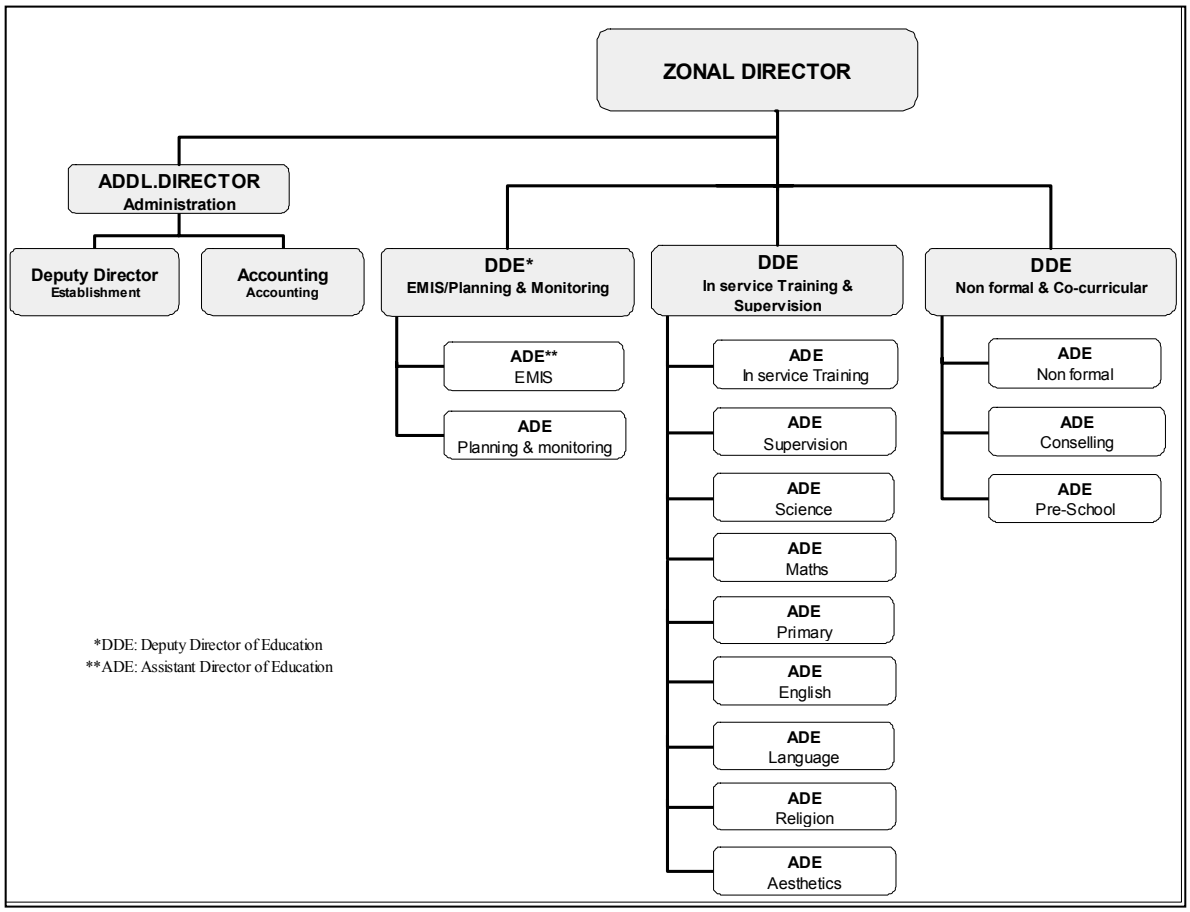
2) Zonal Education Office

The Zonal Education Office, headed by a Zonal Director, is responsible for administrative work of the schools and teachers in the Zone as well as quality improvement of teaching and learning in the schools.

Personnel management within the Zone such as teacher transfer and up-keeping of teacher files is a Zonal responsibility. Information regarding the school census is gathered from schools by the Division Office and compiled at the Zone Office before results are sent to the Provincial Department.

For quality improvement in education, the Zone Office has subject specialists in different subject areas and responsible for supervision and improvement of quality of teaching at the school level.

The diagram below shows an example of the zonal organization (Galle Zonal Office in the Southern Province).



Source: Gall Zonal Education Office, Southern Province

Figure 2.2.5 Organization of Zonal Education Office (Galle Zone)

School supervision is carried out by supervisory officers of the Provincial and Zonal Education Offices. It is normally done by a team of several officers without giving prior notice. The team monitors class room practice and inspects various school records and files. This type of school visit is

sometimes criticized as the principal and the teachers do not benefit due to little feedback given to the school. There is also a tendency for zonal and provincial officers to visit only nearby schools, neglecting remote schools.

3) Divisional Education Office

The Divisional Education Office is headed by a Divisional Director and equipped with three assistant directors. The office is sometimes located within the premises of one of the schools in the Division. The functions of Divisional Office are: general supervision of schools; collecting information and data from schools (including data for the school census); distribution of textbooks and other materials to schools; assisting school supervision by the Zonal and Provincial Offices. In reality, Divisional Offices, without any administrative responsibilities, do not have adequate resources (both human and financial) to carry out meaningful school supervision.

Primary ISAs and secondary subject ISAs, who were previously attached to the zonal offices, are now attached to the Divisional Office. ISAs are normally recruited from experienced teachers and given regular training at NIE. ISAs' main functions are to carry out in-service training of the teachers in the division by conducting in-service courses and assisting them with class room teaching in the school. In practice there are several constraints including: 1) the number of ISAs is not adequate to cover all the schools in the division; 2) ISAs are responsible up to O-Levels and need assistance for A-Level subjects; 3) ISAs are not given adequate funds and facilities for their work.

This devolved education administrative system was intended to make education system more efficient and responsive to school needs. However, because of the multiple layers between school and MOE, which imposes lengthy bureaucratic procedures, and duplication of functions at different levels, schools are not benefiting from the system.

2.2.2 School Management

(1) Internal Management of School

Issues of School-Based Management (SBM) have been debated in Sri Lanka for many years. In the past, there were several moves towards SBM. Implementation of Establishment of School Development Board (SDB) in 1993 was seen as a sign towards SBM. SDBs, however, were abolished in 1995 even before many schools had formed such boards. SBM was identified as a key strategy to improve school quality in General Education Reform introduced in 1997 and a need of step-by-step introduction of SBM to schools at earliest stage was further reiterated in the Proposals for a National Policy Framework on General Education in Sri Lanka, prepared by NEC in December 2003. However, until recently no clear policy decision was taken to accelerate the move towards SBM. Therefore, although a

number of measures were introduced to schools either as a pilot or on a regular basis, which have supported move towards more autonomy at school level, overall management system and school culture remained top-down and bureaucratic.

Since July/August 2004, MOE has been initiating a number of discussions and consultations with various stakeholders including development partners on the issue of SBM. SBM Committee[5] held meetings to discuss the ways of accelerating the move. The government now has a concrete plan of implementing SBM in 16 zones (2 zones in each province)[6] starting from early 2005. From 2006 some financial management authorities will be transferred to schools island-wide under Education Sector Development Program (2006-2010) under SWAp. Under SBM, schools will be managed by School Management Committee/Board (SMC/B), consisting of principal, teachers, parents, past pupils, and a representative of the education authority. Details of authorities which will be devolved to schools are not yet determined.

Current situation of school management in personnel management, curriculum management, and financial management are discussed below.

1) Leadership of Principals and Personnel Management

Principals play a very important role in improving quality and efficiency of education at school level. NIE has been conducting management training for principals, both full-time and part-time basis. Most of the training programs include SBM among other managerial issues.

The result of the School Survey regarding training for principals is shown in the Table 2.2.2. More than half of the principals in Type 1AB and Type 1C attended NIE management training course while only 19% of principals in Type 2 and 29% in Type 3 schools attended the NIE course. Over 65% of the principals in Type 2 and Type 3 attended management courses organized by Provincial and zonal offices.

Table 2.2.2 Principals Attended Management Training in 2002

School Type	No. of schools	Overseas Training		NIE		Others	
		No.	%	No.	%	No.	%
1AB	50	8	16%	27	54%	0	18%
1C	36	1	3%	19	53%	10	28%
2	32	0	0%	6	19%	21	66%
3	17	0	0%	5	29%	11	65%
Total	135	9	7%	57	42%	51	38%

Source: School Survey, JICA Study Team

[5] SBM Committee is comprised of 4 members: Additional Director General in charge of Faculty of Education Leadership and Teacher Education (NIE); Director of National Schools (MOE); Director of DSD/Navodya Project (MOE); and National Consultant (SEMP).

[6] In addition to schools in 16 selected Zones, all National Schools and Navodya Schools will take part in the project.

From the survey it is found that not all the principals are trained in school management. Currently no pre-posting managerial training or regular in-service training is organized for principals and senior teachers.

From the JICA Pilot Project it was identified that the facilitative leadership is one of the most important qualities of principals to succeed in school-based activities. Capacity building of principals and senior teachers in management skills including leadership training should be further emphasized. The JICA Pilot Project also identified the importance of regular monitoring and on-site consultation to improve school management.

Teacher appraisal was introduced to all schools in 2002. Using a standardized format, the principal (or a senior manager) assesses teachers on teaching and learning areas and other activities such as co-curricular activities and community relations. It is a useful tool, if used properly, to find out strengths and weaknesses of each staff. However, after the assessment, few school-based activities are organized in order to develop teacher capacity utilizing the findings of the assessment.

2) Curriculum Development

All government schools follow the national curriculum, and text books are centrally managed and distributed to schools. However, due to 1997 General Education Reform and introduction of quality inputs funds, schools have more opportunities to enrich teaching and learning process by providing relevant teaching and supplementary materials and introducing more conducive teaching methods.

In reality, apart from primary level, it is rare to find innovative teaching materials and teaching methods in school situation. Secondary level education focuses on the National Exams. In JICA Pilot Project it was a challenge for many secondary teachers to develop their own teaching materials and conduct more practical and interesting classes.

3) Financial Management

At school level the main source of funding is from the government. Teachers' salaries are sent to the school account by the government (MOE for National Schools and Provincial Council for provincial schools), form which monthly pay checks are issued to each teacher. Utility expenditures, such as electricity, water and telephone, are paid partly by the government and partly by the school. The payment system differs from province to province but some sort of cost sharing is normally practiced. For example, in Western Province, half of the electricity cost is paid by the government and half by the school, while water and telephone cost are sourced by the school.

In addition to government funds, school collect Facility Fee from each student. Facility fee is normally around Rs.30 per year for primary and Rs.60 for secondary school student. Contributions from School Development

Society (SDS) and Past Pupils' Association (PPA) constitute important funds for some schools. The amount the school can generate from SDS and PPA varies considerably from school to school. Popular schools in urban area often collect over a million rupees from these two sources while small schools in deprived area have difficulty in generating even a couple of thousand rupees.

Until the introduction of Quality Input Funds in 2000, most schools (except a few schools which enjoy large financial contributions from SDS and PPA as mentioned above) had little freedom to obtain what they needed for their schools. Schools had to send their request forms of required materials and equipment to zonal education office (or MOE in case of National Schools). Requested items were not always approved nor delivered on time due to administrative and other reasons.

In 2000 under the World Bank funded GEP2, Quality Inputs Fund was introduced to schools, which allows schools to utilize the fund for the purchase of items within the prescribed regulations. The allocation of funds to school is based on Norm-Based Unit Cost Resource Allocation Mechanism (NBUCRAM), which considers such factors as number of students, classes, school category and others. Some allowances are given to deprived schools. Since 2003 more flexibility has been given to the school in the utilization of the funds. This system has been widely appreciated by the principals and teaching staff as schools are able to obtain what they require for their school in accordance with their own priorities. This scheme has been carried over by the government from its national budget even when the fund allocation under GEP2 ended in 2003.

Under SBM, school will be given the similar allocation of funds for other purposes such as staff development, building maintenance and development, etc. Such allocation of funds will be based, as for Quality Input Funds, on a certain formula funding to ensure equity. Further, some funds (education quality development fund) will be made available for schools based on school's plan and its performance.

Although schools have been managing Quality Input Funds for the past 4 years, it is identified from the experience of JICA Pilot Project that many schools are not yet conversant with financial procedures. Schools need to be made aware of financial transparency and accountability in the use of allocated funds.

(2) Community Participation

Schools are not isolated from their surrounding communities. There are different support groups at school level: School Development Societies (SDSs); Past Pupils Associations (PPAs); and local businesses in some cases.

Most schools have SDS and it is the only support group for many of the smaller schools. SDS comprises school staff, parents, past pupils and well-wishers. Activities of the SDS varies from school to school, though most SDSs support their schools by organizing and hosting school events, attending to cleaning and repair works of the school and fund raising. Most of the SDSs collect a yearly membership fee of Rs.3-15[7] per person, though some collect no fees and others collect much higher amounts as donations. These funds are often used for school activities such as sport meetings and school trips. Larger and more prestigious schools often have strong and resourceful PPAs, which contribute significantly to the schools. Some schools have Student Councils, comprised of elected students.

The result of the School Survey regarding school support organizations is shown in the Table 2.2.3 below.

Table 2.2.3 School Support Organization

School Type	No. of schools	School Dev. Society		Past Pupil Association		Student Council	
		No.	%	No.	%	No.	%
1AB	50	49	98%	41	82%	15	30%
1C	36	32	89%	13	36%	9	25%
2	32	31	97%	2	6%	10	31%
3	17	16	94%	3	18%	3	18%
Total	135	128	95%	59	44%	37	27%

Source: School Survey, JICA Study Team

Out of 135 sample government schools, 128 schools had SDSs, accounting for 95% of the sample schools and no significant variations were found among school types. Less than half of the sample schools had PPAs, although 82% of the Type 1AB schools had PPAs. Student Councils are not so common, especially among primary schools.

Some schools have good connections with nearby organizations, industries, and businesses, which sometimes give contribution to the schools in different ways. One school the JICA Study Team visited had toilets built by a textile company in the area and another had a school project funded by a nearby food company. At one school officers from nearby Air Force were contributing manpower to build school fences and clearing the school premises.

As described above most of the schools raise their own funds in addition to an allocation from government. The following table shows the results of the School Survey concerning funds raised by government schools.

[7] According to the 1982 Circular on SDS, yearly membership fee should be not more than Rs.3 and not less than Rs.1 for members who are parents or guardians and for the other members Rs.15 and teachers were exempted from the membership fee.

Table 2.2.4 Fund Raised at School (Rs.)

Fund Source		Parents		Community		Industry		Others		Total Fund Per Student
School Type	Total No. of schools	No. of schools	Per student	No. of schools	Per student	No. of schools	Per student	No. of schools	Per student	
1AB	50	46	83	20	28	14	4	20	45	160
1C	36	27	23	6	1	7	5	10	8	37
2	32	21	54	4	5	5	4	5	3	66
3	17	9	34	3	22	2	1	1	1	58
Total	135	103	67	33	21	28	4	36	32	124

Source: School Survey, JICA Study Team

Amounts collected from parents such as facility fees, SDS membership fees and other contributions, constitutes the major part of the fund (more than half). The average amount of funds raised by schools (including facility fee) is Rp.124 per student, ranging from Rs.37 to Rs.160.

In reality, the amount of funds school may be able to generate largely depends on the socio-economic condition of the community of which school is part of. Many of the popular schools in urban areas generate large sums of money while small schools in poor, disadvantaged area have no such possibility.

One of the components of JICA Pilot Project was improvement of basic infrastructure and school facilities in cooperation with parents and students. Schools constructed teachers' quarter, science laboratory, mathematics room, library, science garden, etc. As the plan was prepared by the school, based on its immediate needs, teachers, parents and even students took initiatives to find human and material resources for the project. Some contributed their skills at lower price than commercial basis, some volunteered their time and labor, which resulted in the reduced cost of 50 to 70% of normal construction costs. Further, due to the sense of ownership to the facility, which grew during the project implementation, will probably help maintain the facilities better by the community.

2.3 Teacher Training and Deployment

2.3.1 Teacher Training System

(1) Qualification for Teachers

In 1997, MOE established the National Authority on Teacher Education (NATE) to co-ordinate and control teacher education undertaken by various institutions. NATE drafted a new National Teacher Education Policy in 2001, which describes a new qualification for teachers in primary, secondary and collegiate levels as shown in Table 2.3.1.

Table 2.3.1 Qualification for Teachers in Each Level

Level	Required qualification for teachers
Primary (grade 1 to 5)	- National Diploma in Teaching on primary education from National Colleges of Education (NCOE), or - Trained Teachers' Certificate on primary education from Teachers' (Training) Colleges (TTC)
Junior Secondary and O-Level (grade 6 to 11)	- National Diploma in Teaching on specific subjects from National Colleges of Education (NCOE), - Trained Teachers' Certificate on specific subjects from Teachers' (Training) Colleges (TTC), or - University graduates with professional teaching qualifications
A-Level (grade 12 to 13)	- University graduates with professional teaching qualifications, or - Those with accredited qualifications equivalent to university degrees from teacher education institutions such as NIE

Source: National Teacher Education Policy (National Authority on Teacher Education, MOE, 2001)

Based on this policy, the new teachers for grade 1 to grade 11 are basically recruited from National Colleges of Education (NCOE), which offer 2-year residential program and 1-year internship at the school. Science and mathematics teachers for A-Level class are recruited from university graduates, and most of them are Science graduates. It has been observed that many of them have no professional education before they start to teach.

Table 2.3.2 shows the actual situation of distribution of qualified teachers in government schools. It indicates that the teachers' qualifications in Tamil-medium schools are inferior to those in Sinhala-medium schools. This is especially true in Type 3 schools, rural schools, and plantation schools.

According to the school survey conducted by JICA Study Team, almost all A-Level science and mathematics teachers are university graduates, and most of O-Level science and mathematics teachers are teachers who were trained at TTC or NIE.

Table 2.3.2 Distribution of Qualified Teachers in Government Schools (2003)

		Sinhala-medium school					Tamil-medium school					English-medium					Total				
		No. of Teachers	%of Graduate Teachers	%of Trained Teachers	%of Untrained Teachers	%of Trainee Teachers	No. of Teachers	%of Graduate Teachers	%of Trained Teachers	%of Untrained Teachers	%of Trainee Teachers	No. of Teachers	%of Graduate Teachers	%of Trained Teachers	%of Untrained Teachers	%of Trainee Teachers	No. of Teachers	%of Graduate Teachers	%of Trained Teachers	%of Untrained Teachers	%of Trainee Teachers
Province																					
	Western	34,736	35%	61%	2%	2%	3,173	31%	59%	3%	7%	1	100%	0%	0%	0%	37,910	35%	61%	2%	2%
	Central	20,511	30%	66%	3%	0%	6,261	13%	74%	9%	4%	11	91%	9%	0%	0%	26,783	26%	68%	4%	1%
	Southern	25,860	32%	65%	2%	1%	679	13%	73%	6%	7%	7	100%	0%	0%	0%	26,546	31%	65%	2%	1%
	North-East	4,015	14%	78%	5%	2%	20,503	29%	63%	3%	5%	47	70%	9%	4%	17%	24,565	26%	66%	4%	4%
	North Western	22,276	32%	66%	2%	0%	2,309	21%	70%	6%	3%	15	80%	7%	0%	13%	24,600	31%	66%	3%	1%
	North Central	11,508	20%	75%	5%	1%	1,051	11%	77%	10%	2%	2	100%	0%	0%	0%	12,561	19%	75%	5%	1%
	Uva	12,802	25%	70%	3%	2%	1,800	4%	76%	6%	14%	11	100%	0%	0%	0%	14,613	22%	71%	3%	4%
	Sabaragamuwa	17,347	26%	71%	3%	1%	1,754	15%	73%	5%	6%	16	100%	0%	0%	0%	19,117	25%	71%	3%	1%
Type																					
	Type 1AB	37,392	43%	55%	1%	1%	8,738	40%	55%	2%	2%	94	94%	1%	1%	4%	46,224	43%	55%	1%	1%
	Type 1C	46,221	32%	65%	2%	1%	11,349	26%	64%	5%	4%	12	25%	33%	8%	33%	57,582	31%	64%	3%	2%
	Type 2	52,185	22%	73%	4%	2%	11,666	16%	72%	5%	7%	3	33%	0%	0%	67%	63,854	21%	73%	4%	3%
	Type 3	13,257	15%	80%	4%	2%	5,777	7%	78%	7%	8%	1	0%	100%	0%	0%	19,035	12%	79%	5%	4%
Location																					
	municipal council are	18,912	39%	58%	2%	1%	5,899	31%	64%	2%	3%	26	92%	0%	4%	4%	24,837	37%	60%	2%	2%
	urban council area	10,014	37%	61%	2%	1%	3,843	28%	64%	3%	4%	24	100%	0%	0%	0%	13,881	35%	61%	2%	2%
	pradeshiya saba area	120,129	28%	68%	3%	1%	27,788	21%	68%	6%	6%	60	73%	10%	2%	15%	147,977	26%	68%	3%	2%
Ownership																					
	National school	23,056	43%	55%	1%	0%	4,483	37%	58%	3%	2%	87	99%	1%	0%	0%	27,626	42%	55%	2%	1%
	Provincial school	125,999	27%	69%	3%	1%	33,047	21%	68%	5%	6%	23	26%	22%	9%	43%	159,069	26%	68%	3%	2%
	Plantation school	325	11%	81%	5%	3%	4,760	3%	77%	8%	12%	0	0%	0%	0%	0%	5,085	4%	77%	8%	11%
	Total	149,055	30%	66%	3%	1%	37,530	23%	67%	5%	5%	110	84%	5%	2%	9%	186,695	28%	67%	3%	2%

Note: Graduate teachers: university graduates, post graduate degree/diploma holders, or graduate trainees
Trained teachers: teachers with diploma from National Colleges of Education (NCOE), or certificate from Teacher Training Colleges (TTC) or National Institute of Education (NIE).
Untrained teachers: untrained teachers only with A-Level or O-Level certificate, or 2-3 year diploma, who are absorbed to Sri Lanka Teachers' Service (SLTS)
Trainee teachers: teachers who are not absorbed to Sri Lanka Teachers' Service (SLTS)
Other teachers: volunteer teachers, or teachers paid by other than the government

Source: School Census 2003, MOE

(2) Teacher Training Institutions

Table 2.3.3 shows a list of teacher training institutions in Sri Lanka and their major teacher training courses. Most of around 50,000 untrained teachers who were recruited from 1989 to 1994 have been successfully trained in 2-year residential course at Teachers' Training Colleges (TTC) or 3-year distance course at National Institute of Education (NIE). While TTCs are almost finishing their original role to provide in-service teacher training for untrained teachers, there are still some untrained teachers, especially Tamil-medium primary school teachers, so there are still some students in 10 TTC as shown in Table 2.3.4.

Table 2.3.3 Teacher Training Institutions and Major Courses

Institution (No.)	Major Courses (Duration)	No. of admitted students	Description
National College of Education (NCOE) (No.=17)	National Diploma in Teaching (3 years)	3,706 (2003)	2-year residential program and 1-year internship at schools. Initial training for those who passed A-Level exam.
	Workshops and seminars on various topics (1/2 – 2 days)	-	Short-term continuing education courses for teachers.
Teacher s' Training College (TTC) (No.=14)	Trained Teachers' Certificate (2 years)	1,164 (2004)	Residential course. Initial training for untrained teachers already in schools. (Out of 14 TTC, only 10 TTC received students in 2004.)
Teacher Education Institute (TEI) (No.=5 under planning)	Workshops and seminars on various topics (1 to a few weeks)	-	Residential course. Short-term continuing education courses for teachers. Not functioning yet.
Teacher Center (TC) (No.= 100)	Workshops and seminars on various topics (mainly 1/2 – 2 days)	-	Short-term continuing education courses for teachers.
National Institute of Education (NIE) (No.=1 central campus, 30 learning centers for distance education, and 440 training centers for short-term courses)	Trained Teachers' Certificate (3-5 years)	none (2004)	Distance education. Initial training for untrained teachers already in schools.
	Bachelor of Education (B.Ed.) (3 years)	2,179 (2004)	Distance education. Initial training or upgrading training for trained teachers.
	Post Graduate Diploma in Education (PGDE) (2 years)	1,450 (2004)	Distance education. Upgrading training for untrained graduate teachers.
	Master of Education (M.Ed.) (2 years)	70 (2004)	Distance education. Upgrading training for teachers with PGDE or B.Ed. degree.
	Workshops and seminars on various topics (1/2 – 2 days)	-	Short-term continuing education courses for teachers.
University (No.=12 universities and 1 Open University for distance education)	Bachelor of Education (B.Ed.) (4 years)	24 (2003)	In 2003, offered only in Open University
	Bachelor of Science (B.Sc.) (4 years)	5,262 (2003)	Offered in 12 universities except University of Moratuwa
	Master of Education (M.Ed.) (1-2 years)	2,000 (2003)	Offered in University of Colombo, University of Peradeniya, University of Jaffna and Open University
	Master of Science (M.Sc.) (1-2 years)	439 (2003)	Offered in 7 universities.

Sources: MOE, NIE, and Sri Lanka University Statistics 2003

Table 2.3.4 No. of Admitted Students in 10 TTCs

TTC name	Province	Language of instruction	No. of students admitted in 2004 for 2-year Trained Teacher Certificate course					
			Total	Primary	Science	Maths	English	Others
Maharagama TTC	Western	Sinhala	90	0	0	0	71	19
Giraagama TTC	Central	Sinhala	21	0	0	0	0	21
Yathanside TTC	Central	Tamil	132	128	0	0	0	4
Peradeniya TTC	Central	Sinhala	0	0	0	0	0	0
Balapitiya TTC	Southern	Sinhala	33	27	0	0	0	6
Unawatuna TTC	Southern	Sinhala	14	0	10	4	0	0
Kopay TTC	North-East	Tamil	396	374	0	0	0	22
Palali TTC	North-East	Tamil	0	0	0	0	0	0
Addalachchenai TTC	North-East	Tamil	221	173	24	15	0	9
Batticaloa TTC	North-East	Tamil	257	222	22	7	0	6
Total			1,164	924	56	26	71	87

Source: National Commissioner, National Colleges of Education, MOE

National Colleges of Education (NCOE) now play the major role in providing initial training (pre-service training) for primary and secondary school teachers up to O-Level. A-Level teachers must be university graduates. As shown in Table 2.3.3, distance education courses, such as Bachelor of Education and Post Graduate Diploma in Education courses at National Institute of Education (NIE), also play a significant role for upgrading the qualification of many existing teachers.

Table 2.3.5 shows a list of 17 National Colleges of Education (NCOE). While most NCOE provide training courses for primary school teachers, only 6 NCOE (Siyane, Sripada, Nilwala, Vavuniya, Batticaloa, Addalachchenai) provide courses for science and mathematics teachers for grade 6 to 11. For plantation schools, only one NCOE, Sripada NCOE in Central Province, provides pre-service training in Tamil-medium science and mathematics teachers. Recently English-medium library science and IT courses have started in 3 NCOE (Pasdunrata, Mahaweli and Jaffna) in order to supply new cadres of school librarians and IT center staff.

Table 2.3.5 No. of Admitted Students in 17 NCOEs

NCOE name	Province	Language of instruction			No. of students admitted in 2004						
		Sinhala	Tamil	English	Primary	**Science**	**Maths**	Library & Science & IT	English	Others	Total
Haptigama NCOE	Western	○			50	**0**	**0**	0	0	30	80
Siyane NCOE	Western	○			0	**15**	**20**	0	0	57	92
				○	0	**59**	**38**	0	0	0	97
Pasdunrata NCOE	Western			○	0	**0**	**0**	57	243	0	300
Darga NCOE	Western		○		117	**0**	**0**	0	0	24	141
Mahaweli NCOE	Central			○	0	**0**	**0**	59	165	20	244
Sripada NCOE	Central		○		64	**31**	**16**	0	0	105	216
		○			29	**20**	**20**	0	0	0	69
Ruhuna NCOE	Southern	○			50	**0**	**0**	0	0	50	100
			○		30	**0**	**0**	0	0	19	49
Nilwala NCOE	Southern	○			0	**14**	**20**	0	0	30	64
				○	0	**17**	**25**	0	0	0	42
Jaffna NCOE	North-East		○		30	**0**	**0**	0	0	88	118
				○	0	**0**	**0**	14	30	0	44
Vavuniya NCOE	North-East		○		60	**25**	**0**	0	0	103	188
		○			63	**0**	**0**	0	0	0	63
Batticaloa NCOE	North-East		○		57	**17**	**24**	0	0	77	175
Addalachchenai NCOE	North-East		○		60	**30**	**30**	0	0	109	229
Wayamba NCOE	North Western	○			0	**0**	**0**	0	0	177	177
Pulatisipura NCOE	North Central	○			50	**0**	**0**	0	0	30	80
Uva NCOE	Uva	○			29	**0**	**0**	0	0	59	88
Ruwanpura NCOE	Sabaragamuwa	○			50	**0**	**0**	0	0	30	80
Sariputa NCOE	Sabaragamuwa	○			0	**0**	**0**	0	0	60	60
				Total	739	**228**	**193**	130	438	1,068	2,796

Source: National Commissioner, National Colleges of Education, MOE

Admission to NCOE is basically decided by the students' mark in the A-Level examination, but 25% of the admission is allocated to students from 15 difficult districts; namely, Matale, Nuwara Eliya (Central Province); Hambantota (Southern Province); Jaffna, Kilinochchi, Mannar, Vavuniya, Mullaitivu, Ampara, Trincomalee (North-East Province); Puttalam (North Western Province); Anuradhapura, Polonnaruwa (North Central Province); Badulla and Manaragala (Uva Province).

More than 90% of NCOE students are female, because female students tend to get higher marks in A-Level Examination than male students. Since already about 70% of teachers are female, the higher percentage of female NCOE students will certainly increase the share of female teachers further in near future, which may

have negative implications on solving unequal distribution of teachers between urban and rural areas, because many female teachers prefer or are obliged to work in urban areas due to family reasons.

While the number of NCOE has increased using the loan from the World Bank in order to meet the increased demand for initial teacher education, the number of students admitted to NCOE is limited to the teacher demand, and often very small when considering the large size of the facilities at NCOE. The recent World Bank study[8] on teacher deployment estimates that about 10% of teachers who graduate from NCOE do not become teachers, because they refuse to work in assigned schools in rural areas.

Since initial teacher education has been improved significantly in recent years, continuing teacher education is the next agenda for MOE. A total of 100 Teacher Centers have been established nationwide for short-term in-service training (mainly conducting half- to 2-day workshops during weekends), 16 of which were recently constructed under the World Bank's Teacher Education and Teacher Deployment Project (TETD). Every Teacher Center is attached to one NCOE, which dispatches lecturers for seminars and workshops in the affiliated Teacher Centers.

There is also a re-development plan to utilize Teachers' Training Colleges (TTC) for continuing education, as shown in Table 2.3.6. Particularly, 5 former TTC (Maharagama, Gampola, Balapitiya, Unawatuna and Anuradhapura) are planned to be converted to Teacher Education Institutes (TEI), which will offer short-term (from 10-day to 3-month courses) residential continuing education courses for teachers.

However, the opportunities for continuing education at Teacher Centers and TEI are still limited, and the contents of continuous training needs to be developed.

[8] Teacher Deployment in Sri Lanka: An Audit (Planning and Performance Review Division, MOE, May 2004)

Table 2.3.6 Re-development Plan for 14 TTCs

TTC Name	Province	Re-development Plan
Peradeniya TTC	Central	Teach Grade 6-9 subjects, A-Level science and mathematics, and A-Level General English, in English-medium (Has started from September 2004)
Special Education TTC, Maharagama	Western	Will be opened as a new TTC for inclusive education for children with special needs.
Maharagama TTC	Western	Will be developed as Teacher Education Institute (TEI) for continuing education programs in science, mathematics, special education, agriculture and management training in Sinhala and Tamil medium
Gampola TTC	Central	
Balapitiya TTC	Southern	
Unawatuna TTC	Southern	
Anuradhapura TTC	North Central	
Giraagama TTC	Central	Will continue as TTC to provide in-service training for untrained teachers in aesthetic subjects. One section will be allocated to a Cultural Center for SARCC countries.
Yathanside TTC	Central	Will continue as TTC to provide in-service traiuning for untrained teachers in Tamil medium
Kopay TTC	North-East	
Palali TTC	North-East	
Addalachchenai TTC	North-East	
Batticaloa TTC	North-East	
Dambadeniya TTC	Sabaragamuwa	Proposed to provide pre-service training by being attached to Sariputa NCOE

Source: National Commissioner, National Colleges of Education, MOE

(3) Problems in Teacher Training

Problems in teacher training are summarized as follows:

1) Problems in Pre-Service Teacher Training

a) *Graduate teachers without pre-service training*: Teachers for Grades 12 and 13 must be university graduates, but most of them do not have any teaching training nor teaching internship in which they can learn through actual teaching practice at schools, before working as teachers. Although they are encouraged to take Post Graduate Diploma in Education (PGDE) course while working as teachers, it is far better to make pre-requirement for them to learn some educational subjects and learn and practice various teaching-learning methods at schools under an internship program, before assigning as teachers.

b) *Low morale and discipline of NCOE students*: It is estimated that about 10% of new graduates from NCOE refuse to work in rural and difficult schools. This is a real waste of money for the government, so it is important to conduct a teacher aptitude test for NCOE applicants before accepting in NCOE, and provide morale and discipline guidance during school days at NCOE, by putting a high value for teachers working in rural and difficult schools.

c) *Underutilization of NCOE facilities*: In order to provide pre-service training for teachers, 17 NCOE were established around the country, but the number of students in NCOE is small compared with the capacity of the facility, because the number of students is decided based on demand for teachers. It may be good to evolve NCOE into universities with Faculty of Education and other Faculties in order to respond to high demand for university education.

2) Problems in In-service Teacher Training

a) *Insufficient continuing education opportunities for teachers*: While there is a big need to train teachers on latest development on new curriculum and teaching-learning methods, the number of teachers who can attend continuing education is still limited. Especially teachers in rural and small schools have difficulties to attend continuing education, because of lack of substituting teachers.

b) *Lack of continuing education programs which address actual teachers' needs in classroom*: In-service training is designed and conducted by NIE, mainly to provide teachers with information on new curriculum. But there are many teaching-learning problems as well as classroom management problems which teachers are facing in classroom every day, so it is important to develop continuing education programs which address teachers' actual needs and difficulties in classroom, by strengthening NIE's research capacity.

(4) In-Service Adviser (ISA)

There are 2,507 subject-wise In–Service Advisers (ISAs), also called as Master Teachers in Sri Lanka, who are attached to Divisional Education Offices. ISAs have two roles: 1) to train teachers on the new curriculum introduced by NIE through seminars, and 2) to visit government schools regularly, observe the teaching-learning process in classrooms, and advise teachers (except A-Level teachers) on how to improve their teaching. Lack of ISAs for A-Level (grades 12 and 13) teachers is considered as weakness in teacher support in A-Level.

Table 2.3.7 Distribution of ISAs by Province and Medium of Instruction

Province	No. of teachers (2003)			No. of ISAs (2002)			No. of teachers per ISA		
	Sinhala-medium	Tamil-medium	Total	Sinhala-medium	Tamil-medium	Total	Sinhala-medium	Tamil-medium	Total
Western	34,736	3,173	37,909	424	32	456	82	99	83
Central	20,511	6,261	26,772	88	58	146	233	108	183
Southern	25,860	679	26,539	350	30	380	74	23	70
North-East	4,015	20,503	24,518	46	322	368	87	64	67
North Western	22,276	2,309	24,585	259	67	326	86	34	75
North Central	11,508	1,051	12,559	175	13	188	66	81	67
Uva	12,802	1,800	14,602	366	36	402	35	50	36
Sabaragamuwa	17,347	1,754	19,101	228	13	241	76	135	79
Total	149,055	37,530	186,585	1,936	571	2,507	77	66	74

Source: School Census 2003 and MOE

Table 2.3.7 shows the distribution of ISAs by province and medium of instruction, and it reveals a very unequal distribution of ISAs among provinces as well as between Sinhala and Tamil medium schools. Out of 2,507 ISAs, 571 (23%) are

Tamil-medium ISAs. The number of Tamil-medium ISAs in North-East Province has increased significantly from 17 in 2001 to 322 in 2002, mainly due to GTZ's Teacher In-Service Project (TIP), a part of GTZ's Basic Education Sector Program (BESP), which have trained not only primary school teachers but also ISAs.

Table 2.3.8 and Table 2.3.9 show the available and required number of ISAs by province and subject – Sinhala medium and Tamil medium respectively. This tables indicates that ISAs for science and mathematics are generally in shortage, except Sinhala-medium ISAs in Western, Southern and Uva Provinces and Tamil-medium ISAs in North Western Province.

It is often observed that ISAs seldom visit rural schools due to transportation problems, but it is rural schools which need ISAs' service most, because rural teachers working under difficult situations need more assistance. There is also the concern over the quality of ISAs' services. ISAs were initially trained in NIE, and when NIE introduced new curriculum, ISAs were again trained by NIE on how to introduce new curriculum to teachers, but they have received no other training. Feedback on teaching problems from ISAs to NIE is poor, so in-service training provided by ISAs tends to be top-down in nature, and often does not reflect teachers' real problems and difficulties at the classroom.

To solve this situation, GTZ's BESP/TIP introduced a cascade training system for primary school teachers in North-East Province, as shown in Figure 2.3.1. In this cascade training system, 1) national and provincial resource persons and training specialists first train master trainers (MTs) at the national or provincial levels, then 2) MTs train ISAs at the zonal level, then 3) ISAs train school principals, sectional heads and one senior teachers (they are called Head plus One (HPO) trainers) at the divisional level, and finally 4) HPO trainers train teacher at the school level. It is also an important feature of the cascade system to get regular feedbacks from the bottom and respond to the new training needs from the school levels.

After successful implementation of the cascade training system in North-East Province, MOE recently adopted this cascade teacher training system to train primary school teachers in all provinces.

Problems in ISAs are summarized as follows:

- *No ISAs for A-Level teachers:* ISAs are only available for teachers in Grade 1 to 11, and not for Grade 12 and 13.
- *Shortage of science and mathematics ISAs:* Science and mathematics ISAs are in shortage especially for rural areas.
- *Unequal distribution of ISAs:* most of ISAs are located in urban areas, and many rural schools do not receive ISAs' in-service training regularly.
- *ISAs' weak ability to respond to teachers' needs:* The main role of ISAs is

to deliver messages from MOE and NIE to teachers, and most of them are not well responding to teachers' actual needs at classrooms. The main mode of ISA's support to teachers is to observe teachers' lessons and give oral advice, but without any demonstration lessons by ISAs, many teachers cannot improve their lessons as ISAa recommend.

- *Insufficient training of ISAs especially on activity-based and interactive teaching and learning:* While Education Reform recommended more activity-based and interactive teaching and learning, it is seldom practiced in the classroom, mainly because of insufficient training of ISAs and teachers as well as lack of practical teaching materials for it. So it is important to develop suitable teaching materials for activity-based and interactive teaching and learning, and train ISAs and teachers on how to use them in the classroom.

Table 2.3.8 Available and Required Number of ISAs by Province and Subject – Sinhala Medium (2002)

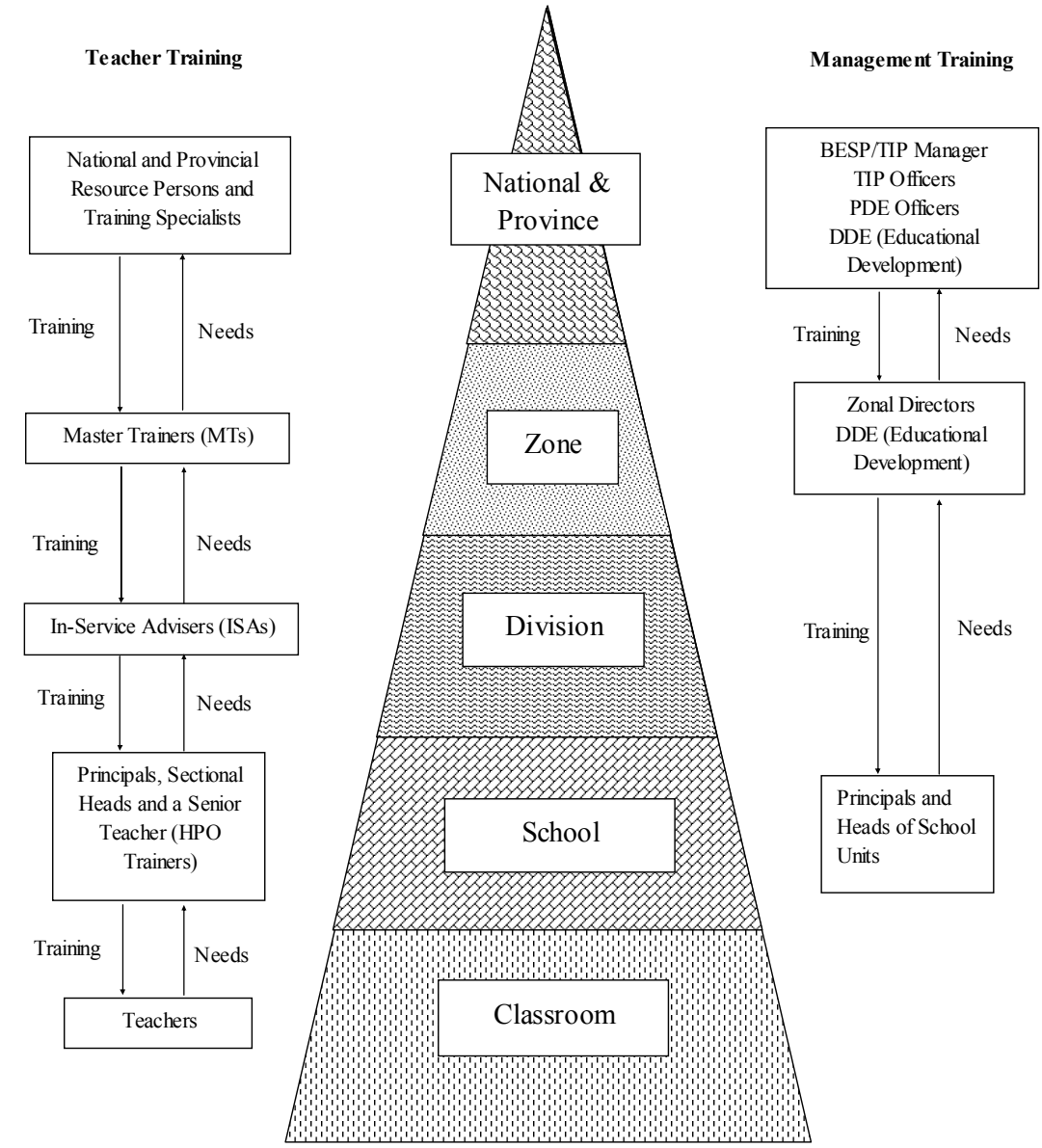
Province		**Science**	**Mathematics**	Sinhala	English	Social Studies	Buddhism	Christianity (Catholic)	Christianity (non-Catholic)	Agriculture	Home Economics	Dancing	Oriental Music	Western Music	Art	Physical Education	Total
Western	Available	**36**	**38**	27	57	35	33	7	0	24	25	26	32	0	38	46	424
	Required	**30**	**38**	39	38	38	30	7	1	2	3	10	11	2	11	38	298
	Excess (+) / Deficit (-)	**6**	**0**	-12	19	-3	3	0	-1	22	22	16	21	-2	27	8	126
Central	Available	**11**	**10**	9	10	12	4	1	0	5	5	3	6	0	5	7	88
	Required	**28**	**32**	32	32	32	28	3	1	3	3	14	15	1	15	32	271
	Excess (+) / Deficit (-)	**-17**	**-22**	-23	-22	-20	-24	-2	-1	2	2	-11	-9	-1	-10	-25	-183
Southern	Available	**37**	**41**	40	27	40	36	0	0	31	25	12	13	1	16	31	350
	Required	**36**	**39**	40	39	39	36	2	1	2	3	10	11	1	11	39	309
	Excess (+) / Deficit (-)	**1**	**2**	0	-12	1	0	-2	-1	29	22	2	2	0	5	-8	41
North-East	Available	**5**	**7**	4	6	4	1	0	0	3	3	2	3	0	2	6	46
	Required	**30**	**30**	30	30	30	30	7	1	2	6	8	8	1	8	30	251
	Excess (+) / Deficit (-)	**-25**	**-23**	-26	-24	-26	-29	-7	-1	1	-3	-6	-5	-1	-6	-24	-205
North Wester	Available	**25**	**23**	26	30	29	30	3	1	14	20	12	12	0	9	25	259
	Required	**23**	**24**	24	27	26	25	6	3	20	20	16	16	1	16	24	271
	Excess (+) / Deficit (-)	**2**	**-1**	2	3	3	5	-3	-2	-6	0	-4	-4	-1	-7	1	-12
North Centra	Available	**21**	**13**	20	13	21	17	0	0	22	9	5	7	0	5	22	175
	Required	**27**	**27**	27	27	27	27	1	1	27	27	27	27	1	27	27	327
	Excess (+) / Deficit (-)	**-6**	**-14**	-7	-14	-6	-10	-1	-1	-5	-18	-22	-20	-1	-22	-5	-152
Uva	Available	**23**	**26**	52	21	39	32	0	0	33	31	9	26	4	39	31	366
	Required	**21**	**23**	23	23	23	21	1	1	2	1	7	8	1	8	23	186
	Excess (+) / Deficit (-)	**2**	**3**	29	-2	16	11	-1	-1	31	30	2	18	3	31	8	180
Sabaragamuv	Available	**22**	**25**	20	24	26	22	1	0	18	10	13	12	0	8	27	228
	Required	**25**	**27**	27	27	27	25	1	1	1	1	6	7	1	7	27	210
	Excess (+) / Deficit (-)	**-3**	**-2**	-7	-3	-1	-3	0	-1	17	9	7	5	-1	1	0	18
Total	Available	**180**	**183**	198	188	206	175	12	1	150	128	82	111	5	122	195	1,936
	Required	**220**	**240**	242	243	242	222	28	10	59	64	98	103	9	103	240	2,123
	Excess (+) / Deficit (-)	**-40**	**-57**	-44	-55	-36	-47	-16	-9	91	64	-16	8	-4	19	-45	-187

Source: MOE

Table 2.3.9 Available and Required Number of ISAs by Province and Subject – Tamil Medium (2002)

Province		**Science**	**Mathematics**	Tamil	English	Social Studies	Islam	Hinduism	Christianity (Catholic)	Christianity (non-Catholic)	Agriculture	Home Economics	Dancing	Oriental Music	Western Music	Art	Health & Physical Education	Total
Western	Available	**4**	**1**	9	0	2	9	4	0	0	0	1	0	1	0	0	1	32
	Required	**11**	**11**	14	11	11	7	3	3	1	1	1	1	3	1	3	11	93
	Excess (+) / Deficit (-)	**-7**	**-10**	-5	-11	-9	2	1	-3	-1	-1	0	-1	-2	-1	-3	-10	-61
Central	Available	**7**	**7**	11	7	6	3	3	2	1	3	2	0	3	0	1	2	58
	Required	**15**	**15**	18	15	15	11	15	3	1	1	1	1	3	1	3	15	133
	Excess (+) / Deficit (-)	**-8**	**-8**	-7	-8	-9	-8	-12	-1	0	2	1	-1	0	-1	-2	-13	-75
Southern	Available	**0**	**2**	18	0	2	3	0	0	0	0	2	1	0	0	1	1	30
	Required	**11**	**11**	14	11	11	7	3	3	1	1	1	6	3	1	3	11	98
	Excess (+) / Deficit (-)	**-11**	**-9**	4	-11	-9	-4	-3	-3	-1	-1	1	-5	-3	-1	-2	-10	-68
North-East	Available	**37**	**36**	39	34	45	11	21	10	0	16	21	6	11	0	15	20	322
	Required	**73**	**73**	73	73	73	15	73	8	1	6	6	18	16	2	19	73	602
	Excess (+) / Deficit (-)	**-36**	**-37**	-34	-39	-28	-4	-52	2	-1	10	15	-12	-5	-2	-4	-53	-280
North Westerr	Available	**9**	**8**	9	2	8	8	2	1	0	5	7	0	0	0	2	6	67
	Required	**7**	**8**	15	2	7	9	2	1	1	6	6	1	2	1	6	5	79
	Excess (+) / Deficit (-)	**2**	**0**	-6	0	1	-1	0	0	-1	-1	1	-1	-2	-1	-4	1	-12
North Central	Available	**1**	**1**	3	0	3	2	0	0	0	1	1	0	0	0	0	1	13
	Required	**3**	**3**	3	3	3	2	1	2	1	3	3	3	3	1	3	3	40
	Excess (+) / Deficit (-)	**-2**	**-2**	0	-3	0	0	-1	-2	-1	-2	-2	-3	-3	-1	-3	-2	-27
Uva	Available	**3**	**6**	4	6	4	3	4	0	0	1	0	1	0	0	4	0	36
	Required	**8**	**8**	8	8	8	5	5	2	1	1	1	1	2	1	2	8	69
	Excess (+) / Deficit (-)	**-5**	**-2**	-4	-2	-4	-2	-1	-2	-1	0	-1	0	-2	-1	2	-8	-33
Sabaragamuw	Available	**3**	**0**	2	0	3	2	0	0	0	0	1	0	0	0	1	1	13
	Required	**7**	**7**	7	7	7	4	5	2	1	1	1	1	2	1	2	7	62
	Excess (+) / Deficit (-)	**-4**	**-7**	-5	-7	-4	-2	-5	-2	-1	-1	0	-1	-2	-1	-1	-6	-49
Total	Available	**64**	**61**	95	49	73	41	34	13	1	26	35	8	15	0	24	32	571
	Required	**135**	**136**	152	130	135	60	107	24	8	20	20	32	34	9	41	133	1,176
	Excess (+) / Deficit (-)	**-71**	**-75**	-57	-81	-62	-19	-73	-11	-7	6	15	-24	-19	-9	-17	-101	-605

Source: MOE



Note: HPO = Head plus One Teacher DDE = Deputy Director of Education

Figure 2.3.1 Cascade Teacher Training System under GTZ's TIP

2.3.2 Teacher Deployment

(1) Teacher Demand and Supply Situation

National Teacher Education Policy in 2001 specifies that teacher supply should confirm the following student-teacher ratios:

- 26:1 for primary level
- 22:1 for secondary level

Table 2.3.10 Student-Teacher Ratio by Medium of Instruction, School Type and Province

Province	Sinhala-medium government schools					Tamil-medium government schools				
	1AB	1C	Type 2	Type 3	Total	1AB	1C	Type 2	Type 3	Total
No. of Schools										
Western	126	219	633	257	1,235	9	24	49	36	118
Central	49	211	359	308	927	14	68	163	280	525
Southern	87	218	534	252	1,091	3	12	21	2	38
North-East	7	45	137	67	256	110	213	491	756	1,570
North Western	57	209	575	240	1,081	9	44	69	31	153
North Central	27	111	317	239	694	1	22	34	27	84
Uva	35	127	314	159	635	3	22	60	110	195
Sabaragamuwa	38	165	454	271	928	5	24	41	124	194
Total	426	1,305	3,323	1,793	6,847	154	429	928	1,366	2,877
No. of Students										
Western	301,367	202,732	210,874	63,787	778,760	28,398	27,359	20,369	3,287	79,413
Central	98,793	140,966	87,241	31,533	358,533	28,164	57,244	54,334	29,331	169,073
Southern	178,303	146,245	127,731	51,316	503,595	3,491	5,189	4,742	186	13,608
North-East	9,269	30,156	36,117	5,467	81,009	139,701	147,287	169,562	85,424	541,974
North Western	108,401	145,288	125,234	22,064	400,987	16,401	29,458	18,572	1,947	66,378
North Central	55,807	83,013	82,169	17,201	238,190	967	12,312	7,601	2,725	23,605
Uva	59,170	91,161	81,311	9,311	240,953	2,540	17,196	18,125	10,772	48,633
Sabaragamuwa	78,886	111,196	114,342	31,920	336,344	7,381	16,568	10,114	10,196	44,259
Total	889,996	950,757	865,019	232,599	2,938,371	227,043	312,613	303,419	143,868	986,943
No. of Teachers										
Western	11,977	8,787	11,199	2,773	34,736	1,076	1,041	911	145	3,173
Central	4,721	7,676	6,063	2,051	20,511	1,082	2,003	2,008	1,168	6,261
Southern	7,378	7,460	8,502	2,520	25,860	137	280	251	11	679
North-East	408	1,328	1,885	394	4,015	5,384	5,392	6,331	3,396	20,503
North Western	4,921	7,493	8,326	1,536	22,276	573	917	703	116	2,309
North Central	2,103	3,587	4,573	1,245	11,508	35	527	353	136	1,051
Uva	2,549	4,506	4,925	822	12,802	111	579	670	440	1,800
Sabaragamuwa	3,335	5,384	6,712	1,916	17,347	340	610	439	365	1,754
Total	37,392	46,221	52,185	13,257	149,055	8,738	11,349	11,666	5,777	37,530
Student-Teacher Ratio										
Western	**25**	**23**	19	23	22	**26**	**26**	22	23	**25**
Central	21	18	14	15	17	**26**	**29**	**27**	25	**27**
Southern	**24**	20	15	20	19	**25**	19	19	17	20
North-East	**23**	**23**	19	14	20	**26**	**27**	**27**	25	**26**
North Western	22	19	15	14	18	**29**	**32**	**26**	17	**29**
North Central	**27**	**23**	18	14	21	**28**	**23**	22	20	22
Uva	**23**	20	17	11	19	**23**	**30**	**27**	24	**27**
Sabaragamuwa	**24**	21	17	17	19	22	**27**	23	28	**25**
Average	**24**	21	17	18	20	**26**	**28**	**26**	25	**26**

Note: 1) The above number of Sinhala-medium and Tamil-medium schools does not include 66 bi-medium schools where not only Sinhala or Tamil but also English are used as a medium of instruction.

2) For the analysis of student-teacher ratio based on schools types, the following simplified student-teacher ratios are used: 26:1 for Type 3 schools, 24:1 for Type 2 schools, 22:1 for Type 1AB and 1C schools, and 24:1 for all schools.

Source: School Census 2003, MOE

Table 2.3.10 shows the student-teacher ratio by the medium of instruction (Sinhala or Tamil), school type and province. It indicates that while there is large excess of teachers in Type 2 and Type 3 Sinhala-medium schools, there is shortage of teachers in Type 1AB Sinhala-medium schools and Type 1AB, Type 1C and Type 2 Tamil-medium schools. This shortage of teachers in Type 1AB schools is caused by excessive students concentration in Type 1AB schools. Province-wise, teacher shortage is severe especially in Type 1AB Sinhala-medium schools in North Central Province, Type 1AB, Type 1C and Type 2 Tamil-medium schools in North-Western, Central, North-East and Uva Provinces.

Actual situation of teacher excess/shortage in Sinhala-medium schools and Tamil-medium schools as of June 1st, 2004 is shown in Table 2.3.11 and 2.3.12 respectively. These tables show that teacher shortage is generally more acute in Tamil-medium schools than Sinhala-medium schools. While there is excess of Sinhala-medium science and mathematics teachers for Grade 12-13 (A-Level), there is shortage of Sinhala-medium science and mathematics teachers for Grade 6-11 in North-East, North Central and Uva Provinces, where there are many rural schools, and shortage of Tamil-medium primary school teachers and science and mathematics teachers for Grade 6-11.

It is well known that rural schools suffer most from shortage of teachers, because many teachers feel difficult to commute to remote rural schools without teachers' quarters, and many married teachers prefer to work in urban centers where their children can attend urban popular schools.

Table 2.3.11 Teacher Excess and Deficit - Sinhala Medium (as of June 1st, 2004)

Province		Grade 1-5 (Primary) Teachers		Grade 6-11 (Secondary) Teachers			Grade 12-13 (A-level) Teachers			Sectional Heads			Guidance & Counselling	Principals	Total
		General	English (Grade 3-5)	Science/Maths	English	Others	Science	Art/Commerce	Others	Grade 1-5	Grade 6-11	Grade 12-13			
Western	Available	9,223	1,601	4,674	2,308	8,815	1,014	2,587	316	454	1,009	270	127	1,199	33,597
	Required	10,135	1,563	4,274	2,003	6,955	985	2,603	636	604	1,772	198	239	1,259	33,226
	Excess (+) / Deficit (-)	-912	38	400	305	1,860	29	-16	-320	-150	-763	72	-112	-60	371
Central	Available	5,247	754	2,545	1,377	5,136	430	2,017	175	208	482	130	216	928	19,645
	Required	4,851	976	2,377	1,234	4,539	372	1,504	290	294	507	112	244	933	18,233
	Excess (+) / Deficit (-)	396	-222	168	143	597	58	513	-115	-86	-25	18	-28	-5	1,412
Southern	Available	6,690	1,254	3,363	1,683	6,669	586	1,948	396	150	1,053	60	306	1,046	25,204
	Required	7,062	1,212	3,250	1,566	6,756	572	2,110	317	228	1,089	72	306	1,109	25,649
	Excess (+) / Deficit (-)	-372	42	113	117	-87	14	-162	79	-78	-36	-12	0	-63	-445
North-East	Available	1,397	103	485	209	1,008	32	307	22	12	30	4	6	236	3,851
	Required	1,295	266	533	259	900	27	247	20	49	48	1	15	308	3,968
	Excess (+) / Deficit (-)	102	-163	-48	-50	108	5	60	2	-37	-18	3	-9	-72	-117
North Western	Available	6,403	1,036	2,636	1,340	5,887	348	1,619	561	288	452	111	165	1,071	21,917
	Required	6,372	1,252	2,624	1,294	5,164	325	1,602	608	352	556	113	283	1,093	21,638
	Excess (+) / Deficit (-)	31	-216	12	46	723	23	17	-47	-64	-104	-2	-118	-22	279
North Central	Available	3,644	474	1,443	612	3,012	145	688	97	117	209	30	86	709	11,266
	Required	3,365	751	1,540	721	2,594	121	635	99	170	320	39	102	661	11,118
	Excess (+) / Deficit (-)	279	-277	-97	-109	418	24	53	-2	-53	-111	-9	-16	48	148
Uva	Available	3,673	482	1,588	747	3,351	196	880	133	186	242	83	91	636	12,288
	Required	3,521	614	1,616	736	2,907	180	876	136	205	287	73	107	637	11,895
	Excess (+) / Deficit (-)	152	-132	-28	11	444	16	4	-3	-19	-45	10	-16	-1	393
Sabaragamuwa	Available	4,737	763	2,205	1,094	3,823	341	1,663	147	184	341	55	93	882	16,328
	Required	4,698	918	2,187	1,048	3,781	258	1,131	265	245	422	56	120	924	16,053
	Excess (+) / Deficit (-)	39	-155	18	46	42	83	532	-118	-61	-81	-1	-27	-42	275
Total	Available	41,014	6,467	18,939	9,370	37,701	3,092	11,709	1,847	1,599	3,818	743	1,090	6,707	144,096
	Required	41,299	7,552	18,401	8,861	33,596	2,840	10,708	2,371	2,147	5,001	664	1,416	6,924	141,780
	Excess (+) / Deficit (-)	-285	-1,085	538	509	4,105	252	1,001	-524	-548	-1,183	79	-326	-217	2,316

Source: Planning Division, MOE

Table 2.3.12 Teacher Excess and Deficit - Tamil Medium (as of June 1st, 2004)

Province		Grade 1-5 (Primary) Teachers		Grade 6-11 (Secondary) Teachers			Grade 12-13 (A-level) Teachers			Sectional Heads			Guidance & Counselling	Principals	Total
		General	English (Grade 3-5)	Science/Maths	English	Others	Science	Art/Commerce	Others	Grade 1-5	Grade 6-11	Grade 12-13			
Western	Available	958	136	473	220	754	84	276	9	41	99	24	11	110	3,195
	Required	1,115	181	462	207	716	82	254	48	19	225	9	25	131	3,474
	Excess (+) / Deficit (-)	-157	-45	11	13	38	2	22	-39	22	-126	15	-14	-21	-279
Central	Available	2,615	218	662	413	1,492	79	351	27	56	126	9	41	546	6,635
	Required	2,904	583	1,083	515	1,667	110	473	60	126	249	19	130	423	8,342
	Excess (+) / Deficit (-)	-289	-365	-421	-102	-175	-31	-122	-33	-70	-123	-10	-89	123	-1,707
Southern	Available	230	44	81	47	163	11	56	22	4	26	0	7	40	731
	Required	255	50	94	56	192	17	59	12	9	19	4	9	42	818
	Excess (+) / Deficit (-)	-25	-6	-13	-9	-29	-6	-3	10	-5	7	-4	-2	-2	-87
North-East	Available	7,248	340	2,560	822	5,138	639	2,144	109	203	340	70	108	1,265	20,986
	Required	8,549	1,645	3,077	1,422	5,017	568	1,834	184	436	475	40	173	1,943	25,363
	Excess (+) / Deficit (-)	-1,301	-1,305	-517	-600	121	71	310	-75	-233	-135	30	-65	-678	-4,377
North Western	Available	879	133	287	126	619	24	206	36	21	21	7	9	155	2,523
	Required	1,046	189	388	198	695	23	208	55	80	77	18	30	155	3,162
	Excess (+) / Deficit (-)	-167	-56	-101	-72	-76	1	-2	-19	-59	-56	-11	-21	0	-639
North Central	Available	469	44	101	68	286	3	59	0	7	13	0	8	82	1,140
	Required	423	88	156	101	255	2	94	5	16	29	2	11	80	1,262
	Excess (+) / Deficit (-)	46	-44	-55	-33	31	1	-35	-5	-9	-16	-2	-3	2	-122
Uva	Available	823	121	153	117	439	14	49	13	26	28	10	6	189	1,988
	Required	871	180	303	143	520	15	100	18	30	47	9	24	191	2,451
	Excess (+) / Deficit (-)	-48	-59	-150	-26	-81	-1	-51	-5	-4	-19	1	-18	-2	-463
Sabaragamuwa	Available	711	98	181	108	336	17	139	8	20	27	3	10	178	1,836
	Required	839	171	272	153	465	19	119	25	31	35	3	12	187	2,331
	Excess (+) / Deficit (-)	-128	-73	-91	-45	-129	-2	20	-17	-11	-8	0	-2	-9	-495
Total	Available	13,933	1,134	4,498	1,921	9,227	871	3,280	224	378	680	123	200	2,565	39,034
	Required	16,002	3,087	5,835	2,795	9,527	836	3,141	407	747	1,156	104	414	3,152	47,203
	Excess (+) / Deficit (-)	-2,069	-1,953	-1,337	-874	-300	35	139	-183	-369	-476	19	-214	-587	-8,169

Source: Planning Division, MOE

The government has recently started Graduate Employment Scheme, in which a total of 41,305 unemployed university graduates will be recruited for the public sector. The unemployed university graduates are currently taking 3-month management training at NIE before being assigned in government offices and schools. Out of 41,305 graduates, around 10,000 to 12,000 are expected to become teachers (including school counselors, librarians, IT center staff, and special education teachers) in the government schools in order to solve the teacher shortage problem especially in rural and plantation schools. But many principals in rural and plantation schools expressed their doubts about the positive impacts of the Graduate Employment Scheme in solving teacher shortage in their schools, because most of these unemployed graduates are from urban areas (about 40% of them are from Western Province), so they will surely try to get transfer to urban schools near their home after mandatory work period in rural schools.

(2) Incentives for Teachers Serving in Difficult Schools

MOE tries to remedy the teacher excess and shortage problem by analyzing teacher demand and supply balance annually, and allocates the number of admissions to NCOE according to the teacher needs. The students who are admitted to NCOE must sign the agreement with MOE to work for difficult schools for 3 years after graduation of NCOE, but in reality, 10-15% of NCOE graduates are estimated to escape this duty mainly by using politician's influence over the provincial government[9].

In 1995, MOE issued a National Policy on Teacher Transfers (Circular No. 95/11), which specifies the following deployment policy by classifying schools into 4 categories: very congenial, congenial, non-congenial, and difficult:

1) The minimum period of service at one school:
   - 3 years for difficult schools (now called as "very difficult schools")
   - 4 years for non-congenial schools (now called as "difficult schools")
2) The maximum period of service at one school
   - 8 years for congenial schools
   - 6 years for very congenial schools.
3) The first appointment of the newly recruited teachers must be either in difficult schools or in non-congenial schools.

   This Policy became effective in January 1997, and, in 1999, MOE also decided to provide the following incentive measures for teachers serving in schools classified as difficult stations (Circular No. 99/17):
   - To provide priority in giving loans to public servants;

[9] Teacher Deployment in Sri Lanka: An Audit (Planning and Performance Review Division, MOE, May 2004)

- To give preference in granting scholarships abroad and training opportunities;
- To consider as having served an extra 1 year in each 3-year period for promotion:
- To give preference in providing official quarters; and
- To allow extra annual salary increment if a teacher serving in a difficult station obtains less than 25% of annual leave for 3 consecutive years at the end of the 3 years.

The government also plans to provide financial incentives to teachers working in rural schools from January 2005: Rs. 2,500-/month for teachers working in very difficult schools and Rs. 1,500-/month for teachers working in difficult schools, but most of teachers are still not sure whether this new policy will be implemented or not, because of the government's bad record of false promises in the past. Many teachers also claimed that even if it is implemented, the impact will be negligible, because the amount of financial incentive is not attractive enough for them: they can earn more money by working in private tuition classes when they work in urban schools.

(3) Problems in Teacher Deployment

Problems on teacher deployment are summarized as follows:

- Shortage of science and mathematics teachers in rural schools and Tamil-medium schools: While there are often excess teachers in urban schools and Sinhala-medium schools, there is acute shortage of teachers, especially science and mathematics teachers, in rural schools and Tamil-medium schools such as plantation schools.
- Teachers' unwillingness to work in rural schools with inferior facilities: Shortage of teachers in rural schools is often caused by inferior facilities of the rural schools, such as lack of staff housing and poor access to the school, so it is important to upgrade the infrastructure and facilities of rural schools such as water supply, staff housing and access road to the school, in order to attract more teachers to rural schools.
- Insufficient incentives for teachers working in rural schools: Although MOE provided some incentives for teachers working in rural schools, many teachers claim that these incentives are not attractive enough for them, because 1) they cannot believe the government actually provides these incentives to them, and 2) even if it is provided, the amount of incentives is not big enough: they can earn more money by working in private tuition classes when they work in urban schools.
- Teachers' bad image toward rural schools and rural teachers: Many teachers claimed that if they work in rural schools, they will be considered as inferior teachers by others. This is due to negative images of rural

schools and rural teachers shared by many Sri Lankan people, so it is necessary to remedy such people's prejudices by advocating to work for rural areas through the national mass campaign to reduce urban-rural inequality in Sri Lanka.

- Teacher transfer often influenced by local politicians and bureaucrats: Many teachers use their connection with the local politicians and bureaucrats who can influence the local government to transfer teachers to the schools with better facilities often in urban areas.
- Not strict implementation of teacher deployment policy and regulations and teachers' lack of trust in the government: While there are government policy and regulations to try to solve teacher shortage in rural schools, the real problem is that MOE has never implemented them strictly, so there are many cases of exceptions where teachers were able to escape from the duties to work for rural schools reportedly by using local politician's influence. As a result, many teachers claim that they cannot trust MOE's policy and regulations to provide incentives for teachers working in rural schools, because they have experienced MOE has changed its policy and regulations frequently and there have been so many unfulfilled promises by the government.

2.4 Student Assessment System

2.4.1 Public Examination System

The National Evaluation and Testing Service (NETS) administers the Public Examination System from the setting, printing and distribution of papers followed by marking through to the compilation of marks and publication of results. University people and teachers set the examinations. There are three public examinations conducted each year, namely:

- Grade 5 Scholarship Examination
- GCE O-Level Examination (end of grade 11)
- GCE A-Level Examination (end of grade 13)

(1) Grade 5 Scholarship Examination

1) Current Situation

This examination is held in August every year and has as its major objective:

- The provision of financial assistance scholarships (bursaries) to the parents of clever students from disadvantaged economic or geographical backgrounds. Scholarship holders together with those who 'qualify' are eligible to go to popular schools.

- The examination is not a test of syllabus content but rather a predictive test using many items that are included in typical "intelligence" tests. The examination consists of two papers:

Paper I consists of multiple-choice language comprehension and computation items.

Paper II consists of single word or short answer questions language comprehension (including some answers in English), environmental studies and mathematics items.

292,000 candidates sat the examination in 2003. Only 10,000 candidates obtained scholarships, while another 13,000 students 'qualified' in the examination. This means that 23,000 students were eligible to attend popular schools.

2) Issues and Problems

The main issue is:

The small number of scholarships being offered is an access and equity problem as the number of students sitting the examination has risen in recent years and the number of scholarships has remained the same. Therefore, more scholarships need to be offered to give more disadvantaged students an opportunity to have a better education.

There are several recommendations made by the NEC Commission for the grade 5 examination but these mainly concern changes to the format and content of the papers and an end to coaching students in special classes for the examination.

(2) GCE O-Level Examination

1) Current Situation

The examination is held in December each year at the end of grade 11 and more than 330,000 school students sat the examination in 2003. A total of 59 subjects are offered in the curriculum.

An O-Level "pass" is passing 6 subjects from those studied (including first language and mathematics at one sitting) from a minimum of 8 subjects studied.

As well as for employment and further training, the GCE O-Level examination provides a selection function for GCE A-Level courses. Here, the 6-subject rule also applies but 3 of these must be at credit level and to enter a science stream in A-Level one of these must be in science or mathematics. In 2003, 44% of students sitting the O-Level examination qualified for A-Level studies.

The examinations are written examinations and they satisfy demand for "equality of opportunity" and assume a common curriculum is taught to all

with the same level of teaching ability and same level of school facilities even though this is not the case in reality. There are usually two papers for each subject – one multiple choice and the other a traditional longer answer paper.

There are 5 grades awarded for each subject - A, B, C, S, which are passing grades, and Weak, which is a fail grade. School Based Assessment grades are the same (A, B, C, S and Weak) and a student's results have two columns (parallel reporting) of their SBA grade and their examination grade. Students sit for two papers in each of the subjects 'Science & Technology' and 'Mathematics'. In each subject, the marks for both papers are combined and the examination grade given.

2) Issues and Problems

The main issues for the GCE O-Level examinations are:

- Poor pass rates in '*science and technology'* and m*athematics*. These are still low and require improvements in teaching methods, syllabus modifications, provision of more instructional materials
- The high dropout rate between O-Level and A-Level studies. This problem is linked to the low pass rates and will only improve if the pass rates improve.
- Acceptance of SBA as an equal partner with the written examination component in assessment. This very important for a change in the teaching-learning process, moving away from exam oriented teacher centred teaching towards interactive teaching using practical activities, experiments, projects etc.

There are two recommendations made by the NEC for improving the O-Level examination that will have positive effects in the future.

The first is a revision of SBA including the reporting, marking system and objectivity of SBA should be revised and implemented. The second is the setting of questions in the written examination to test key concepts, ideas etc. rather than trivia.

(3) GCE A-Level Examination

1) Current Situation

The examination is held in April/May each year at the end of grade 13 and more than 171,000 school students sat the examination in 2004. Government policy states that this examination is to serve a dual purpose – an attainment examination and a means of selection to University.

Students study only three subjects out of a total of fifty subjects. To qualify for university they must obtain sufficient marks to pass in those three subjects. The marks for each subject are standardized using the statistical tool "z" scores and then aggregated. They must also take the Common General Test

(not counted in aggregate marks) and may also take General English as an option.

The three subjects that students study are designated in streams and are pre-requisites for university studies in particular undergraduate courses. These streams are:

- Biological Science – *Biology*, *Chemistry*, *Physics*
- Physical Science – *Chemistry*, *Physics,* '*Combined Mathematics'*
- (Both the above options are called the Science stream)
- *Commerce*
- *Arts*

There are 5 grades awarded for each subject - A, B, C, S, which are passing grades, and F, which is a fail grade. School Based Assessment for A-Level is at present being implemented and will be in place for the 2005 A-Level examination.

An (A-Level) "pass" is passing three subjects at one sitting but for certain employers credit or higher passes in various subjects are required.

For each of the three science subjects, students sit for two papers, one a multiple-choice paper and the other a longer traditional written paper. In each subject, the marks for both papers are combined and the examination grade given. For each of the two mathematics papers, students sit for a pure mathematics paper and an applied mathematics paper, both papers being traditional written papers. In each subject, the marks for both papers are combined and the examination grade given.

2) Issues and Problems

Main issues for the GCE A-Level examination are:

- Poor pass rates particularly in c*hemistry*, *physics* and 'c*ombined mathematics'*. This many able students miss out on university education and have to seek employment or other forms of further training.
- Acceptance of SBA as an equal partner with the written examination component in assessment and to ensure equity across schools. At A-Level there should be external monitoring of SBA.
- Limited number of places at Universities compared with those who qualify from the A-Level examination. This creates intense competition for places and examination-oriented teaching. This linkage of the A-Level examination to University entrance also produces a curriculum that is geared only to subject performance and not to broader social and communication skills written into all subject curricula. As well, it is the reason for the huge tuition class industry in Sri Lanka

There are two recommendations made by the NEC Commission for improving the A-Level examination that will have positive effects in the

future.

The first is to review A-Level SBA and make mandatory project work including group work projects, science practicals, assignments and field-work (Environmental Field Study Centres).

The second is to reform the written examination to avoid excessive "cramming", ensure all items in multiple choice are of equal degree of difficulty include some test items that need only be answered by those considering University places.

However, it is not proposed or recommended to replace the existing GCE A-Level and O-Level examinations if both SBA and the present written examinations are improved.

2.4.2 School Based Assessment (SBA)

(1) Current Situation

Both NIE and NETS are involved with School Based Assessment. NIE is responsible for SBA in grades 6-9 and NETS for SBA in grades 10-13. School Based Assessment was introduced to schools as part of the 1997 Reforms. At present, SBA has been implemented up to O-Level in the school system and is in the final implementation stages at A-Level. Parallel SBA grades were reported for the first time on the 2002 O-Level Examination Certificate. Parallel SBA grades will be reported on the 2005 A-Level Examination Certificate.

SBA concentrates on formative as well as summative tasks. These include projects, assignments, quizzes etc as well as end of year tests. Monitoring SBA at the school level involves Principals, teachers, parents and students. As well, education officials such as provincial, zonal subject directors monitor SBA across schools to maintain consistent standards of reporting etc. The new student based, activity teaching methodology introduced under the 1997 Reforms is also part of SBA.

Changes to teaching methodology at all levels of schooling are a major aim of education reforms to improve the quality and efficiency of education. Traditional methods favor lecture, teacher centered techniques with students adopting a passive role and absorbing knowledge rather than being actively involved in the learning process. SBA requires of teachers and students much more interaction and joint participation in the learning as well as the assessment process.

In 2002, the JICA Study Team observed the mechanics of SBA being used in schools both at primary level and up to O-Level. Both students and teachers used record books that recorded different assessment tasks, comments on progress and marks obtained in each subject. The sum of marks was recorded as a letter grade for the student's achievement in the subjects. The School Survey measured the extent of SBA use in schools as presented below.

Table 2.4.1 School Based Assessment

Extend of SBA Use	No. of schools	% of Schools
SBA Introduced	139	98
SBA Instructions Received	141	98
SBA Training Received	127	88
SBA Amendments by Principals	72	50

Source: School Survey, JICA Study Team 2002

The SBA is now very much part of Education Policy. Almost all schools have SBA in place and most Principals have been trained in its use. However, only 50% of Principals have ventured from the official policy and introduced amendments to their School's SBA program.

However, there have been problems with SBA. Most teachers now understand the principles behind SBA but many are still unsure of procedures. Research by NETS has also shown that there is a lack of uniformity of grading across schools. Also, some teachers, particularly in mathematics, are still using the results of various short tests rather than assignments and projects to arrive at their SBA grades.

Another use of school-based assessment is the Grade 9 proficiency examination. This is an examination for those students who leave school before completing their O-Level studies. Employers are asked to recognize the results of this examination. Students are given a Transcript from their school to say that they have completed grade 8 or 9.

(2) Issues and Problems

The main issues for SBA are:

- SBA grades to be comparable across schools. Research on SBA has shown that even with using what is supposed to be a common grading method different schools award different grades for the same work. This should not occur and makes the assessment scheme inequitable.
- Lack of a common objective scheme for all grades and subjects that is clearly understood by Principals and teachers. Principals and teachers understand the principles of SBA but they are unsure of the specifics of recording etc.
- Any adaptation of the scheme to specific school contexts has to be objective.
- The above problems are largely the results of ineffective monitoring by central, provincial and zonal officers.

NEC recommendations agree with the issues above and mention the following two issues:

Firstly, that Student record books should include personality and attitude comments as well as assessment and grades details so as to assist employers, counselors, guidance officers etc.

Secondly, that A-Level SBA reporting and grading should be reviewed by external monitoring panels.

2.5 ICT in Education

2.5.1 Government Policy and Donors' Assistance

(1) Government Policy

The National Policy on Information Technology in School Education (NAPITSE) of the Government of Sri Lanka was issued in 2001 by the Information Technology Unit of MOE. Referring to Sri Lanka lagging behind in the development of ICT in relation to many comparable countries, the National Policy defines a vision of "A new generation of Sri Lankans empowered with information and communication technology" facilitating "the planning, implementation and sustenance of information technology education in schools to enhance student's learning and quality of learning."

The National Policy sets five goals to:

- Envisage and foresee the future global challenges in ICT education and lay the foundation for appropriate human resource development to meet such challenges.
- Create conditions enabling the effective use of ICT as a tool in learning and teaching at all levels in the general school education.
- Provide "information literacy" for all school leavers.
- Create conditions for effective involvement of school system in lifelong education of citizens.
- Create an information literate population of teachers and teacher educators and students.

The recent proposals for a National Policy Framework on General Education in Sri Lanka issued by NEC (2003) states that the main objective in the exercise of providing ICT literacy and basic education is to achieve computer literacy at levels comparable with the nation's achievements in general literacy and numeracy.

The recommendations made by NEC in 2003 follow the goals mentioned in the National Policy. The essential ICT related recommendations are:

- Introducing computer literacy in the core curriculum in the secondary education and in teacher education
- Internet connections using an education Virtual Private Network

- Establishing a National Education Information Network to make educational resources widely available
- Promoting EMIS and automation of data management in administration.

The National Policy is recited in 2004 in the Four Year National Plan for the Development of Secondary Education 2004 – 2008, with no significant changes in the content.

(2) Donors' Assistance

The practical implementation of the National Policy is predominantly the responsibility of development projects funded by international donors. The major ongoing or completed projects in this field are:

1) TETD (Teacher Education, Teacher Deployment) funded by WB

   TETD project is responsible for establishing 8 Provincial IT Centers for teacher training. The network of Computer Resource Centers is planned to be updated so that there would eventually be a network of 100 IT centers altogether.

2) GEP2 (Second General Education Project) funded by WB

   A total number of 400 Information and Communications Technology Centers (ICT Center) has been established under GEP-2. The target grades of GEP-2 are grades 6 to 9. This project component includes teacher training as described later.

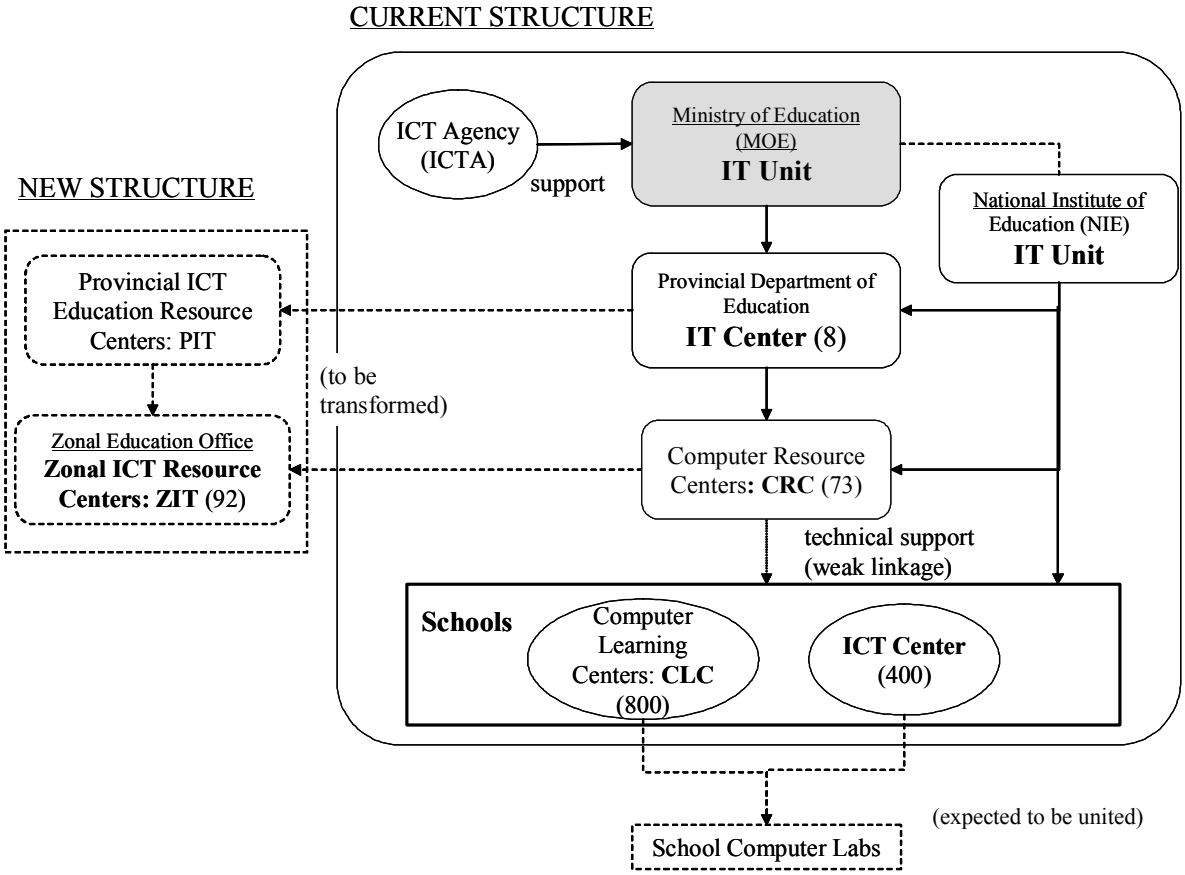
3) SEMP (Secondary Education Modernization Project) funded by ADB

   SEMP has established 800 Computer Learning Centers and started a program of producing CAL material. The target level of SEMP is the secondary education from grade 10 onwards. There are both general and specialist ICT training programs in the ICT components of SEMP.

2.5.2 Current Situation

(1) Institutions and Supporting Organizations

The major bodies of ICT education and their interrelations are illustrated in Figure 2.5.1.



Source: MOE, NIE

Figure 2.5.1 Organizational Structure of ICT Education

1) MOE and PEA

In MOE, ICT policy making is done in the IT Unit. During the previous government the IT Unit was under planning department, separated from the curriculum development of science and mathematics. In the present organization the IT Unit was moved directly under the Additional Secretary of Education, together with science and mathematics. This is an organizational improvement compared to the previous structure. In addition to the present 4 Ministry officers, there is a consultant of the ICT Agency (ICTA) working in the IT Unit. ICTA is an operative agency founded in 2004 under the e-Sri Lanka project that consults the different ministries and aims to integrate the activities of different sectors of the administration.

The new organization structure and establishment of ICTA are two promising moves towards the firm ICT policy in education that has not yet been available.

The Provincial IT Centers established with WB funding are situated under Provincial Departments of Education and are responsible for managing the Computer Resource Centers.

There are new plans funded by WB to update the organization of IT centers from top to school level.

Major revision of the planned ICT organization structure is as follows:

- The Provincial IT Centers will be updated into Provincial ICT Education Resource Centers (PIT). The provincial ICT coordinators have already been nominated.
- In each of the 92 zones, there will be a Zonal ICT Education Resource Center (ZIT). The zonal ICT coordinators have already been nominated. For every zone, one of the existing CRCs will be transformed into the ZIT. For the zones which have no CRCs at present, a new ZIT will be established. If there are more than one CRC in a zone, the remaining CRC will either continue as they are or be transformed into school-based computer centers. The ZITs will be managed by the PIT.
- Because of their different origin as components of different development projects, the functions of the present CLCs and ICT Centers are not fully identical. In the new plans, all school-based computer centers will be unified, independently from their donor background. They will be managed by the ZIT and simply referred to as school computer labs.

2) NIE and CRC

National Institute of Education (NIE)

The IT Unit of NIE is responsible for in-service teacher training, evaluation of ICT curricula, development of the CLCs and ICT Centers, as well as development, evaluation, production and distribution of educational softwares. The unit is an important national hub for the development of ICT in education. However, it has a limited capacity to manage all the different fields.

In the draft organization structure of NIE (October 2004), the IT Unit is placed into the Faculty of Science and Technology, under the Deputy Director General.

In the IT Unit of NIE, there are 5 academic officers to conduct the ICT functions. In addition, NIE can utilize a resource pool of specialists, mainly based on the staff of the CRCs.

Computer Resource Centers (CRC)

There are 73 Computer Resource Centers throughout the country in September 2004, founded by the Government in 1994. The CRCs are formally managed by the PEA, but academically they operate under the guidance of NIE.

The main functions of the CRCs are ICT education for students waiting for their examinations' results, teacher training, and technical support to CLCs and ICT Centers. The original equipment of the CRCs from 1994 is outdated compared with the recent purchases for the CLCs. There has neither been funding nor a

policy to update the CRCs. Depending on the local funding, some CRCs have purchased new equipment, while others have lagged behind.

The distribution of CRCs is not even, favoring the most developed Western Province and disfavoring especially the conflict-affected North Eastern Province. Geographical distribution of CRCs is illustrated in Table 2.5.1.

Table 2.5.1 Distribution of CRCs by Province (2004)

Province	No. of CRCs	No. of Zones
Western	24	12
Southern	9	11
Central	8	15
Sabaragamuwa	8	7
Uva Province	7	7
North Western	6	8
North Central	6	8
North Eastern	5	24
TOTAL	73	92

(2) Curriculum, Syllabus and IT Education Conducted

Generally, it is the goal to integrate ICT in the curriculum of each subject at secondary level. There are only two separate optional IT subjects:

1) General IT for Grade 12

The curriculum, syllabus and teachers' guides were first prepared on General IT for grade 12, and the classes commenced in June 2002. It is intended that General IT for grade 12 will be implemented in all those Type 1AB schools that have computer centers. The grade 12 course covers 108 periods per year (3 periods per week) with 65 periods of theory and 28 periods of practicals. One period is 40 minute long.

The syllabus topics are:

- Fundamentals of IT
- Mathematics for computing
- Information systems
- Computer programming
- Use of computer software
- IT and national development

A teacher's guide for teachers and a resource book for students are provided.

2) GCE O-Level Information Technology

Information Technology for GCE O-Level (grades 10-11) started as a pilot programme in 2003. The subject is planned to be launched islandwide in January 2005.

The syllabus topics are:

- Fundamentals of ICT
- Computer architecture and operating systems
- Generic software
- Modern ICT applications in the world of work
- System analysis and design
- Computer programming
- Internet and web site development
- IT and society
- Students' project (practical work to be done after school hours)

General ICT education has also been targeted to school leavers and students' waiting for their O-Level examinations results.

The curriculum of ICT education targeted to grades 6 to 9 is still underway under WB assistance, and the installation of the ICT Centers is not yet complete. There are no plans for another separate ICT subject, but the goal is in integration of ICT into the curriculum of each subject.

In all basic policy documents, developing ICT literacy skills are placed into the secondary level curriculum, and the use of computers at primary level is not discussed. The rigid structure of the curriculum and the strong guiding effect of the examinations may make it difficult to apply the recommendations to introduce ICT related activities even in secondary education.

(3) Teaching Materials

The resource material offered to the school-level computer centers includes

- CLC Management and Maintenance Guide (CLC)
- Computer Learning Center Resource Book (CLC)
- ICT Resource Book (ICT Center)
- Curricula and Syllabuses of the IT subjects
- Teacher's guides to the IT subjects
- Resource books for the IT subjects
- CAL software CD-R (CLC)
- CAL software kit for grades 6 to 9 (ICT Center, unpublished)

The resource books concentrate on a brief description of the basic concepts of ICT and the basic technical use of the common Microsoft Office software.

Basic office applications including Microsoft Excel, Word, PowerPoint, Access and Internet Explorer are available in all of the different types of computer centers. A CD containing a selection of educational freeware has been produced for the use of the CLCs, and a similar package is to be produced for the ICT Centers. These CAL packages contain material for science and mathematics education.

A new set of educational software is under development by NIE. This set contains material for science and mathematics education. Production of learning software by individual teachers is encouraged. Private ready-made software will be purchased, and localized if necessary.

Recently, development of ICT in education has emphasized the use of CAL software. However, the actual impact of this approach has not been big. The production of locally designed or localized software is still under process, and even the package delivered to the CLCs has been used in the minority of the schools having a CLC.

There is a lack of Sinhala and Tamil media material to support using ICT in education.

(4) Teacher Training

Till 2003, the in-service training of teachers in ICT was mainly (and almost completely) organized by the CRCs. The development projects, especially SEMP, have significantly increased the role of CRCs in teacher training.

The SEMP is providing a 'General Awareness in IT' course, containing modules for the basics of ICT, use of Word, Excel and PowerPoint applications, use of the Internet, and the basics of CAL. The training was started in NIE (3500 teachers trained till September 2004), but it has also commenced in the Provincial IT Centers (appr. 1000 teachers trained) by private training companies. The total number of teachers participated in this training is planned to be 10,300 by the end of December 2004.

The long-term goal of SEMP is to offer International Computer Driving License (ICDL) certificate to all teachers of the CLC schools. This certificate is based on the standards defined by International Society for Technology in Education (ISTE), and it is provided by private training companies. The training costs are covered by SEMP, but the courses are also open to any teachers who are willing to attend. The ICDL training has just started, and there are no measurable results yet.

Both ADB and WB have already trained 5-15 teachers per school in general ICT skills, in addition to the maintenance training provided to one teacher per school. A summary of the number of teachers attended in the systematic and up-to-date ICT training is presented in Table 2.5.2.

Table 2.5.2 Teachers attended ICT training by 2004

Training Programme	External Donor	No. of Schools	Teachers/ School	Total
CLC user training	ADB	800	5	4,000
ICT Center user training	WB	400	15	6,000
General Awareness	ADB			10,300*
Total				20,300

*Note: Including the number of teachers to be trained by the end of December 2004
Source: Reports of SEMP and GEP-2

The volume of teacher training in ICT is insufficient to meet the actual needs. By the end of 2004, approximately one tenth of all teachers have attended systematic general ICT training. The issues are the capacity limits of NIE and insufficient resources of other bodies such as the CRCs and Provincial IT Centers.

According to our study, poor command of English is another major obstacle for teachers to obtain ICT skills.

Teachers attend training programs in the universities to qualify for new lectorates in the different ICT centers. A rough estimate of the volume by September 2004 is 400 teachers in mastership or lower post-graduate courses and 200 in Diploma in IT courses for no-graduate teachers.

(5) Facilities and Equipment

1) CLCs and ICT Centers

Computer Learning Centers (CLCs) were established under the SEMP project funded by ADB. They are targeted to strengthen the capacity of secondary education from O-Level to A-Level. The original objective of the project was to establish 800 centers with 10, 15 or 20 computers per school, depending on the size of the school. In 2004, a decision was made to set up 200 additional centers.

Table 2.5.3 Computers Distributed to Schools (2004)

Project	No. of schools	Computers per school	Total
ICT Center	400	10	4,000
CLC	800	15*	12,000
Government	615	4	1,790
Total			17,790

*Estimated average; the actual number depends on the size of the school and ranges from 10 to 15 or 20.
Source: Action Plan for IT Education and discussions with MOE and NIE officials

Information and Communication Technology Centers (ICT Center) were established under the GEP-2 project funded by WB. The goal of setting up 400 centers with 10 computers each was reached in 2004. The ICT Centers are targeted to grades 6 to 9.

In addition, the Government has reported of distributing altogether 1,790 computers in 615 schools, 4 computers per school.

According the plans of MOE, the CLCc and ICT Centers originally funded by different donors will be unified and referred to simply as school computer labs.

2) Computers Available at School

Computers have also been donated to schools by Old Boys and Old Girls as well as other independent donors, and schools have purchased ICT equipments using their Quality Input funds. There are however no statistics of the total number or quality of the computers having a funding other than the international donors, which makes it difficult to estimate the overall number of computers in schools island-wide.

There is no funding for maintenance of the ICT equipment in any of the projects. Another problem for planning the maintenance is that there are no statistics of the quality of the computers other than those in the CLCs and CRCs.

2.5.3 ICT for Science and Mathematics Education

(1) Present Situation and Progress

Basic office tools including Excel (or similar open source software) are available in all of the different types of computer centers. The SEMP project has distributed one CD with a selection of educational software to all CLCs. This software package also contains material that can be used in science and mathematics. Both types of computer laboratories are provided with resource books that can be used in both teaching the use of general office applications and guiding to use educational software.

A new set of educational software is under development by NIE. This contains material for science and mathematics education. Production of learning software by individual teachers is encouraged. Private ready-made software will be purchased, and localized if necessary.

Off-line encyclopedias in CD-R format are widely available in the schools having computer laboratories. The major challenge herein is to develop information searching and analyzing skills, as well as reporting skills.

(2) Problems and Future Direction

The major current problems are attached to the following subfields:

- Insufficient ICT literacy among teachers
- Lack of teaching materials
- Lack of equipment, poor maintenance and low quality of facilities

- Lack of Internet access

Low ICT skills of teachers prohibit teachers from promoting use of ICT in their teaching practices. Lack of applicable teaching and learning material is another reason why ICT tools such as Excel are not widely used in science and mathematics education. Poor command of English is a notable obstacle to many teachers in adopting the necessary ICT skills, as the interface language of the applications and resource material is English.

The present setting does not give a sufficient support to using ICT in science education. Use of subject-based CAL software has been emphasized in the ongoing ICT education projects, but all they have been able to distribute by September 2004 is one sample of exemplary freeware or demo versions of international commercial applications. Meanwhile use of general office software has been neglected, and there are no educational teacher guides or sample files to help the teacher in using such applications as Excel in science or mathematics.

Use of ICT should support the overall goals of developing experimental and student-centered teaching and learning methods, instead of lecturing and memorizing. Educational software should help in the understanding of key concepts and support the promotion of multiple assessment modalities. This emphasizes the importance of evaluation of the CAL material to be produced or purchased.

Spreadsheet and text processing software should find extensive use whenever student reports are made, especially in A-Level science education. Use of Internet should be enhanced wherever the network resources are available.

Lack of Sinhala and Tamil media software will make it difficult for students, especially below O-Level, to follow instructions or the course of the educational software.

The majority of all government schools still lack computer centers, and the existing CLCs and ICT Centers lack funding for maintenance. Together with poor facilities in many schools (no air-conditioning, no shelter from insects or humidity), poor basic maintenance may lead to deterioration of equipment and endanger sustainability in developing ICT literacy.

Lack of cable connections and high cost of Internet access in rural areas cause that only a few schools have access to the Internet. This means that they cannot benefit from modern technology in searching scientific information from the web. Strengthening the necessary network infrastructure requires national efforts and strong support from sources apart from the education sector.

2.6 Finance for Education

2.6.1 Government Expenditure on Education

(1) Overall Expenditure

In Sri Lanka, all education from primary school to university is financed by public funds. Table 2.6.1 shows the change of government expenditures and education expenditures for the last two decades.

Table 2.6.1 Government Expenditures on Education (Rs.billion)

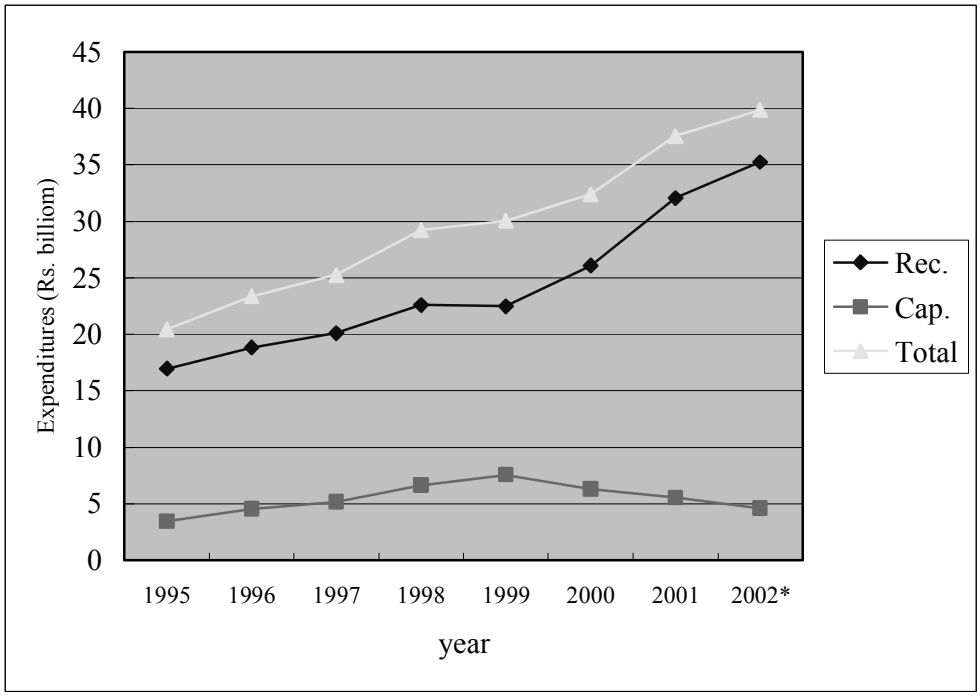
	1980	1985	1990	1995	1996	1997	1998	1999	2000	2001	2002*
Government Total Expendirute											
Recurrent	13.46	32.65	71.77	154.16	175.15	184.75	199.65	207.27	254.28	303.36	330.27
	52.8%	60.3%	78.6%	78.7%	82.3%	80.8%	78.7%	77.5%	79.0%	81.7%	84.9%
Capital	12.03	21.53	19.53	41.72	37.64	43.98	54.16	60.34	67.77	67.90	58.59
	47.2%	39.7%	21.4%	21.3%	17.7%	19.2%	21.3%	22.5%	21.0%	18.3%	15.1%
Total	25.49	54.18	91.30	195.88	212.79	228.73	253.81	267.61	322.05	371.26	388.86
Education Expenditure											
Recurrent	1.54	3.53	8.54	16.97	18.83	20.10	22.61	22.49	26.08	32.04	35.24
	85.6%	84.4%	88.0%	83.1%	80.6%	79.6%	77.3%	74.9%	80.5%	85.3%	88.4%
Capital	0.26	0.65	1.16	3.45	4.53	5.15	6.63	7.55	6.30	5.53	4.61
	14.4%	15.6%	12.0%	16.9%	19.4%	20.4%	22.7%	25.1%	19.5%	14.7%	11.6%
Total	1.80	4.18	9.70	20.42	23.36	25.25	29.24	30.04	32.38	37.57	39.85
General Education Expenditure											
Recurrent	1.40	3.18	7.58	14.69	16.35	16.15	19.00	18.85	23.13	27.10	30.02
	92.1%	91.9%	91.2%	83.9%	82.0%	80.9%	78.8%	75.2%	82.7%	86.9%	89.5%
Capital	0.12	0.28	0.73	2.81	3.58	3.81	5.11	6.20	4.84	4.09	3.51
	7.9%	8.1%	8.8%	16.1%	18.0%	19.1%	21.2%	24.8%	17.3%	13.1%	10.5%
Total	1.52	3.46	8.31	17.50	19.93	19.96	24.11	25.05	27.97	31.19	33.53
(Higher Education Expenditure)											
Recurrent	0.14	0.35	0.96	2.28	2.47	3.96	3.61	3.64	3.95	4.94	5.21
Capital	0.14	0.38	0.42	0.63	0.96	1.33	1.52	1.35	1.46	1.44	1.10
Total	0.28	0.73	1.38	2.91	3.43	5.29	5.13	4.99	5.41	6.38	6.31
Education Expenditure as % of Total Government Expenditure											
	7.06%	7.72%	10.62%	10.42%	10.98%	11.04%	11.52%	11.23%	10.05%	10.12%	10.25%
Recurrent Education Expenditure as % of Total Government Recurrent Education Expenditure											
	11.44%	10.81%	11.90%	11.01%	10.75%	10.88%	11.32%	10.85%	10.26%	10.56%	10.67%
Capital Education Expenditure as % of Total Government Capital Expenditure											
	2.16%	3.02%	5.94%	8.27%	12.04%	11.71%	12.24%	12.51%	9.30%	8.14%	7.87%
Education Expenditure as % of GDP											
			2.20%	3.11%	3.06%	2.90%	2.98%	3.07%	2.89%	3.06%	2.81%

Source: Sri Lanka University Statistics 2003 *Provisional

In the 1960s the government allocated around 5% of GDP and 15% of the government budget to achieve free primary and secondary education. Once achieved by the early 1970s, however, the government shifted budgetary priority to other sectors like agriculture and energy. In addition, high military expenditures since the mid-1980s severely constrained government investments in social services in general. In recent years, the government education expenditure has hovered at around 3% of GDP, lower than the 3.5% mean for Asia and the 3.9% mean for developing countries. Similarly, the share of education in the total expenditures was remained at around 10%, below the 14% mean for Asia and 15% for developing countries. Although the Presidential Task Force on General Education Reforms (1997) recommended the increase of government funds to

4.5% of GDP within the next few years, little improvement has been seen so far. Decades of low spending on education has affected the quality of education.

The following graph shows the change of government education expenditures between 1995 and 2002.



Source: Sri Lanka University Statistics – 2003. * Provisional figures

Figure 2.6.1 Government Education Expenditures

From the above graph it is clear that the recurrent expenditures are very high in proportion. On average it was 81.6% between 1995 and 2002. Continuous recruitment of large number of teachers in the late 1980's and early 1990's and salary hike in 2000 contributed to large increases of recurrent expenditure. In year 2002, the provisional education expenditure was Rs.39.85 billion of which Rs.4.61 billion was allocated to capital expenditure, accounting for only 11.5% of the total education expenditure. The ratio of capital expenditures was still lower in general education. As described in the following section a large part of capital expenditure is sourced by external loans and grants. Due to the fact that high recurrent expenditures of teacher salaries accounts for most of the budget, allocation to quality inputs is very limited, which also has affected the quality of education tremendously.

(2) Education Expenditure at Different Cycles

As shown in Table 2.6.1 in recent years 16-17% of the education expenditure is spent on higher education including universities. Though it is difficult to separate the allocation of expenditures between primary and secondary education, it is

estimated that about 40% of the general education expenditure is spent on primary education and 60% on secondary education[10]. From these figures, it is estimated that from government education expenditure approximately 34% is spent on primary education, 50% on secondary education and 16% on tertiary education. This allocation pattern is biased towards the secondary education, considering that many countries, developed and developing, spend about 50% of education budget on post primary education.

Table 2.6.2 shows the unit cost of general education calculated by MOE at different cycles: primary cycle for grade 1-5; secondary cycle for grade 6-11; and collegiate for grade 12-13. These figures clearly show very high unit cost at collegiate cycle and comparatively low unit cost at primary and secondary cycle.

Table 2.6.2 Unit Cost of General Education in 2001 (Rs.)

Primary Cycle (Grade 1-5)	Secondary Cycle (Grade 6-11)	Collegiate Cycle (Grade 12-13)	All Cycles (Grade 1-13)
9,554	8,038	21,939	10,084

Source: Planning Division, MOE

2.6.2 Education Expenditures by MOE

In 2002, the total expenditure of MOE was Rs.10.62 billion, of which approximately Rs.10.4 billion was spent on general education while the balance was mainly for cultural affairs. Table 2.6.3 shows the allocation of education expenditure at MOE by category.

Table 2.6.3 Education Expenditures of the MOE in 2002 (Rs.mil)

Programmes and Projects	Recurrent Exp		Capital Exp		Total	
Ministry Administration	93.33	1%	13.05		106.38	1%
Planning and Programming	7.54		0		7.54	0%
Primary Education	926.28	14%	170.90	5%	1,097.18	11%
Secondary Education	3,229.06	48%	378.13	10%	3,607.19	35%
Special Education	581.01	9%	0		581.01	6%
Teachers Colleges and Centres	85.42	1%	10.21		95.63	1%
Colleges of Education	317.94		17.04		334.98	3%
Grants and Assistance for Education	1,274.61		0		1,274.61	12%
GEP (World Bank)	0		1,328.85	36%	1,328.85	13%
TETD (World Bank)	0		1,038.55	28%	1,038.55	10%
SEMP (ADB)	0		640.89	17%	640.89	6%
Donor Funded Capital Projects	0		36.20	1%	36.20	
Transfers to Public Institutions and Enterprises	231.29	3%	58.32	2%	289.61	3%
Total	6,746.48	100%	3,692.14	100%	10,438.62	100%

Source: Budget Estimates 2004

10 Information from Planning Division, MOE.

MOE directly administers 323 National Schools island-wide and their expenditures are included in the category "Primary Education" and "Secondary Education" in the table. These two categories amount to Rs.4.7 billion accounting for 46% of the MOE education expenditures. The major items under "Grants and Assistance for Education", which accounts for 12% of MOE education expenditures, are "transfers to households through welfare programmes" such as the distribution of free textbooks, supply of uniforms and bursaries and scholarships. The three projects in Table 2.6.3, namely GEP, TETD and SEMP, are projects funded by World Bank and ADB loans. Together with other donor funded capital projects, capital investment by foreign loans and grants account for Rs.3.0 billion, which is 81% of capital expenditure at MOE and 65% of national education capital expenditures. Currently education expenditures, especially capital expenditures, are highly dependent on foreign loans and grants. Alternative ways of generating education funds need to be devised.

2.6.3 Provincial Education Finance

Financially, Provincial Councils depend heavily on transfers from the central government as they cannot raise sufficient funds from devolved revenues[11]. The Ministry of Finance on the recommendation of the Finance Commission allocates grants to the Provinces to meet their fiscal needs. There are four types of grants: Block Grants (for recurrent expenditures); Criteria Based Grants; Matching Grants; and Provincial Specific Development Grants (PSDG). The latter three are for capital expenditures. PSDG is ear-marked for certain sectors including education.

The following table shows the total expenditure and education expenditure of each Province in the year 2002. The total expenditure of 8 Provincial Councils were nearly Rs.46 billion and each Province's expenditure ranged from Rs.3.45 billion in Uva to Rs.10.83 billion in Western Province. The total education expenditure was Rs.21.4 billion, accounting for nearly 47% of total provincial expenditure, ranging from 41% in Western Province to nearly 52% in North Western Province. Nearly 95% of education expenditure is for recurrent expenditure mainly for teacher salaries, leaving very little for quality items.

11 In fiscal year 2001 total provincial expenditure was Rs.43.6 billion, of which the provinces' own revenues were Rs.7.5 billion, accounting for approximately 17% of the total expenditures. In case of Western Province, however, the province's own revenue was 53% of the total expenditures as its own revenue while the rest of the provinces raised only around 10% or less.

Table 2.6.4 Education Expenditures by Province in 2002

Province	No. of Students (2002)*	Total Provincial Expenditures			Provincial Education Expenditures			% of Ed. Expenditure	Unit Cost		
		Rec Exp (LKR mil)	Cap Exp (LKR mil)	Total (LKR mil)	Rec Exp (LKR mil)	Cap Exp (LKR mil)	Total (LKR mil)		Rec Exp (LKR)	Cap Exp (LKR)	Total (LKR)
North Western	406,331	5,102	630	5,731	2,717	240	2,957	51.60%	6,686	591	7,277
Western	690,971	10,213	614	10,826	4,286	103	4,390	40.50%	6,203	150	6,353
Southern	397,332	4,836	929	5,765	2,599	259	2,858	49.60%	6,541	652	7,193
Sabaragamuwa	327,601	3,432	827	4,259	1,834	134	1,968	46.20%	5,598	408	6,006
Uva	241,648	2,867	585	3,452	1,520	101	1,621	47.00%	6,289	418	6,707
Central	452,524	5,219	643	5,862	2,839	74	2,913	49.70%	6,274	163	6,438
North Central	243,641	3,003	626	3,629	1,559	101	1,660	45.70%	6,400	415	6,814
North East	561,489	5,475	787	6,262	2,923	151	3,074	49.10%	5,205	269	5,474
Total	**3,321,537**	**40,146**	**5,641**	**45,787**	**20,277**	**1,163**	**21,440**	**46.80%**	**6,105**	**350**	**6,455**

Source: MOE (2002), Expenditure Estimates 2003. Calculations by JICA Study Team.

* Only in provincial schools

Note: The above figures are based on the 2002 provisional expenditures, as breakdown of actual provincial expenditures were not published when writing the report (Oct. 2004). The total education expenditures of 8 provinces here differ slightly from the actual figure in Table 2.6.5.

The above table also shows the education cost per student in each province. Unit education recurrent expenditure varies from Rs.5,205 in North East Province to Rs.6,686 in North Western Province. Unit capital education expenditure here also varies considerably, ranging from Rs.150 in Western Province to Rs.652 in Southern Province. This disparity derives from inadequate allocation method. The current allocation method is not based on per student basis, but on the previous year's allocation, thus long going disparity remains. There is a need to formulate and follow an equitable allocation methods based on the per student basis to have more equitable allocation of limited education funds.

2.6.4 Budget for National School and Provincial School

In Sri Lanka majority of schools are financed through two channels in a rather complicated way. As mentioned previously MOE directly administers 323 National Schools while provincial councils are responsible for the rest of the 9,790 government schools. Both recurrent and capital expenditures for the National Schools are included in the expenditures under the MOE. For the administration of provincial schools recurrent expenditures are channeled through Finance Commission to the provincial education authorities. Capital expenditures, however, flow in through two channels. As mentioned in the previous section, PSDG and other grants are transferred directly to provincial councils, however, much larger fund is transferred through MOE to provincial schools. Major part of education capital expenditures are funded by foreign loans and grants, which are normally handled by MOE, and depending on the projects the funds are allocated to both National and Provincial Schools. There are other government initiated programme such as Model Primary School Project and Navodya School Project, which target mainly provincial schools. However, funds for such projects are managed by MOE.

Because of these two parallel fund allocation systems to provincial schools, it is difficult to determine how much funds, especially for capital expenditures, are

allocated to National Schools and Provincial schools. Table 2.6.5 is an estimated ratio of unit cost of National Schools and Provincial Schools. The estimate is based on two assumptions. The first one is that MOE expenditures under Primary Education and Secondary Education (from Table 2.6.3) are wholly allocated to National Schools, though some capital expenditures under these categories might be allocated to some Provincial Schools. The second assumption is that other categories of MOE expenditures, especially donor or loan funded projects and *Grants and Assistance for Education* (from Table 2.6.3), are allocated proportionately to the number of students to all government schools, thus the exclusion of these expenditures does not affect the comparison[12].

Table 2.6.5 Estimated Education Expenditure Unit Cost

School	No. of Students (2002)	Recurrent Exp.		Capital Exp.		Total Exp.	
		Amount (Rs.mil)	Per student	Amount (Rs.mil)	Per student	Amount (Rs.mil)	Per student
National Schools	705,538	4,155	5,889	549	778	4,704	6,667
Provincial Schools	3,321,537	21,282	6,407	764	230	22,046	6,637

Source: Sri Lanka University Statistics 2003, Budget Estimates 2004
Note: Calculated by JICA Study Team

From the above calculation, the estimated government expenditure per student is Rs.6,667 for National Schools and Rs.6,637 for Provincial Schools, only slightly higher for National Schools. Per student recurrent expenditure is around 10% higher in Provincial Schools, which is probably attributed to the fact that quite a number of Provincial Schools are small and small scale schools are less efficient in terms of teacher/student ratio, resulting in higher recurrent expenditure.

On the other hand, per student capital expenditure is Rs.778 for National Schools and only Rs.230 for Provincial Schools. In reality, as mentioned previously, there will be a further addition of capital expenditures through projects funded by foreign loans and grants. However, it would not be very far fetching to estimate that capital expenditure is allocated 3 times more to a National Schools compared to a Provincial School. Even though understanding that most National Schools are Type 1AB and require facilities such as science laboratories, it seems inequitable to continue such an allocation pattern with unclear criteria of allocation from MOE. Further, many National Schools are popular schools, which have sound resource basis including Past Pupils Society to generate funds while some small rural schools have little possibility in generating extra funds.

12 The caution is needed here as some of the donor or loan funded projects sometimes use National Schools as target schools of their pilot projects, thus more expenditure maybe allocated to National Schools.

2.7 External Assistance

2.7.1 Ongoing Projects

(1) World Bank Projects

1) General Education Project (GEP) (World Bank) 1997 – 2004 (extended to October 2005)

The main objective of this project is to promote quality, equity and efficiency of the system particularly for grades 1-9. This will be achieved by:

- Producing new curriculum and curriculum materials including textbooks for grades 1 –9 and training teachers trained to use the materials.
- Reorganization, renovation and refurbishment of Type 2 schools.
- Improving school libraries with renovated rooms, books and training librarians.
- Comprehensive management training at all levels.

The curriculum and instructional materials outputs of this project are relevant to the JICA study.

The following components have now been completed:

- Curriculum Development and Associated Materials for grades 1-9
- Quality Inputs for grades 1-9 and selected grades 10-13
- Management and Planning - management building for MOE, PEA, NIE, UGC
- Financing – distribution of educational resources
- Studies – impact of GEP 1 and GEP 2, monitoring of current GEP 2 inputs, issues for future investment needs

Components still underway:

- Textbook and Education Publications
- School Facilities Rationalization
- Extra Quality Inputs for Information Technology and teaching material for English language learning – to date equipment for 400 ICTs
- Libraries –to date 501 new libraries, 1499 refurbished libraries, 4000 schools provided with books
- Project Coordinating Unit

2) Teacher Education and Teacher Deployment Project (TETD) (World Bank) 1996 – 2004 (extended to October 2005)

The main objective of this project is to improve the quality, effectiveness and efficiency of the teaching service. This will be achieved by:

- Rationalization of teacher recruitment, deployment & training
- Strengthening of teacher training authorities

- Focusing teacher training in three institutions namely, Universities, NCOEs, and the NIE.
- Building of new NCOEs and refurbishment of existing teacher training institutions
- Building of Teachers Centers, quality of the teaching service, in-service training outputs and science equipment for NCOEs (special interest to the JICA study)

Extension of the Two Projects

Both projects have been extended from their original closing dates in June 2004. This is because of changing circumstances in Sri Lanka relating to peace initiatives and changing Government priorities.

The three new priority areas identified by the Government are:

- Education in conflict-affected areas
- Promotion of English language teaching and learning
- Support for ICT in the Education system

The initiatives in ICT are relevant to the JICA study, particularly those associated with subject related uses of the computer.

(2) ADB Projects

1) Secondary Education Development Project (SEDP) 1994-1999

This project involved three components:

- Development of curriculum and learning materials grades 6-11
- Improvements of Examination and Evaluation system including the establishment of the National Centre for Evaluation and Testing (NETS)
- Physical infrastructure and equipment for school development and upgrading

With the curriculum development there was coordination with the GEP2 project and with the physical infrastructure component, there was coordination with SIDA.

2) Secondary Education Modernization Project (SEMP) 2001-2005

The objective and components are as follows:

- To improve the quality of secondary school to raise national examination results for one million grade 10-13 students in 2,300 secondary schools.
  - Component 1 - Quality improvements in grades 10-13
  - Component 2 - Access to Quality Instruction for Disadvantaged Schools
  - Component 3 – Efficiency in Management and Supervision

The outputs for SEMP relevant to the JICA study are:

- Quality Improvements in grades 10-13 - curriculum strengthening of all Type 1AB and 1C schools in Science, Mathematics, Computer Education and other subjects
- Establishment of 800 Computer Learning Centers (CLCs) including physical facilities and teacher training:
- School Based Assessment (SBA) at O-Level and A-Level – assistance to NETS in SBA and examinations
- School Based Management (SBM)
- Upgrading 100 schools to full-curriculum schools by the supply of A-Level Science labs and equipment for students of grades 12 and 13
- Provide necessary Sinhala, Tamil and English books for A-Level classes
- Prepare, print and distribute necessary A-Level books through the Department of Educational Publications
- Establishment of onsite Environmental Studies Centers in selected schools.

3) North East Community Restoration and Development Project (NECORD)

This project is concerned with building and restoration of infrastructure facilities in North East Province schools.

(3) UNICEF Projects

1) Rapid Needs Assessment Survey, NIE with UNICEF, October 2002

This survey was concerned with the short-term and long-term educational needs of children in twelve districts in the conflict areas. The survey provided comprehensive information on children and teacher issues as well as the rehabilitation of school buildings.

2) Child Friendly School Program, UNICEF 2002

The Child Friendly School Program (CFS) commenced in 2002 is an ongoing venture. The Program assisted in the development of 124 Child Friendly Primary Schools in the North Western Province as a pilot. The Program assisted in seven areas:

- Teaching-learning
- Teachers and other staff
- School premises
- Classrooms and buildings
- Health and nourishment
- Parent and community participation
- Supervising and administering authorities

The other focus for the program is for authorities to recognize the student talents required for life by adapting evaluations focused on skills and attitudes as well as knowledge based performance in written examinations.

(4) DFID (UK) Projects

DFID has been responsible for two primary school projects now completed. These were:

- Primary Maths Project: 1998 – 2004
- Primary English Project: 1996 – 2002

Both these projects were concerned with:

- Curriculum Development for grades 1 to 5
- Syllabuses, Teachers' Guides, textbooks for grades 1 to 5
- Pre- service Teacher Training, In-service Teacher Training on the new curriculum
- Monitoring, evaluation and research on the new curriculum

(5) GTZ (Germany) Projects

1) Basic Education Sector Program (BESP) – 2001-2005

This program is very broad with the main inputs being in primary teacher training and school education in conflict areas.

The following programs are components of BESP:

- Teacher In-Service Program (TIP) (1999 – 2005) is an island-wide input in primary teacher training. The essential elements of the program are:
  - Primary in-service teacher education that emphasizes competency based, learner-centered and activity oriented learning-teaching approaches
  - School strengthening by developing a spirit of teamwork and co-operation and enhancing local initiative and creativity and school-based ownership (similar to JICA study).
  - In-service training for ISA's and HPO's (Principal plus one senior teacher from the same school)

The program was piloted in North East Province and Central Province in 1999 and will extend to all remaining Provinces by 2004. The Program also fits neatly with the 1997 Primary Reforms and the DFID projects in English and Mathematics and is school-based which is a key element of the JICA study.

- Vanni Education Rehabilitation Project (VERP) is concerned with rehabilitation of psychologically affected children/youth and their basic education in conflict areas.
  - Intervention programs with war trauma affected children in North East Province

- Inclusion of a unit of study on war trauma affected children in NCOE primary teacher training programs.

- Basic Education for Children in Disadvantaged Areas (BECARE) trains Counselors and Befrienders in conflict areas.

GTZ was also involved with UNICEF in North East Province primary schools.

- Other GTZ inputs are in assistance with two Units attached to MOE:
  - Material Development and Training Unit (Pre-Service) (MDTU) at NIE
  - Impact Monitoring Unit at MOE

GTZ projects are relevant to the JICA study because of their concentration on basic education, instructional materials and primary teacher in-service training in disadvantaged areas.

(6) JICA/JBIC (Japan) Projects

1) Junior School Improvement Project– JICA 2000

Supply of infrastructure facilities (only Type 2 and Type 3 schools)

Quality improvement through Teacher Training

- First phase – 12 schools
- Second phase – 13 schools

2) Small-scale Infrastructure Rehabilitation And Upgrading Project (SIRUP I and II) (JBIC) 2004, 2005-2007

These projects are concerned with sub-projects to upgrade and rehabilitate infrastructure of education facilities e.g. new classrooms, repairing buildings, constructing or repairing activity rooms and O Level laboratories, installing toilet units and water supply and drainage system. SIRUP I was a pilot project in Central Province in 2004 and has been successfully completed. Planning is now underway for SIRUP II which is scheduled for 2005-2007 and will cover all eight Provinces. This Project will form part of the cooperative inputs of SWAp, the World Bank/MOE proposal for future education inputs and will work through MOE, Provincial Ministries of Education and Ministry of Skill Development in its activities.

(7) SIDA (Sweden) Projects

1) School Building Project in Plantation Areas - SIDA 1987-1999

Building and Rehabilitation of Primary and other Schools in Plantation Areas

2) Facilitation of Democratic and Pluralistic Values through Primary and Secondary Education (FDPV) (SIDA) –first suggested in 2002 – possible implementation date 2005

This is a proposed program to teach the principles of values, democracy, decision-making, tolerance, mutual understanding etc. as part of the mainstream curriculum. UNICEF may also be involved in this program.

2.7.2 Proposed External Assistance Initiatives

(1) Sector Wide Approach (SWAp) to Future Education Funding (WB)

The World Bank after discussions with GOSL and other donors UNICEF, SIDA and DFID have proposed a new approach of Sector Wide funding for education projects in the future[13].

The key characteristics of the new approach will be:

- GOSL and Donor partnership
- Comprehensive education sector development framework
- Multi year education expenditure framework
- Long term, output-oriented education planning horizon
- Streamlined management systems at central, provincial and school levels, including capacity building at all levels
- Monitoring and evaluation of education outputs and outcomes

MOE has already embarked on this new approach already with its school plan initiative due for completion in May 2005.

The sector program has four key development objectives to be supported by external funding as time goes on:

- Promoting equity by enabling all children access to basic education (grades1-9), either within the formal school system or in non-formal education
- Enhancing the quality, economic impact and social relevance of basic and secondary education by supporting initiatives to improve learning outcomes and orient the education system to the world of work
- Strengthening the capacity of the education system to allocate and distribute public resources efficiently and equitably within the school system
- Improving the institutional capability of central and provincial agencies to deliver high quality services

Proposed Secondary Modernization Project (SEMP 2) Project (ADB)

SEMP 2 has two broad goals namely, to support GOSL strategy to improve the quality, equity, and management efficiency of secondary education and make it more responsive to new labour market requirements. The rationale of the proposed Project is to focus on upgrading and modernizing Type 1C schools to Type 1AB schools in the following ways and with the lessons learnt in SEMP. SEMP 2 will also coordinate efforts with (i) North East Community Restoration and Development Project (NECORD) (multi funded) and (ii) Small-scale

13 SL Education Sector Operation - World Bank Preparatory Mission - Draft Aide Memoire July 26 – August 12, 2004

Infrastructure Rehabilitation and Upgrading Project SIRUP II (JBIC funded) so as to avoid duplication of building school facilities.

The following are the proposed components of SEMP 2:

Component 1: Improvements in Quality and Equity of Secondary Education

- Facilities Upgrading and Provision of Equipment
- New Curriculum Options, Learning Materials and Teaching Methodologies
- Special School and Student Support Programs

Component 2: Provincial and Zonal Capacity

- Strengthening of Zonal Offices
- Strengthening of Provincial Office

Component 3: Supporting Government Policies and Reforms for improving Education System Management

- Support for Decentralized Education Management
- Developing School Partnerships and Sustainability
- Streamlining National Examination System
- Capacity Building of Central Ministry
- Special Features related to the JICA study are:
- Continuous Monitoring and Supervision of School Performance
- School Development Plans
- Achieving Equity Across the Country
- Promoting Science Teaching and Learning
- Promoting Decentralized Education Management
- School Sustainability measures

2.7.3 Lessons Learned

Lessons learned from the four Projects, namely, GEP2, TETD and SEMP and UNICEF CFS are as follows:

(1) Staff Appraisal Report GEP2

- Local personnel should participate more in surveys and monitoring.
- Project performance and sustainability increase when operational responsibilities are given to local implementation units
- Make certain that the MOE stick to agreed criteria of staff selection and pick the right people to be counterparts or to implement the program.

(2) Staff Appraisal Report TETD Project

- Importance of ensuring ownership of the project by a wide range of senior officials, particularly from the Provinces

- Ensure participation for all stakeholders and to recognize their interests in project implementation
- The Ministry must give positive attention to implementation and monitoring and helping to resolve problems
- Need in project design to draw not only on previous experience in Sri Lanka but on lessons from projects in other countries

(3) Lessons Learnt from SEMP and GEP2[14]

- Some schools are not ready to receive ICT because of poor infrastructure, low-level skills of personnel, and inability to maintain, exploit and sustain the ICT facilities. For similar reasons, they are not ready for multimedia teaching and learning resources.
- Despite initial training teachers are still not comfortable with SBA and will require regular ongoing training to overcome difficulties. Monitoring of SBA is still not effective.
- The implementation of SBM even though a component of the 1997 reforms has not occurred with many Principals and school communities unsure of its benefits. Both Principals and SDBs require further training to make SBM a reality. Computerization of SBM is still a long term rather than a short-term objective.
- The criticism of SEMP projects putting too much emphasis on ICT points to the continuing shortfall of science and technical facilities in 1C and Type 2 schools as needing to be overcome before ICT can be introduced to those schools
- The JICA Science and Mathematics project with its bottom-up approach tells us clearly that different schools have different needs and that these requirements are best met by enabling the school themselves. The problem is whether the same approach would work with 1,000 Type 1C schools as with the 25 pilot schools. (Comment - GOSL thinks so as it is commencing preparation of school development plans at the school level).

(4) Staff Appraisal Report UNICEF Child Friendly Schools

- The most important ingredient of the largely successful program in NW province has been the process of change created in the school culture
- The most important determinant that has changed is the interest and enthusiasm of the Principal and teaching staff
- Small inputs over a long period of time are more effective
- Success is most likely where the process of change is created and maintained by those subject to the change
- Measurement of early change was fundamental to progress

[14] ADB Report on proposed SEMP II Project 2004

- Schools must have 'ownership' of processes that are unique to each school but within agreed overall goals for primary education
- Children and pupils need to have more involvement and opportunities for contributions than was the case in the program
- Blessings of Provincial education authorities are essential for success
- Continual monitoring, a successful part of this program, is vital for the development of the program
- Core groups fro both within and outside the zone or province (for mutual support, monitoring, supervision, training and evaluation) should be formed to initiate the processes of improvement
- The most successful and progressive participants from the program in NW Province should be part of any replication in other Provinces
- There should be more input into improving teaching methodology and competence. A component to encourage methods such as pupil centred teacher-learning and learning by doing should be added to future programs
- Training should be goal-oriented and must include how to measure progress towards these goals

CHAPTER 3 SCIENCE AND MATHEMATICS EDUCATION

3.1 Curriculum

3.1.1 Curriculum of Science and Mathematics

(1) Current Situation

The suggested curriculum reforms under the 1997 General Education Reforms document have now taken place and preliminary moves are underway to commence another cycle of reforms especially at the secondary level. This new cycle of reforms should commence in 2005. The latest proposals in the NEC Proposals2003[15]suggest that the primary curriculum remain unchanged but that changes be made to the secondary curriculum. The Secondary Plan 2004-2008[16] also suggests changes be made to the secondary curriculum. A lead-time of two years should be allowed for the preparation of textbooks, teacher's guides and other materials so Curriculum Reform implementation will only be affected once the textbooks are ready.

The table 3.1.1 is the completed curriculum reform implementation plan. SBA was implemented at O-Level in 2002 but is at present under review.

The Centre for Curriculum Development (CCD) at NIE is responsible for the design and development of the school curriculum at Primary, Junior Secondary, Senior Secondary and Collegiate Levels.

NIE curriculum officers are responsible for:

- Reviewing, revising and periodically upgrading the curriculum to ensure that all curricula are responsive to social, cultural, economic and technological demands
- Developing new curricula and related curricula materials. In particular, preparing Syllabus statements, Teachers' Guides and other relevant material for teachers to effectively implement the curriculum
- Providing in-service training for subject in-service advisers in new or revised curricula who disseminate the information to teachers in schools
- Carrying out research on curricula and disseminating research findings to schools
- Keeping all curricula stakeholders aware of curriculum development.
- Disseminating new curricula details to Universities, NCOE's and Teachers Colleges for use in their courses

[15] Envisioning Education for Human Development – Proposals for a National Policy Framework on General Education in Sri Lanka, NEC, December 2003
[16] National Plan for the Development of Secondary Education 2004-2008, MOE

Table 3.1.1 Schedule of Curriculum Reform 1998-2003

Grade and Implementation	1998	1999	2000	2001	2002	2003
Primary Program (English& Math)						
Grade 1		→				
Grade 2			→			
Grade 3				→		
Grade 4					→	
Grade 5						→
Junior Secondary New Curriculum						
Grade 6 & 9		→				
Grade 7			→			
Grade 8				→		
GCE O-Level New Curriculum						
Grade 10			→			
Grade 11				→		
GCE A-Level New Curriculum						
3 subjects reform commenced Biology and Combined, Higher Math	→	→	→			
General English		→	→	→		
Technology				→	→	→
School Based Assessment						
Grades 6 & 9		→	→			
Grades 7 & 10				→		
Grades 8 & 11					→	

Source: MOE Reforms in Education 1997 Document

Note:

1. A-Level SBA will be introduced in 2005
2. Technology will become a fourth stream from May 2003, Universities will also accept one subject from six technology subjects and IT as one of the three A-Level subjects making up a stream.

(2) Curriculum System

As a result of the 1997 Reforms, a complete review and reorganization of the school curriculum was implemented. This also included a review of the textbooks being used. The followings are details of the new curriculum.

1) Primary Grades 1-5

Table 3.1.2 below describes the Primary School Curriculum by grade and subject.

The five grades are arranged in three key stages – one teacher teaches the same class through grades 1 and 2 and also through grades 3 and 4. Subjects are taught in one half hour blocks.

Table 3.1.2 Primary School Curriculum

Key Stage 1		Key Stage 2		Key Stage 3
Grade 1	Grade 2	Grade 3	Grade 4	Grade 5
First Language		First Language		First Language
Mathematics		English		English
Religion		Second National Language		Second National Language
Environmental Activities		Mathematics		Mathematics
Oral English activities		Religion		Religion
Interaction-grade 6 children		Environmental Activities		Environmental Activities
		Oral English Activities		Oral English Activities

Source: National Curriculum Process Plan June 2000 Annex 6

2) Junior Secondary Grades 6-9

Table 3.1.3 below outlines the grade 6-9 curriculum and subject time allocation.

Students study *mathematics* in each grade and '*environmental studies'* in grade 6 followed by '*science and technology'* in grades 7-9.

At the end of grade 9, students sit for a school-based Proficiency Examination that is manly used for those students leaving school. They are provided with a transcript of their results. Prospective employers are encouraged to give official recognition to this examination.

Table 3.1.3 Junior Secondary Curriculum

Subject	Number of periods per week (40 minutes)			
	Grade 6	Grade 7	Grade 8	Grade 9
Religion	3	2	2	2
First Language	5	5	5	5
English	5	5	5	5
Mathematics	5	6	6	6
Health & Physical Education	4	3	3	3
Aesthetic Subjects	4	3	3	3
Sinhala/Tamil (second language)	2	2	2	2
Environmental Studies	9			
Science & Technology		6	6	6
Social Studies & History		5	5	5
Life Competencies		3	3	3
Group Work	3			
Total	40	40	40	40

Source: National Curriculum Process Plan June 2000 Annex 6

3) Grades 10-11 GCE O-Level

At O-Level, grades 10 & 11 students study 8 core subjects and 2 additional subjects as presented in Table 3.1.4 below. Their additional subject choices depend on the resources available.

Table 3.1.4 Curriculum Frame for Grades 10 and 11

Subject	Number of 40 minute Periods per week	
	Grade 10	Grade 11
Religion	2	2
First Language	5	5
English	5	5
Mathematics	6	6
Aesthetic Subjects/Literature	3	3
Science and Technology	6	6
Social Studies and History	5	5
Technical Subject	4	4
Additional Subject I	2	2
Additional Subject II	2	2
Total	40	40

Source: National Curriculum Process Plan June 2000 Annex 6

4) Grades 12-13 GCE A-Level

Each student studies three academic subjects (previously four before the reforms) in grades 12 and 13. Each subject is studied for 400 minutes per week (10 periods each 40 minutes).

The three academic subjects are available in three streams. These streams are university department entry requirements. The streams are:

- Science – Biological Science stream and Physical Science stream
- Commerce
- Arts

Biological Science stream students study *biology*, *chemistry* and *physics*. Physical Science stream students study *chemistry*, *physics* and '*combined mathematics'*.

Practical work in Biology, Chemistry and Physics is compulsory and there are SBA activities such as projects, assignments, fieldwork required of both science and mathematics student.

(3) Comments on Syllabuses

The syllabuses are well presented and detailed. However, there are problems with the contents and overcrowding of most of the secondary syllabuses and many teachers have difficulty in completing all the topics in a particular syllabus. As more time in the school calendar is required to be given to SBA activities, it will be necessary to consider modifications to most syllabuses to allow for this change. The aim of the change should be to make each syllabus broader rather than longer and thus improve student understanding of particular topics.

1) Comments on Science

Primary Environment Related Activities (ERA)

Grades 1-5 Environmental Studies explores the world in which the primary children live commencing with familiar things like animals, trees, wind, etc. and then looking at issues such as pollution, small scale gardening, etc. in an integrated manner like the grade 6 Environmental studies syllabus.

GCE O-Level Science and Technology

The O-Level '*science & technology'* syllabus is a broad approach to science and its applications and was devised to overcome the more academic approach of the previous science subject at O-Level. It has now been recommended that the '*science and technology*' subject be changed to the subject '*science*'. This was because it was felt that '*science and technology*' contained too few science concepts and with the advent of ICT the meaning of Technology was unclear in '*science and technology*'. Grade 6 '*environmental studies'* is a bridging course between primary and junior secondary and is very much based on informal practical activities to illustrate science concepts. These concepts are integrated with social studies in a thematic approach. The content and activities are appropriate to the age of the students. This subject will also be changed because it is recommended that grade 6-9 be a common curriculum for all grades.

GCE A-Level Science

The A-Level syllabuses could be reduced in content and still be of an acceptable standard internationally. The content in the three science subjects is very academic particularly in *chemistry* and *physics*. Each subject has a good experimental program (Practicals Program).

2) Comments on Mathematics

Primary Mathematics

The grade 1-5 syllabuses have been written as part of the DFID project and contain content to the highest international standard. Because they were produced as part of a Project package of syllabus, teachers' guides and new textbooks they are more detailed than the other mathematics syllabuses and are excellent.

GCE O-Level Mathematics

The syllabuses from grades 6 to 11 have similar content and standard to syllabuses internationally. They are concept and skills based and would be better if more applications were included and some topics left to A-Level. These topics could be part of a bridging course between O-Level and A-Level.

GCE A-Level Mathematics

The syllabuses are very academic and could be reduced in content and still be

of a very acceptable standard internationally. Applied mathematics with dynamics and statics used to be called mechanics is very oriented to mathematical physics. Other applications of mathematics like many from discrete mathematics are excluded. These are more relevant for most students in the computer age.

3) Issues, Problems and Constraints

The following are issues related to curriculum:

- Insufficient Vertical integration of the secondary curriculum grades 6-1
- Too many topics in both A-Level and O-Level syllabuses in science and mathematics
- Few modern topics in applied mathematics at A-Level such as number theory, network theory, and graph theory
- Limited applications and problem solving topics in O-Level science and mathematics
- Limited use of information technology to improve science and mathematics teaching-learning
- Insufficient bridging programs connecting the completion of O-Level and commencement of A-Level in both science and mathematics

(4) Proposed Curriculum Changes[17]

This year is the end of the present curriculum cycle and as part of the 2003 NEC Policy Framework several changes to the present curriculum have been proposed.

The exception to this change is primary grades 1 to 5 for which the recommendation is no change from the present curriculum. Below are the proposed changes by NEC, some of which are already being implemented.

1) Junior Secondary curriculum (grades 6-9)

- A common 4 year curriculum for grades 6-9 – the transition grade 6 to be abandoned and grade 6 to become the first year of the common curriculum
- The *'science & technology'* subject to be replaced by *'science'* for all grades 6-9
- *History*, *geography*, *civics/civic education* be separate subjects in grades 6-9 instead of '*environmental studies'* (grade 6) and *social studies & history* (grades 7-9)
- Retaining and strengthening 'Technical Skills' and adding 'Computer Literacy'
- At least 20% of any subject grade be given over to activity based projects/practical skills assessed by SBA
- Activity rooms be built in each school (also proposed in 1997)
- The Junior Secondary curriculum to comprise 12 subjects

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2) Senior Secondary curriculum (grades 10-11)

- The *'science & technology'* subject to be replaced by *'science'* for grades 10-11
- *History*, g*eography*, c*ivics/civic education* be three separate subjects
- *'Information Technology'* be a new technical subject
- Some unpopular subjects be dropped
- An activity-based project/assignment approach be followed as a compulsory part of each subject curriculum and assessed by SBA
- The Senior Secondary curriculum to comprise the same 12 subjects as the Junior Secondary curriculum

Table 3.1.5 below outlines the proposed new curriculum.

Table 3.1.5 Recommended New Curriculum Grades 6-11

SUBJECT	Number of 40 minute periods per week					
	G6	G7	G8	G9	G10	G11
Religion	2	2	2	2	3	3
First Language	5	5	5	5	5	5
English	8	5	5	5	5	5
Mathematics	8	6	6	6	6	6
Science	5	6	6	6	6	6
History	2	2	2	2	2	2
Geography	2	2	2	2	2	2
Civics	2	2	2	2	2	2
Aesthetic Subject	2	3	3	3	3	3
Technical Skills/Design and Technology	2	3	3	3	3	3
Sinhala/Tamil (2nd language)	1	2	2	2	1	1
Health and Physical Education	1	2	2	2	2	2
Total Number of periods per week	40	40	40	40	40	40

Source: NEC Framework 2003

3) Collegiate curriculum (grades 12-13)

- Curriculum to be no longer structured in academic streams – Science, Commerce, Arts
- All schools shall offer a core curriculum (10 periods per week) of general life skill subjects and a flexible curriculum from which three academic subjects can be selected (two of these may be requirements for certain University faculties) and the other a free choice
- Science students must reach a minimum standard in a practical examination and non-science students a minimum standard in an activity based assignment to qualify to sit for the GCE A-Level examination – both examined by external panels
- The number of subjects offered at the GCE A-Level examination be reduced from 41 to 31 plus Technology (with 6 options) and Information Technology added

- The Common General Paper to continue to be a compulsory component for university admission

3.2 Instructional Materials

3.2.1 Textbooks and Distribution System

Textbooks

Textbooks are provided free to schools for distribution to all students island-wide up to grade 11. These include Sinhala and Tamil versions of each book in the various school subjects from grades 1 - 11, English language books for English as a second language classes in grades 3 - 11 and English medium classes in grades 6,7 and 8. In grades 12 and 13, some students buy their own textbooks and others are distributed to students under various schemes.

SEMP project has provided several Type 1AB schools with a number of English medium books in *Biology*, *Chemistry*, *Physics* and *Mathematics*.

Although NIE officers design and prepare the syllabuses and teachers' guides they do not write the textbooks. Teams of teachers write the textbooks with some assistance from education officers and university people.

1) Primary textbooks

Primary mathematics textbooks for grades 1- 5 have been produced by the DFID team and distributed to schools over the past five years. They follow the syllabuses closely and are of high quality. Included are attractive student centred activities as well as the usual mathematics computation sections. They are attractively presented in several colours. There is no textbook for primary *'environmental studies'*.

2) Junior Secondary and GCE O-Level textbooks

There are separate mathematics textbooks for each grade from 6 to 11 and these compare favorably with publications from overseas education systems except in the quality of production. They follow the syllabuses closely. However, some revisions need to be made particularly at the grade 6-9 levels. These revisions include closer adherence to the various syllabuses, more detail on specific topics with clearer explanations, increased numbers of examples, better layout and correction of errors in the answers section. More student activities need to be included in the textbooks. These additions will take place in the next curriculum cycle.

The grade 6 Environmental Studies textbook is unique in that it was produced in 1999 for the special grade 6 bridging course introduced in Sri Lanka schools. The textbook provided is a colour edition but the standard of colour, layout and artistry is varied. This integrated subject covers Social, Natural and Manmade Environment and the textbook covers topics from both science

and social science. Junior Secondary '*science & technology'* grades 7-11 follow on from the grade 6 Environmental Studies and the grade 7-11 textbooks capture the unique nature of this subject. The textbooks are activity based and integrate ideas from biology, chemistry, physics and technology. They have excellent illustrations and applications and the units covered are relevant to local society and culture. However, several units are not sufficiently linked to the science concepts that they contain.

3) GCE A-Level textbooks

A-Level Textbooks for *Biology*, *Chemistry*, *Physics* and '*Combined Mathematics'* are in English medium and come from overseas publishers. Fortunately, the content in books, particularly from the United Kingdom, Singapore and India is similar to the Sri Lankan A-Level curriculum content. Teachers select material from the textbooks that corresponds to the local syllabuses.

SEMP project is providing extra library copies of the Biology, Chemistry, Physics and Combined Mathematics textbooks to Type 1AB schools.

Publication and Distribution of Textbooks

Prior to 2002, the Education Publications Department arranged for the printing and distribution of all textbooks that are free for students. From 2002, private firms have tendered to the Education Publications Director for the writing and production of textbooks. The private firms employ people to write the textbooks (usually teachers). The Educational Publications Department is responsible for the distribution of the textbooks to schools. The private sector is to be asked to tender for this service from 2004 onwards.

Multiple Book Option

The Educational Publications Department buys copies of the first choice book of the schools, one for each student. As well, the department distributes one copy per subject per grade of two other books to each school as library reference books for teachers and students.

Distribution

At present, the Educational Publications Department distributes the textbooks island-wide through Divisional Offices from where they are delivered to schools. There have been problems with lateness, non-delivery and errors.

It is intended that the distribution of the textbooks be put out to private sector tender to increase efficiency of delivery.

3.2.2 Teachers Guides and Reference Materials

(1) Teachers Guides

NIE Curriculum Officers produce Teachers' Guide(s) corresponding to each syllabus they prepare. The Teachers Guides provide learning objectives for each subject, sequence of topics, allocation of time to topics, teaching notes on content, learning/teaching strategies and assessment details. From subject to subject, they vary in detail with the Science Teachers' Guides providing more information for the teacher than the Mathematics Teachers' Guides. There was also evidence to suggest lack of correlation between Teachers' Guides and textbooks in some cases. Relevant Teachers' Guides are distributed to teachers through the Divisional Offices and they receive training from ISAs on their use. As in most countries, many teachers teach from the textbook and make little use of Teachers' Guides.

(2) Reference Materials

Sri Lankan teachers have little access to reference material in the Sinhala or Tamil medium. There are some small publications in science and mathematics on selected topics but these have limited circulation. With the upgrading of Type 1AB school libraries, GEP2 project has provided a good range of English medium Science and Mathematics reference books. As well as these reference books, some schools have limited material on CD, DVD and video for A-Level classes. There is little ICT material in schools but computer literate teachers prepare examination papers, class exercises, graphs and diagrams for their students using Word, Excel, etc.

(3) Local Materials

Activity based and student centered learning/teaching places much emphasis on the teacher preparing his/her non-written material from locally available resources. The school survey reported that there was much local material available to use in the classroom. School visits showed that primary teachers have taken up the reforms to make up their own materials both with many well equipped classrooms displaying charts, mobiles, models, teaching aids made from various local materials etc. Classes were observed where students were actively engaged in using materials to help them learn. This was not evident in many secondary classes where more traditional textbook, "chalk and talk" methods are still preferred to student based active learning. Computer literate teachers prepare examination papers, class exercises, graphs and diagrams for their students.

(4) Issues, Problems and Constraints

The following are identified as issues with respect to instructional materials:

- Limited supplementary material in Sinhala and Tamil e.g. model experiments, activities, projects, sets of exercises etc.
- Limited low-cost local teaching materials produced at school level
- Variable quality and late distribution of textbooks to remote areas
- Variable quality of Teachers' Guides
- Very limited ICT materials for science and mathematics

3.3 Infrastructure, Facilities and Equipment

School facilities in the government schools are provided by MOE for National Schools and by Provincial Ministries for other schools. The government is responsible for providing all facilities ranging from the main infrastructure such as access roads, water, and electricity, to classrooms and school furniture.

Norms for the provision of facilities have been developed by NIE in consultation with MOE to provide minimum facilities to schools as follows:

3.3.1 Basic Infrastructure

(1) Minimum Standard

Water supply, electricity and telephones

Tap water or wells to be provided for each school.

In the updated list of norms (2004) there is no mention about electricity or telephone cables.

Teachers' quarter, sanitation

- Principal's quarters: one per school
- Teachers' quarters: up to 4 teachers – 1 single roomed unit, and more units according to the number of teachers
- Staff room:
  - Up to 10 teachers – no room
  - 11 to 20 teachers – 1 room (3 m x 6 m)
  - 21 to 40 teachers – 1 room (6 m x 6 m)
  - - Over 40 teachers – 1 room (10 m x 6 m)
- Latrines (boys): one latrine up to 200 male students and one additional latrine for every 200 units of enrolment
- Latrines (girls): one latrine up to 100 female students and one additional latrine for every 150 units of enrolment
- Urinals (boys): no urinals if enrolment is below 45, otherwise one set of 3 urinals for every 150 male students
- Teachers' toilets:
  - Less than 10 teachers – 1 toilet
  - 11 to 40 teachers – 2 toilets
  - 41 upwards – 3 toilets

(2) Present Situation

The existing situation of basic infrastructure and school facilities was assessed using the results of the school survey conducted by JICA Study Team in 2003. School visits have been conducted during the course of the study.

The school survey revealed that 35% of rural and 60% of plantation schools lacked electricity. Only 26% of rural schools, 23% of Type 2 schools and 18% of Type 3 schools had telephones. Tap water was available in less than 25% of Type 2 and Type 3 schools, again rural and plantation schools being the most disadvantaged.

The condition of school facilities varies. In general, sanitary facilities are poor. Only 40% of toilets are functioning even in urban areas, and the situation is even worse in the rural and conflict areas where less than 35% of schools had toilets. The hygienic condition of toilets is very poor with cracked and stained structures and lack of water for flushing.

Teachers' quarters can only be found in about 15% of Type 1AB schools, and more than 90% of Type 1C, Type 2 and Type 3 schools have no kind of staff accommodation. This is a major problem, for availability of staff accommodation would be a crucial recruitment factor in making rural schools more attractive to teachers.

3.3.2 Facilities

(1) Minimum Standard

According to the standard, the minimum facilities should be as follows:

Classroom Space

- Primary (grade 1 to grade 5) – 1.29 m^2 per student
- Secondary/collegiate (grades 6 to 13) – 1.05 m^2 per student

Science Laboratory and Math Room

A school having students from grade 6 upwards is entitled to one of the following:

- Science room / multipurpose room, grades 6 to 9:
  - Enrolment up to 50 – 1 multipurpose room (6 m x 6 m)
  - Enrolment 51 to 120 – 1 multipurpose room (10 m x 6 m)
  - Enrolment 121 upwards – 1 science room (6 m x 6 m) and 1 multipurpose room (10 m x 6 m)
- Science room / multipurpose room / home science room, years 6 to 11
  - Enrolment up to 90 – 1 multipurpose room (10 m x 6 m)
  - Enrolment 91 to 180 – 1 multipurpose room (6 m x 6 m) and 1 science room (6 m x 6 m)
  - Enrolment 181 to 360 – 1 science room (10 m x 6 m) and 1 multipurpose room (10 m x 6 m)

  - Enrolment 361 upwards – 1 O-Level laboratory and 1 home science or multipurpose room (10 x 6 m)
- A-Level science laboratory
  - A-Level Science enrolment up to 30 – 1 O-Level laboratory (if there is one)
  - A-Level Science enrolment 31 to 180 – 1 double unit
  - For every additional 160 students in A-Level classes – 1 double unit
- A-Level Geography room
  - For 50 students studying Geography in A-Level Arts/Commerce – 1 geography room (10 m x 6 m)

Library

- Enrolment in grades 1 to 11 up to 90 – 1 room (3 m x 6 m)
- Enrolment in grades 1 to 11 over 90 – 1 room (6 m x 6 m)
- A-Level enrolment over 180 – 1 room (6 m x 6 m)

Furniture

- For students in grades 1 to 4 – 1 Type C infant desk & chair per student
- For students in grades 5 to 8 – 1 Type B medium size desk & chair per student
- For students in grades 9 to 13 – 1 Type A student desk & chair per student
- Teacher's desk and chair – 1 per classroom
- Office tables – 2 per school
- Blackboards – 1 per classroom
- Steel cupboards – 1 per classroom, 2 per office, 1 for store room

(2) Present Situation

The basic design of the classrooms was made some 30 years ago for a class size of only 30 students, compared with the 40-50 students often accommodated in certain schools now. There is little room for storage of materials, and they are very cramped.

Desks and chairs are available in all schools, but more than 50% of Type 3 and plantation schools do not have the required number of desks and chairs for the class. In more than 50% of the school the condition of furniture is very poor with rusted frames and decayed timber. Blackboards are generally available, even if in a bad condition, but racks and lockers are very rare.

Generally, there are two main issues. First, the condition of facilities is poor, partly because of poor original quality of work and partly because of poor maintenance. The latter is not necessarily a matter of funding, but is a result of neglecting regular maintenance tasks. Secondly, there is a severe disparity. Rural schools, Type 2 and 3 schools and especially schools in the conflict-affected area tend to lack even the very basic infrastructure.

1) External Assistance

World Bank funded GEP2 has provided schools with facilities under three subprojects: School Facilities Rationalization, Quality Inputs, and School Libraries.

The School Facilities Rationalization has mainly aimed at allocating resources in a feasible and sustainable way, starting from the assumption that it may be efficient and cost-effective to support school units that are big enough for new investments. Quality Inputs subproject has provided schools with 400 new ICT centers. A total of Rs. 16,000,000 was released to schools in eight selected zones in eight selected provinces, enabling the principals to procure low-cost items at school level, and funds have been allocated to PEAs for the provision of consumables, for maintenance and replacements. The School Libraries subproject has provided schools with a total number of 501 new and 1499 renovated school libraries.

The GEP2 project has been restructured and continued till October 2005. During the continuation period, reconstruction in conflict affected areas is emphasized.

ADB funded SEMP has provided school with several improvements related to facilities and equipment for science and mathematics education:

- A total number of 100 Type 1C schools have been upgraded to Type 1AB schools by establishing 100 new double unit science laboratories.
- Ordinary classrooms have been converted to computer laboratories by building up the necessary electricity, air conditioning, isolation and locks. In this subproject a total number of 1,000 classrooms have been renovated.
- Audio-visual units have been built in all senior secondary schools island-wide where electricity is available.

2) Facilities for science and mathematics

Science rooms or multi-purpose rooms for grades 6 to 9 are single-storey buildings with facilities for science and technology as well as for other technology skills. Nearly 80% of schools lack science rooms and have to use normal classrooms for science education.

O-Level science laboratories are single-storied structures with laboratory tables for students and a demonstration table for the teacher. There is a separate tiled worktop with two sinks of water and drainage, and two steel cupboards are available. Less than 40% of both urban and rural schools have O-Level laboratories, and 75% of those existing lack proper minimum facilities.

A-Level science laboratories are two-storied structures usually with separate physics and chemistry laboratories at ground level and botany and zoology

laboratories at upper level. There are two small adjoining rooms for storage and preparation.

There are only few primary science laboratories. Therefore, the need is to construct a new room or to convert an existing classroom to a primary science laboratory.

Science laboratories for O-Level are poor or non-existent and need to be improved substantially or constructed completely. Regarding A-Level science laboratories, the following should be carried out:

- Improve the ventilation of chemical storage rooms.
- Provide fire extinguishers.
- Improve gas, water, and drainage facilities to laboratories.
- Provide improvements to floors, walls and furniture.

There are three major issues. First, the majority of schools are lacking even the basic science laboratories. Secondly, the existing laboratories concentrate on Type 1AB schools, while it is very difficult to run modern and experimental science education in the majority of Type 2 and Type 3 schools. Third, maintenance of the laboratories is generally poor. What was clearly visible during then school visits was that storage of chemicals and laboratory equipment was below international standards. Improper handling and storage of laboratory chemicals is hazardous and brings out even severe health risks.

3.3.3 Equipment

(1) Laboratory Equipment for Science and Mathematics

Science and mathematics equipment and materials are provided upon a special request by schools on a specific form (Form A65) through the Zonal Science Officer. There are four main types of equipment:

- Permanent equipment, such as microscopes, ammeters etc.
- Glassware, such as lenses, test tubes etc.
- Perishable consumables, such as wires, filter papers etc.
- Chemicals

There is a full list of standard equipment and materials in the MOE Circular No. 1993/21. The list is comprehensive and covers the requirements of various different laboratories. Procurement lists are prepared annually for each type of equipment and material and sent to MOE or Provincial Ministry for supply. GEP2 Quality Inputs Components has also provided equipment. Therefore, there is no shortage of equipment in schools, but the problem is lack of their proper storage and poor usage.

At present, schools may get equipment from various sources at various levels – MOE, PEA, Zonal Offices, even using their Quality Inputs. Instead of a unified procurement process, supply and procurement are done through several parallel

routes. The result is that depending on the activity of the school principal, an individual school may either not even get the basic supplies or manage to get duplicate equipment. To avoid further growth of disparity, the processes and monitoring of procurement should be developed.

(2) Educational Technology Equipment

Educational technology equipment has not been included in the minimum standards. While radio is fairly common (72% of schools islandwide), only 7% of all schools have overhead projectors and as few as 1% of all schools can access a photocopy machine. Even such a past-time technology equipment as a Ronio duplication machine can be found only in 26% of all schools. Regional differences are significant. for example, while as many as 49% of schools in Polonnaruwa district and 44% in Colombo district can use television, only 10% of schools in Jaffna district and 1% of schools in Mullativu district can do the same (24% of schools islandwide). Concentration of modern educational technology into urban Type 1AB schools is demonstrated by the fact that as many of 44% of Type 1AB schools have a photocopying machine, though their overall distribution to schools is only 1%.

Statistics of distribution of educational technology equipment is illustrated in Table 3.3.1.

As indicated in the Table, absence of such modern basic equipment as overhead projectors, photocopiers and even older duplication machines is a major issue. Developing school-based teaching material and modern interactive teaching methods are severely hindered by lack of technological basic equipment. Computer laboratories can substitute them in some measure, but they exist only in a minority of Type 1AB schools.

Table 3.3.1 Percentages of School by District Possessing Certain Technology Equipments

District	Ronio* Machine	Radio	Television	Computer	Photocopy machines	Overhead projector
Ampara	16 %	28 %	14 %	8 %	1 %	6 %
Anuradhapura	25 %	76 %	35 %	5 %	0 %	3 %
Badulla	25 %	94 %	29 %	10 %	0 %	14 %
Batticaloa	21 %	30 %	15 %	8 %	3 %	3 %
Colombo	47 %	93 %	44 %	32 %	8 %	16 %
Galle	23 %	90 %	28 %	13 %	2 %	19 %
Gampaha	35 %	90 %	29 %	13 %	3 %	8 %
Hambantota	19 %	89 %	15 %	9 %	0 %	8 %
Jaffna	21 %	36 %	10 %	17 %	1 %	4 %
Kalutara	21 %	84 %	27 %	16 %	1 %	5 %
Kandy	45 %	69 %	23 %	15 %	2 %	7 %
Kegalle	20 %	67 %	30 %	8 %	1 %	3 %
Kilinochchi	4 %	34 %	10 %	4 %	0 %	0 %
Kurunegala	21 %	91 %	19 %	8 %	1 %	4 %
Mannar	18 %	24 %	9 %	12 %	1 %	0 %
Matale	40 %	63 %	19 %	8 %	0 %	5 %
Matara	21 %	91 %	17 %	8 %	0 %	6 %
Monaragala	19 %	92 %	28 %	7 %	0 %	7 %
Mullativu	3 %	14 %	1 %	3 %	0 %	0 %
Nuwara Eliya	29 %	66 %	14 %	10 %	0 %	4 %
Polonnaruwa	30 %	85 %	49 %	8 %	0 %	6 %
Puttalam	30 %	94 %	22 %	10 %	1 %	6 %
Rathnapura	26 %	61 %	37 %	7 %	1 %	6 %
Trincomalee	21 %	30 %	18 %	10 %	3 %	6 %
Vavuniya	8 %	19 %	8 %	7 %	2 %	3 %
Sri Lanka	26 %	72 %	24 %	11 %	1 %	7 %

*Duplication
Source: MOE, 2004

3.4 Teachers' Competence and Teaching Methods

3.4.1 Teachers' Competence and Professionalism

Teachers play key roles in improving education in schools. Without improving teachers' motivation and capacity for teaching, education reform will not bear any fruitful results at the school level. Since teacher's qualifications are only a small part of teachers' capacity to teach, it is important to assess the level of teachers' actual capacity to teach. Table 3.4.1 shows the percentage of teachers with appropriate level of teaching capacity, which was evaluated by school principals during the school survey conducted by JICA Study Team in 2003. It clearly shows that teachers' teaching capacity is perceived to be the highest in private schools, and teachers in urban schools are perceived to have higher teaching capacity than those in rural schools.

Table 3.4.1 Percentage of Teachers with Appropriate Level of Teaching Capacity (Evaluated by Principals)

	Urban Schools	Rural Schools	Plantation Schools	Conflict Area Schools	Private Schools	All Schools
Grade 1-5						
Mathmatics	75%	70%	86%	67%	93%	84%
Environmental Science	79%	73%	83%	68%	96%	85%
Average	77%	72%	85%	68%	95%	84%
Grade 6-9						
Mathmatics	83%	71%	78%	81%	96%	83%
Science	81%	70%	78%	77%	96%	84%
Average	82%	71%	78%	79%	96%	83%
Grade 10-11						
Mathmatics	82%	67%	71%	88%	94%	75%
Science & Technology	83%	74%	71%	83%	94%	76%
Average	83%	71%	71%	86%	94%	75%
Grade 12-13						
Mathmatics	78%	71%	--	96%	90%	81%
Physics	78%	76%	--	81%	90%	80%
Chemistry	68%	51%	--	96%	90%	83%
Biology	79%	79%	--	92%	90%	83%
Average	76%	69%	--	91%	90%	82%

Source: School Survey, JICA Study Team

In Sri Lanka, many school children suffer not only from shortage of qualified teachers, but also from teachers' absenteeism. While MOE can set the required teaching time for each subject, it is up to teachers how many minutes are actually spent for each subject, because teachers are often absent from classrooms due to various reasons.

JICA Study Team investigated the situation of the lost teaching time for mathematics and science lessons in 25 pilot schools. The detailed results of this survey are shown in Chapter 2.2 "Survey on Teaching Time" of Part III. This survey indicates that more than 30% of the required teaching time for grade 8 and 10 students and more than 20% of the required teaching time for grade 4 students was lost due to absent teachers. More than 60% of the reasons for this are teachers' leave: teachers are entitled to take a total of 41 days of annual leave, and most of teachers are taking 100% of their leave.

Considering the pleas of children who suffer from lack of teachers in their classroom, it is important to arrange substitute teachers for teachers taking leave, and the required number of teachers for a school must take into account the need for substitute teachers. If increasing the number of teachers is not possible for the time being, it may be necessary to adjust the contents of curriculum to fit the actual teaching time by teachers.

In Sri Lanka, while co-curricular activities such as sports and club activities after regular school hours are encouraged in the new curriculum, most of teachers leave

school just after 2 pm, when their required work hour finishes. This is partly because many teachers work in private tuition classes after school hours, or many female teachers (about 70% of teachers are female) are busy in household work.

Teachers' high absenteeism may be the reflection of low professionalism of teachers, because teachers put higher priority on their personal interest and convenience over children's needs. Teachers' selfish attitude is also evident in the fact that around 10-15% of NCOE graduates refuse to work in rural schools due to their personal convenience, although they are mandated to work in rural schools for at least 3 years.

This tendency is found not only in NCOE graduates, but also in university graduates, some of who become A-Level teachers. Both of them are a part of a small number of the privileged students who are admitted to higher education (only 2.5% of 20-24 years old age-group is enrolled in universities), so they may be good at examination marks, but unfortunately most of them lack the commitment to work for the country, and instead they look for personal convenience. To become good teachers, they must have a strong commitment in teaching profession and love to children whom they teach, regardless of whether they teach in an urban school or in a rural school. It is important to improve teacher trainees' professional ethics and commitment in improving urban-rural inequality for the betterment of all Sri Lankan children during pre-service training in NCOE as well as universities.

3.4.2 Teaching Methods

Education reform in 1997 recommended to introduce student-centered learning especially in the primary level, which requires teachers to learn and use various new teaching methods in classrooms. Table 3.4.2 shows how often various teaching methods are used at schools, analyzed by school type, and Table 3.4.3 shows the share of various teaching methods in terms of teaching hours by level and subject. During implementing the pilot projects, JICA Study Team conducted a survey on use of various teaching methods in mathematics and science lessons in 6 pilot schools, and the summary result of this survey is shown in Table 3.4.4.

Table 3.4.2 Frequency in the Use of Various Teaching Methods by School Type

Teaching Method	Type 1AB Schools (Sample No.=57)			Type 1C Schools (Sample No.=36)			Type 2 Schools (Sample No.=34)			Type 3 Schools (Sample No.=17)			All Schools (Sample No.=144)		
	Often	Sometimes	Never	Often	Sometimes	Never	Often	Sometimes	Never	Often	Sometimes	Never	Often	Sometimes	Never
Small group teaching	51%	42%	7%	50%	42%	8%	49%	46%	6%	82%	6%	12%	54%	39%	8%
Outdoor lessons	19%	65%	16%	25%	72%	3%	23%	71%	6%	29%	47%	24%	23%	66%	11%
School excursions	16%	77%	7%	8%	89%	3%	6%	89%	6%	18%	53%	29%	12%	80%	8%
Industry visit	11%	70%	19%	0%	83%	17%	9%	54%	37%	6%	47%	47%	7%	67%	26%
Work experience	23%	51%	26%	22%	42%	36%	11%	43%	46%	12%	24%	65%	19%	43%	38%
Science/math fairs/exhibitions	16%	70%	14%	3%	72%	25%	11%	54%	34%	0%	24%	76%	10%	61%	29%
Science/math projects	23%	65%	12%	31%	44%	25%	11%	51%	37%	6%	12%	82%	20%	50%	30%
Students as peer tutors	9%	51%	40%	8%	44%	47%	6%	37%	57%	6%	18%	76%	8%	42%	50%

Source: School Survey, JICA Study Team

Table 3.4.3 Share of Various Teaching Methods by Level and Subject

Teaching Method	Primary	Grade 10-11		Grade 12-13			
		Science	Maths	Chemistry	Physics	Biology	Maths
Lecture	19%	39%	44%	42%	42%	42%	47%
Group discussion	63%	37%	41%	32%	32%	33%	41%
Research and practical work	16%	24%	15%	26%	26%	25%	12%
Total	100%	100%	100%	100%	100%	100%	100%

Source: School Survey, JICA Study Team

Note: Share is calculated based on the teaching hours devoted for each different teaching method.

From Table 3.4.2 and 3.4.3, the following trends on the use of various teaching methods can be observed:

a) Small group teaching is the most frequently used teaching method in all schools, and is especially high (82%) in Type 3 primary schools.

b) Outdoor lessons, science/mathematics projects and work experience are also popularly used teaching methods. Science/mathematics projects and work experience are used mostly in Type 1AB and Type 1C schools.

c) Student as peer tutors is the least used teaching method in all types of schools.

d) Type 3 primary schools use small group teaching and group discussion very often, but seldom use work experience, science/mathematics fairs/exhibitions, science/mathematics projects and students as peer tutors.

e) Various teaching methods are less used in private schools than in other schools, which may indicate that private schools are more exam-oriented and their teaching is mainly traditional lecture-style.

f) Science and mathematics classes in grades 10-13 consist mostly of lecture and group discussion, and the share of research and practical work is only 24% to 26% for science and 12% to 15% for mathematics.

When implementing the Pilot Project from 2003 to 2004, JICA Study Team conducted a survey on use of various teaching methods in science and mathematics lessons in 6 pilot schools. The detailed results of this survey are described in Chapter 2.3 “Survey on Teaching Method” of Part III, and the summary results are shown in Table 3.4.4.

Table 3.4.4 Average Time Spent for Various Teaching Methods (%)

Subject	Grade	Teacher-centered teaching methods						Student-centered teaching methods				Inactive Time
		Lecturing by teacher	Q & A between teacher & students	Exercise by students	Experiment Demonstra-tion by Teacher	Other	**Sub-Total**	Discussion among students	Presentation by students	Experiment by Students	**Sub-Total**	
Mathematics	4	23.4%	20.0%	45.4%	0.7%	0.0%	**89.6%**	2.2%	2.7%	3.2%	**8.1%**	2.3%
	8	34.7%	16.1%	33.2%	1.9%	0.6%	**86.5%**	3.0%	5.0%	0.0%	**7.9%**	5.5%
	10	30.5%	8.0%	41.8%	0.4%	0.0%	**80.8%**	5.0%	1.7%	0.2%	**6.8%**	12.4%
	All	30.0%	14.3%	39.8%	1.0%	0.2%	**85.4%**	3.4%	3.2%	1.0%	**7.6%**	7.1%
Science	4	18.4%	18.0%	20.0%	5.0%	2.0%	**63.4%**	3.0%	7.1%	23.4%	**33.5%**	3.1%
	8	33.5%	18.0%	19.0%	7.0%	0.6%	**78.2%**	2.6%	7.0%	6.8%	**16.4%**	5.4%
	10	30.9%	12.9%	26.0%	4.7%	0.0%	**74.5%**	2.2%	3.3%	9.3%	**14.8%**	10.6%
	All	28.3%	16.2%	21.8%	5.6%	0.8%	**72.7%**	2.6%	5.7%	12.5%	**20.7%**	6.6%

Source: Survey on Teaching Time, JICA Study Team

From Table 3.4.4, the following trends on use of various teaching methods in mathematics and science lessons are observed:

a) Lecturing by teachers and exercise by students are the dominant teaching methods for all grades (grades 4, 8 and 10).
b) For grade 4, there are more Q&A between a teacher and students for mathematics lessons and more experiment by students for science lessons than grades 8 and 10.
c) Discussion among students and presentation by students are rarely used teaching methods for all grades.
d) More than 10% of teaching time in grade 10 was inactive for both mathematics and science lessons.

The result of these surveys indicates that while student-centered activities are more practiced in primary level than in secondary level, still traditional teaching methods such as lecturing by teachers and exercise by students are prevailing especially in secondary level. It is a challenge for secondary school teachers to change secondary education from exam-oriented education mainly through lectures and exercises to more student-centered interactive education which uses various participatory teaching methods. There is a need to train secondary science and mathematics teachers on various participatory teaching methods. These methods will help students to understand science and mathematics more deeply and practically, and, as a result, make science and mathematics more enjoyable and preferred subjects for the students.

Problems on science and mathematics teachers' competence and teaching methods are summarized as follows:

Insufficient training of secondary level science and mathematics teachers on activity-based and interactive teaching and learning: While many teachers in primary schools are now utilizing student-centered learning techniques, teaching in secondary schools is still dominated by one-way lecture style due to examination-oriented curriculum. Since secondary education is the important part in basic education for all, it is important to use activity-based and interactive teaching a learning, especially for science and mathematics, in order to make science and mathematics more practical, relevant and enjoyable subjects for all students.

- Low professionalism and little cooperation among science and mathematics teachers: Even if teachers are trained in new teaching methods, many teachers are afraid of practicing them in their classrooms, because there is limited support from their colleague teachers and ISAs. Experience in JICA Pilot Project suggests that if teachers are encouraged to work and collaborate in a group (such as a QE circle), they are more eager to try new teaching methods due to good support from their colleagues as well as peer pressure from them. Teachers' teamwork is an

important way to promote their self-development and enhance their professionalism.

- Weak emphasis on practical application of science and mathematics: Since examination-oriented curriculum tends to make science and mathematics education only for theory understanding and memorization, it is necessary to emphasize more practical application of science and mathematics in their real life situation in order to make science and mathematics education relevant to all students.

Little use of teachers' hand-made teaching materials for science and mathematics experiments and practicals: While schools often request modern science laboratory equipment, it is important to encourage teachers to develop their own teaching materials by using locally available resources for science and mathematics experiments and practicals. Teachers' creativity should be encouraged in making hand-made teaching materials, which can stimulate children's interests in application of science and mathematics in their own life and environment.

3.5 Student Performance

The National Evaluation and Testing Service (NETS) conduct three Public examinations each year to measure student performance island-wide.

These examinations are:

- Grade 5 Scholarship Examination
- GCE O-Level Examination
- GCE A-Level Examination

NETS have produced two Statistical Handbooks - 1999 and 1999-2001 [18] containing detailed results of examinations up to those years plus research analysis associated with the results. It was expected that this publication would be produced each year but there have been no editions since 2001.

3.5.1 Results of Grade 5 Scholarship Examination

This examination is conducted in August each year and is both a measure of performance and potential at the end of primary school. It is not a syllabus-based examination and many of the test items included are of the "intelligence" type.

Table 3.5.1 below gives the historical trend national figures for the grade 5 Scholarship Examination.

18 NETS Statistical Handbooks 1999, 1999-2001

Table 3.5.1 Grade 5 Scholarship Results

Year	No. Sat	No. of students qualified	% of students qualified	No. of scholarships awarded	% of Scholarships awarded
1997	241,639	26,468	11.0	10,000	4.1
1998	244,423	24,810	10.1	10,000	4.1
1999	256,139	25,889	10.1	9,924	3.9
2000	248,373	24,737	10.0	9,976	4.0
2001	274,656	24,414	8.9	9,987	3.6
2002	283,469	24,297	8.6	10,000	4.1
2003	292,483	23,205	7.9	10,000	4.3

Source: NETS Statistical Handbooks 1999, 1999-2001, NETS R&D 2004

The figures show a very slim rate of success for candidates, being between 3.6% and 4.3%. Qualified students together with the scholarship winners are able to enroll in popular schools from grade 6. The number of students sitting the examination has increased while the number of students qualifying has decreased.

Table 3.5.2 gives the results of the School Survey results for Grade 5 Scholarship qualifiers by School Type.

Table 3.5.2 Grade 5 Scholarship Results by School Type

School Type	School Qualified Rate 2001 (%)
1AB	17.5
1C	5.8
2	5.1
3	8.3
Total%	10.0

Source: School Survey, JICA Study Team 2003

The table shows that students attending Type 1AB schools are much more likely to be qualified for a Grade 5 Scholarship than those attending other schools. The larger than expected figure for Type 3 schools is because there is a quota system based on parental income for the award of some scholarships and many children of low-income families attend these schools.

3.5.2 Results of GCE O-Level Examination

The O-Level Examination is held in December each year and is for students completing grade 11. The Examination qualifies students for A-Level studies, vocational courses or employment.

Table 3.5.3 below gives the historic trend figures of students qualifying for A-Level Studies from the O-Level examination.

Table 3.5.3 GCE O-Level Examination Results

Year	No. Sat	Qualified for A-Level	
		No.	%
1999	346,796	130,892	37.7
2000	349,464	129,242	36.9
2001	347,315	127,741	36.8
2002	305,518	126,812	41.5
2003	300,205	132,107	44.0

Source: R&D Branch NETS (Department of Examinations) 2004

The table shows a steady trend for three years and then a 4.7% increase from 2001 to 2003 and a 2.5% increase from 2002 to 2003. The year 2002 was the first time that SBA was a component of the O-Level examination and this may have had an effect on the qualification rate.

The non-qualification rate has been decreasing but is still high at 56% in 2003.

Table 3.5.4 gives the historic trend figures for pass rates in six subjects from the O-Level curriculum – *mathematics*, '*science and technology'* and four other subjects for comparison.

Table 3.5.4 School Candidate Passes in GCE O-Level Examination

Subject	% Passes		
	2001	2002	2003
Mathematics	44.1	40.0	42.1
Science & Technology	53.9	54.6	49.0
Social Studies and History	76.1	78.0	77.0
History	65.2	52.1	80.2
Geography	57.0	50.7	62.7
Development Studies	81.3	70.1	88.2

Source: R&D Branch NETS (Department of Examinations) 2004

Note: Figures for the years 1999, 2000 are not comparable as both science and mathematics were examined with two papers of differing degrees of difficulty.

Pass Rates in m*athematics* and '*science and technology'* are very low compared with the other four subjects. As well, from 2001 to 2003, there has been a decrease in the pass rate both for *mathematics* and '*science and technology'*.

Issues and Problems from the GCE O-Level examination results are:

- Poor pass rates in m*athematics* and '*science and technology'* compared with other subjects
- The high non- qualification rate for A-Level studies (56%) of all O-Level candidates

3.5.3 Results of GCE A-Level Examination

(1) Examination Result

The A-Level Examination is held in April each year for students completing grade 13 (final year of school education). The examination qualifies students for university studies, other tertiary courses or employment.

Table 3.5.5 below gives the A-Level university qualification rate for 2003 and 2004.

Table 3.5.5 GCE A-Level Examination - Overall Results

Year	No. of Candidates Sat.	Qualified for University Entrance	
		No. of Candidates	%
2003	185,825	82,192	44.2
2004	171,152	94,228	55.0

Source: R&D Branch NETS (Department of Examinations) 2004

In 2003 and 2004, around 40-50% of the candidates sitting the A-Level examination qualified for university entrance. The figures also show an 10.8% improvement in the qualification rate from 2003 to 2004 but this is not going to allow more students to attend university as the places available remain steady at about 12,000 –13,000 from year to year.

Table 3.5.6 below give historic trend figures for A-Level science stream subjects from 2002 to 2004 and 2004 comparisons with pass rates from three other A-Level subjects.

Table 3.5.6 GCE A-Level Examination – Historic Trend Subject Results

Subject	Year					
	1999	2000	2001	2002	2003	2004
Biology	81.0%	79.0%	74.7%	71.3%	70.3%	75.5%
Chemistry	66.6%	66.9%	52.6%	50.1%	52.4%	50.5%
Physics	65.3%	63.1%	68.6%	62.4%	59.9%	59.4%
Combined Mathematics	49.0%	42.7%	52.2%	54.1%	55.6%	54.5%
Agriculture	70.8%	73.9%	77.3%	N/A	N/A	86.6%
Economics	61.6%	66.3%	67.1%	N/A	N/A	63.9%
Business Studies	71.2%	89.6%	93.7%	N/A	N/A	90.0%

Source: R&D Branch NETS (Department of Examinations) 2004

Pass rates in c*hemistry* are consistent over the years 2001-2004 but have dropped since the year 2000. Physics pass rates have dropped slightly since 2002. '*combined mathematics'* pass rates are consistent over the years 2001-2004 but have risen since 1999-2000.

Pass rates of *chemistry*, *physics* and '*combined mathematics'* are low compared with Agriculture and Business Studies but closer to Economics pass rates.

(2) University Admission

Table 3.5.7 below give figures on places available for the various university streams and the numbers of students qualified for those streams.

Table 3.5.7 Number of Candidates Qualifying and Admitted to University

Year of A-Level	2000			2001 (August)			2002 (April)		
Year of Admission	2001/2002			2002/2003			2002/2003 (A)		
Subject Stream	Not Qualify	Not Admit.	%	Not Qualify	Not Admit.	%	Not Qualify	Not Admit.	%
Arts	50,756	4,283	8.4	53,629	4,328	8.1	46,441	4,370	9.4
Commerce	24,497	2,372	9.7	27,002	2,494	9.2	27,890	2,862	10.3
Physical Science	5,594	2,819	50.4	6,951	2,843	40.9	7,996	3,009	37.6
Biological Science	10,829	2,670	24.7	10,844	2,766	25.5	9,969	2,799	28.1
Total	91,676	12,144	13.2	98,426	12,431	12.6	92,296	13,040	14.1

Source: Sri Lanka University Statistics 2003 - University Grants Commission
Note: There were two intakes of students into university courses in 2002/2003
Not Qualify - the number of students who qualify for university
Not Admit - the number of students admitted to university courses

The admittance rate for those qualified is low and stable (between 12.6% and 14.1%). This highlights that there are limited university places for qualified students.

The admittance rate for qualified Physical Science stream students and Biological Science stream students are much higher than those for Arts and Commerce.

This indicates that qualified science stream students are much more likely to gain university places than arts and commerce stream students.

Issues and Problems from the A-Level examination results are:

- Poor pass rates particularly in c*hemistry*, p*hysics* and '*combined mathematics'* compared with Biology, Agriculture, Economics and Business Studies
- Limited number of places at universities even for those who qualify at the A-Level examination

3.5.4 Repetition and Dropout rates

(1) Repetition and Dropout Rates for Grades 3, 5, 9 and 10

Table 3.5.8 below shows repetition and dropout rates island-wide for grades 3, 5, 9 and 10 in 2001 and 2003.

Table 3.5.8 Repetition and Dropout rates for Grades 3, 5, 9 and 10

		G3		G5		G9		G10	
		2001	2003	2001	2003	2001	2003	2001	2003
Repetition Rate %	Sinhala	0.7	0.3	1.3	0.6	0.5	0.5	0.4	0.2
	Tamil	3.1	1.9	4.2	2.2	1.6	1.6	1.5	1.4
	National	2.3	0.8	2.7	1.1	1.2	0.6	0.9	0.5
Dropout Rate %	Sinhala	0.1	0.2	0.5	3.7	5.1	4.4	5.1	4.9
	Tamil	-0.6	1.1	4.0	6.3	9.2	10.4	8.5	10.0
	National	-0.2	0.5	2.9	4.8	7.6	5.6	6.3	6.1

Source: School Census 2001, 2003, MOE
Note: Negative figures indicate growth in numbers.

Both the total repetition and dropout rates have generally improved between 2001 and 2003. Tamil repetition rates are lower in 2003 than 2001 but the dropout rates have increased. Interventions in the North Eastern province like the GTZ BESP program are probably responsible for the improvement in the Tamil repetition rates but they appear to have had little effect on the dropout rate. Also, Tamil speaking students still have both higher repetition and dropout rates than Sinhala speakers.

(2) Post O-Level Repetition and Drop-out Rates

After completing grade 11 O-Levels, students leave school or qualify for A-Level studies. In 2003, 44 % of all O-Level candidates qualified for A-Levels (see Table 3.5.5). This is a large increase from the 2001 figure of 29.7%.

Those students who did not qualify for A-Level studies either repeated O-Level studies or left school to take up employment or training.

For university intake 2002/2003 (A), 14.1% of students who qualified for university places gained places at the Universities (see Table 3.5.7). This is a small increase on the 2001/2002 figure of 13.2%.

Those students who didn't qualify for university studies either repeated A-Level studies or left school to take up employment or training.

Table 3.5.9 Percentages of First Time and Second Time (Repeating) Students in Grade 11 and Grade 13 Classes in 2003

Examination	Total Students by Grade / Stream	First Time %	Second Time %
O-Level	353,354	77.2 %	22.8%
A-Level Science	35,750	76.5%	23.5%
A-Level Arts	81,015	67.9%	32.1%
A-Level Commerce	46,760	72.7%	27.3%

Source: School Census 2003, MOE

Table 3.5.9 gives figures on the number of students attempting the O-Level and A-Level examinations for the first and second time (repeating).

The table shows the large numbers of repeaters at both examinations with at least 20% of all students in GCE O-Level and GCE A-Level examination classes being repeat students.

CHAPTER 4 PROBLEMS AND CONSTRAINTS

4.1 Access and Equity

Access and equity have long been cornerstones of Sri Lankan education policy and they can be grouped together as a principle of 'equal educational opportunity for all children' in the nation. Without access and equity for all there can only be limited quality and efficiency in the educational system. The main access and equity problem is the inequitable facilities and human resource allocation between urban and rural schools. Inputs of improved basic infrastructure and science facilities in rural and plantation areas are urgently required. Improved human resources e.g. effective principals and good science and mathematics teachers need to be deployed to those areas. As well, effective principals would bring improved school management. These inputs are essential if access and equity targets for MOE can be reached. Also, the poor linkages between MOE, provincial and zonal authorities mean that problems of access and equity often go unheeded to the great disadvantage of students and schools in rural areas. The politicisation of principal appointments and teacher deployment is an ongoing problem for the system.

Access and equity have to be the first priority of MOE for improvements in science and mathematics education in rural areas.

(1) Institutions and Organizations

Significant access and equity problems in education policy and schools programs are:

- Insufficient funds to offset the existing inequities between urban and rural schools
- Inadequate human and financial resources for provincial, zonal and divisional offices
- Inefficient monitoring of rural and plantation schools by MOE, provincial and zonal officers

(2) Curriculum, Teaching Aids and Student Assessment

Significant access and equity problems are:

- Inefficient distribution of materials to rural and plantation schools
- Few library books in rural and plantation schools
- Many rural and plantation schools do not have their full allocation of science equipment and materials
- Inability of teachers in rural and plantation schools to complete science experiments without such equipment

- Less reference material in Sinhala and especially in Tamil for plantation schools

(3) Human Resources

Significant access and equity problems are:

- Inequitable teacher deployment – both for principals and teachers
- Shortage of replacement teachers in rural and plantation schools
- Teacher incentives scheme to attract more teachers to rural and plantation areas is not effective
- Shortage of graduate/diplomate trained science and maths teachers in rural schools especially in Tamil plantation schools
- Shortage of primary teachers in small rural schools
- Limited science/maths ISAs in rural and plantation schools
- Very few A-Level master teachers in rural schools

(4) School Management

Significant access and equity problems are:

- Lack of commitment by principals/teachers after being appointed to rural and plantation schools
- Parent/ community involvement is limited in rural and plantation areas because of poverty and low education standards

(5) Infrastructure, Facilities and Equipment

Significant access and equity problems are:

- Insufficient basic infrastructure in many rural and plantation schools
- Lack of office equipment in rural and plantation schools
- Lack of teacher accommodation in rural and plantation schools
- Lack of or poor facilities in many Type 1C, Type 2 and Type 3 schools
- Lack of or poor quality O-Level laboratories
- Poor or no libraries in rural and plantation schools

4.2 Quality and Efficiency

Quality in education is to be enhanced by inputs aimed at improving science and mathematics education. These inputs include improvements to teacher training, methodology, textbook production, curriculum, SBA, facilities such as laboratories, libraries and multimedia rooms, equipment, and ICT resources.

Efficiency will be realized by increased professionalism of educational personnel and management. Problems such as overlapping and duplication of functions in government, poor linkages between MOE and provincial authorities, delayed implementation of SBM, politicization of Principal appointments and teacher

deployment are all factors in hindering the efficiency of the education sector.

(1) Institutions and Organizations

Significant problems for education policy and schools programs are:

- Unclear policy directions
- Overlapping and duplication of functions at all levels of government
- Poor lines of communication between levels of government and its agencies
- Delayed implementation of SBM
- Weak links between schools and vocational training institutions
- Inadequate human and financial resources for provincial, zonal and divisional offices
- Inefficient monitoring of programs by MOE, provincial and zonal officers
- Limited budget for quality inputs due to high recurrent expenditures on teacher salaries

(2) Curriculum, Teaching Aids and Student Assessment

Significant quality and efficiency problems are:

- Overcrowded, inflexible curricula
- No vertical integration of the curricula i.e. bridging programs between O-Level and A-Level linkages between primary and secondary grades
- Insufficient science emphasis in ERA and '*science and technology*' curricula
- Non-completion of A-Level science practicals
- Outdated topics in A-Level mathematics
- Insufficient reference material in Sinhala and Tamil
- Insufficient use of local low/cost materials
- Limited experiment/activity material for all curricula
- Variation in the quality of textbooks
- Lack of suitable ICT materials in science and mathematics
- Limited interactive teaching-learning methods especially at secondary level
- Too much dependence on teaching guides and textbooks
- Ambiguity of the dual objectives of the A-Level examination i.e. (i) an examination to certify that a student has completed his/her secondary schooling successfully and (ii) a competition for university places
- Too much emphasis on written examinations
- Little use of competency based teaching-learning in secondary classes

(3) Human Resources

Significant quality and efficiency problems are:

- Lack of in-service training based on teacher needs
- Limited preservice graduate teacher training
- Limited continuing education for teachers
- Teachers have few contacts with local industries
- Insufficient interactive teaching and learning method components in training courses
- Insufficient training of ISAs in interactive teaching-learning methods
- Few A-Level ISAs (master teachers)
- Shortage of computer literate teachers
- Shortage of ICT subject teachers and trainers

(4) School Management

Significant quality and efficiency Problems are:

- Lack of ownership by principals and teachers
- Politicization of principal appointments
- Lack of Communication among teachers, between principals and teachers, between school and parents
- Low teacher morale
- Little parental interest in education

(5) Infrastructure, Facilities and Equipment

Significant quality and efficiency problems are:

- Many Low quality classrooms and basic facilities
- Many low standard science laboratories
- Poor library facilities
- Some schools with poor ICT facilities

4.3 Management and Finance

Adequate financial support and good management at all levels of the education system are essential for it to function effectively. Sri Lanka has a major problem with education funding as it has been gradually decreasing as a percentage of GDP largely as a result of the ongoing conflict situation. The current level of 3% of GDP is low by world standards and this is at the centre of an education system that lacks forward momentum.

There are also problems at each management level and between management levels. This is despite the efforts of external agency inputs in recent years in management strengthening and capacity building. There is politicisation of the system at all levels and this results in some administrators and principals having ineffectual management skills resulting in inferior education for the schools with whom they are associated.

As Sri Lanka is moving slowly away from a centralized education to more school-based management, it is vital that there be strong leadership at all levels of the system.

(1) Institutions and Organizations

Significant management and finance problems for education policy and schools programs are:

- Insufficient decentralization of the education system
- Inadequate appointment practice of officers to provincial and zonal offices
- Duplication of external assistance inputs
- Overlapping and duplication of functions within and between the Ministry and different offices of provincial education administrations
- Weak links between planning, policy, implementation and monitoring
- The split of SBA responsibility between NIE and NETS
- Inadequate sector wide funding
- Different funding levels for national and provincial schools
- Limited private sector participation
- Insufficient generation of funds from within the education sector

(2) Human Resources

Significant management and finance problems are:

- Insufficient funding for large scale in-service, continuing teacher training
- Insufficient funding for attractive incentives for teacher deployment in rural and plantation areas
- Insufficient budget allocation for ICT maintenance, technical support

(3) School Management

Significant management and finance problems are:

- Inadequate selection, promotion, transfer policy for principals
- Limited school decision making powers (staffing, budget, curriculum)
- Limited electronic data bases
- Poor school-based financial management
- Slow rate of increase of community participation

(4) Infrastructure, Facilities and Equipment

Significant management and finance problems are:

- Lack of systematic maintenance plans and budget for schools
- Inconsistent implementation of upgrading plans for schools

The problems and constraints mentioned above are summarised in the following table.

Table 4.1.1 Problems and Constraints for Science/Maths Education

Topics	Access/Equity	Quality/Efficiency	Management/Finance
1. Institutions and Organizations			
1) Education Policy and Program	• Inequities caused by 'popular' school enrolments • Limited access to Type 1AB schools in rural areas	• Delayed implementation of SBM • Lack of promotion policy of science and mathematics • Unclear policy directions • Lack of policy detail for introduction of English medium teaching • Weak links between schools and vocational training institutions	• Insufficient decentralization of the education system • Inadequate appointment practice of officers to provincial and zonal offices • Duplication of external assistance inputs
2) MOE, Central, Local offices	• Inadequate human resources for provincial, zonal, divisional offices	• Inadequate human and financial resources in provincial, zonal and divisional offices. • Inefficient monitoring of rural and plantation schools by MOE, provincial and zonal officers • Poor lines of communication between levels of government and its agencies	• Overlapping and duplication of functions within and between the Ministry and different offices of provincial education administration • Weak links between planning, policy, implementation and monitoring • Lack of human and physical resources at divisional offices • Unbalanced distribution of funds from central to provincial governments
3) NIE, NETS		• Split of SBA responsibilities between NIE and NETS • No links between NIE curriculum developers and textbook writers	• Lack of clear definition of its role • Lack of communication channels between institutions like NIE and NETS
4) Funds for education	• Insufficient funds to offset existing inequities between urban and rural schools • Inadequate financial resources for provincial, zonal, divisional offices	• Limited budget for quality inputs due to high recurrent expenditures on teacher salaries	• Inadequate education budget as a proportion of GDP • Insufficient generation of funds from within the educational sector • Inequitable fund allocation between urban and rural schools • Different funding levels for National and Provincial schools • Limited private sector participation in education

Topics	Access/Equity	Quality/Efficiency	Management/Finance
2. Curriculum, Teaching Aids, and Student Assessment			
1) Curriculum and Syllabus		• Common - Overcrowded curricula - Lack of flexibility in curricula: does not allow for different student ability levels - Lack of vertical integration between O-Level and A-Level courses - Lack of linkage between grade 5 and grade 6 curricula - Lack of emphasis on practical applications in science and mathematics • Science - Non-completion of A-Level science practicals - Too little science emphasis in ERA and Science and Technology curricula • Maths - Outdated topics in A-Level maths - Narrow content in O-Level maths syllabus	
2) Teaching Materials	• Inefficient distribution of teaching materials • Lack of library books in rural and plantation schools • Less than complete science equipment allocation in rural and plantation schools – teachers cannot complete science experiments with their classes • Less reference materials in Sinhala and especially in Tamil for plantation schools	• Insufficient reference material in Sinhala and Tamil • Insufficient use of local low/cost materials • Limited activity, experimental material for primary ERA, maths and all secondary science and math courses • Variation in quality of textbooks • Lack of private sector involvement with textbook production	

3) Teaching Methods		• Limited interactive teaching/learning especially at secondary level • Lack of variety in teaching method • Too much dependence on teaching guides and textbooks as the only source of materials • Little attention to clever and slow learning students • Secondary teachers do not use competency based teaching	
4) Student assessment system		• Ambiguity of dual objectives of A-Level examination • Unclear objectives of and benefits of the O-Level examination • Too much an examination oriented education system • Need for improvement in SBA system: lack of clear guidelines • Long time lags for results of public examinations	
3. Human Resources			
1) Principal & Teacher Training		• Inadequate training of principals in management • Lack of in-service training based on teacher needs • Limited pre-service training for graduate teachers • Limited continuing education for teachers at teachers centres • Lack of links between teachers and local industries • Insufficient interactive, teaching/learning method component in training courses	• Lack of sufficient funding for systematic in-service, continuing teacher training • Lack of rationalization of teacher training courses • No concrete plan to use TTC facilities

2) ISA Training and Deployment	• Limited science/maths ISAs in rural and plantation areas	• Insufficient training on interactive teaching/learning method • Politicisation of ISA appointments • Lack of ISA responsiveness to local needs • Few A-Level ISAs (master teachers)	
3) Teacher Performance Appraisal		• Insufficient performance appraisals of teachers • Lack of incentives and promotion based on performance appraisal	
4) Teacher deployment	• Inequitable principal and teacher deployment island wide • Shortage of primary teachers in small rural schools • Shortage of science and math teachers in rural and plantation schools particularly Tamil plantation schools, especially graduates or diplomates. • Shortage of replacement teachers for rural and plantation schools • Ineffectiveness of teacher incentive scheme to go to rural and plantation schools	• Untrained graduates teaching at A-Level • Politicisation of teacher deployment	• Lack of a supply/demand match for preservice science teacher training
5) Teacher Training on Use of ICT	• Some inequity in distribution of teacher training programs	• Inadequate numbers of computer literate teachers • Lack of teaching materials in local language including teachers guides • Shortage of ICT subject teachers and trainers	• Lack of consistent ICT policy • Insufficient implementation of ICT teacher training plans

4. School Management			
1) School Culture and Teachers' Morale	• Lack of principals/teachers commitment who work in rural and plantation schools	• Lack of communication; - among teachers - between teachers and principals - between school and parents • Low teachers morale	• Inadequate selection, promotion, transfer policy for principals • Poor leadership by principals • Limited sense of ownership among teachers and community
2) SBM		• Delayed implementation means many schools are still poorly managed	• Limited devolution of authority to schools (personnel, curriculum, finance) • Lack of leadership of principals • Lack of transparency in school management • Limited accounting skills of principals, office assistants • Lack of data base for school management
3) Parental, Community Participation	• Parent/community involvement in rural and plantation schools is low because of poverty and their low educational standards	• Parents have little interest in school education • Limited activity using participatory approaches • No open classes for parent/teacher interaction	
5. Infrastructure, Facilities and Equipment			
1) Basic Infrastructure	• Insufficient basic infrastructure in many rural and plantation schools • Lack of or poor facilities in Type 1C, Type 2, and Type 3 schools • Lack of teacher accommodation	• Many low quality classrooms and basic facilities still exist • Limited number of 'activity' rooms in Type 2 and Type 3 schools	• Lack of systematic maintenance budget and plan in many schools • Slow implementation of upgrading plans for schools

2) S/M Lab and Library	• Inadequate science labs • Lack of or poor quality O-Level labs • Poor or no libraries in rural and plantation schools	• Many low standard science laboratories • Poor library facilities • Some schools without ICT facilities	• Lack of systematic maintenance budget and plan in many schools
3) Equipment (incl. Facility for ICT)	• Lack of office equipment in many rural and plantation schools • Lack of computers in Type 1C, Type 2 and Type 3 schools	• Lack of suitable ICT materials in science and maths	• Overlapping functions of CLCs, CRCs, ICT centres • Shortage of trained people for maintenance of computers and facilities • Lack of funding for maintenance, technical support fro ICT

Appendix 1-1

School Survey

APPENDIX 1-1 SCHOOL SURVEY

1 Objectives and Methodology

1.1 Objectives

The objectives of the School Survey are:

- To understand the current educational situations at school level;
- To identify problems and constraints; and
- To make a comparative analysis of the educational situations by school type, location and province.

1.2 Approach and Methodology

The School Survey was carried out during January to February in 2003 by means of interview survey to principals and/or other appropriate representatives of schools. The JICA Study Team together with the CP Team selected 144 schools island-wide with a fair distribution by type, location and province. These schools surveyed include schools assisted by JICA, WB and ADB, as well as schools recommended by the NIE. Furthermore, 10 private schools are also included.

The schools surveyed do not necessarily represent each category of school in Sri Lanka, since the total number of the schools are less than 1.5% of all the schools in the country and schools with donor assistance are intentionally included. In addition, it was difficult to collect statistical information in some schools. Keeping these constraints of the School Survey in mind, the analysis was made to gain a picture of the current educational situations in the country.

2 Findings and Analysis

2.1 Major Findings

(1) Sample Population of Schools Surveyed

A distribution of schools surveyed is shown in Table 2.1. The total enrolment of the public schools surveyed is shown in Table 2.2.

Table 2.1 Distribution of Schools Surveyed

Type	1AB	1C	2	3	Total
Urban	35	11	9	6	**61**
Rural	7	18	15	7	**47**
Plantation	2	3	3	2	**10**
Conflict	6	3	5	2	**16**
Private	7	1	2	0	**10**
Total	**57**	**36**	**34**	**17**	**144**

Province	1AB	1C	2	3	Total
WP	11	7	4	4	**26**
CP	8	4	3	3	**18**
SP	8	2	5	1	**16**
NE	7	3	5	2	**17**
NWP	5	4	4	2	**15**
NCP	4	3	4	2	**13**
UVA	4	5	2	1	**12**
SAB	3	7	5	2	**17**
Total	**50**	**35**	**32**	**17**	**134**

Ownership	1AB	1C	2	3	Total
National	25	1			**26**
Provincial	25	34	32	17	**108**
Private	7	1	2	0	**10**
Total	**57**	**36**	**34**	**17**	**144**

Note: Total number of schools surveyed are 144, while those excluding private schools are 134.
Source: JICA Study Team

Table 2.2 Total Enrolment of the Public Schools surveyed

	Grade														student/	No. of
	1	2	3	4	5	6	7	8	9	10	11	12	13	Total	school	schools
1AB	5,407	5,514	5,417	5,379	5,663	9,411	9,002	9,271	9,256	9,471	10,563	9,206	11,032	104,592	2,092	50
1C	2,091	2,113	2,041	2,070	2,136	2,387	2,198	2,209	2,008	2,050	2,448	755	836	25,342	724	35
Type 2	1,254	1,537	1,502	1,427	1,447	1,236	1,188	1,104	1,029	830	880	0	0	13,434	420	32
Type 3	1,124	1,064	1,110	1,097	1,050	78	73	29	25	0	0	0	0	5,650	332	17
Total	**9,876**	**10,228**	**10,070**	**9,973**	**10,296**	**13,112**	**12,461**	**12,613**	**12,318**	**12,351**	**13,891**	**9,961**	**11,868**	**149,018**	**1,112**	**134**

Source: JICA Study Team

(2) Enrolment in the Science Stream in A-Level

Of the total 39% of students enrolled in the science stream island-wide, 43% of students enrolled in urban schools are in the science stream, while less science students in other areas, particularly plantation areas are enrolled, as shown in Table 2.3. More female students are enrolled in the science stream except in rural schools.

Table 2.3 Enrolment of Science, Commerce and Arts in A-Level

	Shares of enrolment			Shares of Girl		
	Science	Commerce	Arts	Science	Commerce	Arts
Urban	43%	29%	28%	53%	48%	71%
Rural	29%	30%	41%	44%	44%	57%
Plantation	7%	52%	41%	100%	83%	89%
Conflict	31%	29%	40%	71%	56%	71%
Private	30%	38%	31%	64%	71%	79%
Total	**39%**	**30%**	**31%**	**55%**	**51%**	**70%**

Source: JICA Study Team

(3) Pass Rates

Table 2.4 shows that the pass rates of the private schools surveyed are extremely high in grade 5 scholarship and O-Level examinations and are relatively high in the A-Level examination. Pass rates of the schools located in conflict area are

significantly high in the A-Level examination, which might imply that only clever students can be enrolled in A-Level due to limited school capacity. Schools located in rural and plantation areas had lower pass rates in all levels. Schools in Uva and Sabaragamuwa show lower pass rates at the A-Level examination, which indicates poor educational environments in those remote areas.

The average pass rates of schools surveyed are higher in examinations of scholarship and O-Level than the national average, while they are lower in A-Level examination except mathematics. This is because pass rates of the national average include repeaters, while those of school surveyed do not.

Table 2.4 Pass Rates by Location and Province

		Pass rate in 2001 (%)						
			O-Level		A-Level			
		Scholarship	Science	Math	Physics	Chemistry	Biology	Math
Location	Urban	13	64	55	60	44	65	60
	Rural	4	45	32	49	42	62	55
	Plantation	6	41	35	42	27	N.A.	N.A.
	Conflict	15	55	50	71	60	84	67
	Private	17	87	80	68	58	67	63
	Average	**10**	**58**	**49**	**61**	**47**	**67**	**61**
Province (exclude Private)	WP	7	62	49	60	47	67	82
	CP	9	55	50	59	45	73	50
	SP	7	62	49	60	48	66	48
	NE	15	55	54	71	58	86	67
	NWP	14	62	59	68	53	68	47
	NCP	14	52	41	67	47	56	52
	UVA	14	61	49	39	22	51	52
	SAB	3	41	30	44	26	42	43
	Average	**10**	**56**	**47**	**61**	**45**	**67**	**61**
	National average	**8**	**54**	**44**	**69**	**53**	**75**	**52**

Source: *Statistical Handbook 1999-2001*, Research & Development Branch, National Evaluation & Testing Service, Department of Examinations
JICA Study Team

(4) Basic Infrastructure

Table 2.5 shows the share of schools who responded to "Good" and "Average" with regard to 25 basic infrastructure items. Toilet, telephone line and teachers' accommodation are the critical constraints in general[1]. Science labs and library are at acceptable levels in Type 1AB and 1C schools, but not in Type 2 and 3 schools. Type 1AB schools have relatively good basic infrastructure, followed

[1] Although student accommodation has the lowest average point, many schools do not need this facility and therefore did not tick "Good" nor "Average", but "Not Available". Same for mathematics labs and workshops.

by Type 1C, whilst Type 2 and 3 schools have poor infrastructure. Table 1.2.6 shows imbalance by location, indicating that schools in plantation and conflict areas have poor basic infrastructure facilities.

Table 2.5 Basic Infrastructure by School Type

			Share of schools responded to Good and Average				
			1AB	1C	2	3	**Average**
1	Class rooms	Floor	89%	89%	77%	94%	**87%**
2		Wall	95%	89%	86%	88%	**90%**
3		Ceiling	49%	22%	20%	35%	**34%**
4		Doors	60%	58%	49%	59%	**57%**
5		Windows	60%	51%	51%	47%	**54%**
6		Lockable room	60%	72%	57%	76%	**64%**
7		Locker	60%	58%	54%	59%	**58%**
8	Toilet	For staff	58%	47%	40%	42%	**49%**
9		For boys	35%	44%	37%	53%	**40%**
10		For girls	44%	50%	46%	59%	**48%**
11	Water supply	Tap water	84%	61%	31%	47%	**61%**
12		Water from well	32%	36%	26%	24%	**30%**
13	Power supply		89%	78%	54%	47%	**73%**
14	Lights		74%	50%	40%	53%	**57%**
15	Access road		79%	75%	74%	65%	**75%**
16	Public transport		84%	78%	57%	41%	**71%**
17	Tel. line		68%	67%	24%	19%	**52%**
18	Science labs		84%	67%	26%	20%	**59%**
19	Mathematics labs.		24%	6%	6%	7%	**13%**
20	Library		84%	69%	35%	13%	**61%**
21	Workshop		48%	12%	3%	7%	**24%**
22	Playground		50%	61%	41%	27%	**48%**
23	Canteen		58%	31%	9%	7%	**34%**
24	Accommodation	Teachers	25%	3%	15%	13%	**15%**
25		Students	31%	0%	3%	0%	**12%**

Source: JICA Study Team

Table 2.6 Basic Infrastructure by Location

Location	Index
Urban	2.25
Rural	1.86
Plantation	1.80
Conflict	1.74
Private	2.70
Average	**2.07**

Note: Index: 3 for Good, 2 for Average, 1 for Poor and 0 for Not Available
Source: JICA Study Team

(5) Teaching Facilities

Table 2.7 shows the share of schools that responded to "Good" and "Average" with regard to 20 teaching facility items. Many schools replied "Poor" for teaching aids, desk & chair and blackboard. As for laboratory facilities, the majority are in relatively good condition, except for gas and laboratory furniture. Computer and VCRs are in good or average condition in 33% and 42% of schools, respectively. Table 2.8 shows the imbalance of teaching facilities by type, location, indicating that Type 2 and 3 schools. Schools in plantation and conflict areas and schools in North East Province are poorly equipped with teaching facilities.

Table 2.7 Teaching Facilities

		% of Good & Average
Basic Teaching Facilities	Racks & cupboards	10%
	Teaching aids	20%
	Desk& chair	28%
	Blackboard	34%
Laboratories	Gas	29%
	Lab. Furniture	26%
	Sinks	52%
	Lab. cupboard	56%
	Water	63%
	Finished floor	66%
	Finished wall	70%
	Sc. Equipment	61%
Multimedia	Projectors	28%
	Racks & stand	31%
	Computers	33%
	VCRs	42%
	TV sets	46%
	Calculators	54%

Source: JICA Study Team

Table 2.8 Teaching Facilities by Type, Location and Province

Type	*Index*
1AB	1.89
1C	1.56
Type 2	1.17
Type3	0.90
Total	**1.53**

Location	*Index*
Urban	1.80
Rural	1.40
Plantation	1.00
Conflict	0.87
Private	1.83
Total	**1.53**

Province	*Index*
WP	1.71
CP	1.50
SP	1.77
NE	0.90
NWP	1.59
NCP	1.41
UVA	1.47
SAB	1.62
Total	**1.53**

Note: Index: 3 for Good, 2 for Average, 1 for Poor and 0 for Not Available
Source: JICA Study Team

(6) Overall Evaluation of the Education System

Table 2.9 gives an overall evaluation of the education system by schools surveyed. Schools were asked to evaluate 15 factors by ticking "Very positive", "Positive", "Average", "Below Average" and "Negative".

As for administration, schools in the conflict area gave higher marks for all factors, while schools in the plantation area gave the lowest. Around 60% of schools are satisfied with support from the Zonal Office and In-Service Advisers. Type 1AB schools and schools in urban area marked relatively higher for all factors, which implies imbalance in administrative support.

With regard to schools & classrooms, only 45% of schools provided positive responses on curriculum. Although 58% of schools are satisfied with textbooks, only around 40% of schools are satisfied with teaching materials and equipment, with particularly low levels of evaluation given by schools in plantation and conflict areas. Availability of computers is extremely limited in schools of Type 1C, 2 and 3 and schools in rural and conflict areas.

For the school community category, Type 1AB schools, private schools and schools in plantation areas gave higher marks to students' interests and parents' involvement. Private schools showed higher marks on community involvement, followed by Type 1AB schools. Very limited cooperative relationships seem to exist with the industrial sector.

Table 2.9 Overall Evaluation of the Education System

		Schools responded to Very Positive and Positive									
	Overall		Type				Location				
	Average index	All	1AB	1C	2	3	Urban	Rural	Plantation	Conflict	Private
Administration											
The Ministry	**2.3**	**46%**	52%	49%	34%	47%	46%	43%	20%	63%	20%
Provincial office	**2.3**	**42%**	42%	46%	44%	29%	41%	36%	10%	63%	30%
Zonal Office	**2.6**	**57%**	58%	54%	59%	53%	51%	57%	50%	63%	30%
Divisional office	**2.6**	**53%**	48%	51%	59%	59%	51%	55%	30%	56%	20%
Subject directors	**2.5**	**54%**	58%	51%	50%	53%	51%	43%	50%	69%	50%
In-service advisers	**2.6**	**62%**	68%	57%	59%	59%	61%	55%	40%	69%	50%
Schools & classrooms											
Curriculum suitability	**2.4**	**45%**	50%	40%	41%	47%	46%	38%	20%	44%	50%
Textbooks	**2.7**	**58%**	64%	49%	66%	47%	54%	57%	30%	50%	70%
Teaching material	**2.3**	**42%**	44%	46%	38%	35%	43%	43%	30%	13%	50%
Equipment	**2.2**	**37%**	40%	31%	38%	35%	39%	36%	20%	6%	50%
Computer	**1.0**	**14%**	36%	0%	3%	0%	16%	6%	20%	0%	40%
School community											
Student interests	**2.5**	**57%**	70%	43%	53%	59%	54%	45%	70%	50%	80%
Parent involvement	**2.3**	**51%**	60%	37%	53%	47%	44%	45%	60%	44%	70%
Community involvement	**2.2**	**46%**	56%	34%	44%	41%	43%	36%	40%	44%	70%
Interest by industrial sector	**1.0**	**10%**	14%	6%	9%	12%	7%	9%	0%	19%	30%

Note: For Index, 4 for very positive, 3 for positive, 2 for average and 1 for negative
Source: JICA Study Team

2.2 Analysis of the Results

(1) Gap between Urban and Rural Areas

A comparative analysis was made to clarify a gap in educational conditions between urban and rural areas, as shown in Table 2.10. The results of the analysis are summarized below.

- Ratio of enrolment in science course among all A-Level courses is lower in rural area. A number of combined reasons could be considered: these are 1) school capacity is limited, 2) science textbooks are expensive and textbooks are not free in A-Level, 3) most available science textbooks are in English, and students in rural areas have limited capacity in English language and 4) the shortage of qualified teachers and poor teaching facilities are more significant in rural areas.
- Pass rates in rural area are lower in both subjects at both O-Level and A-Level. This is because 1) the quality of education is lower in terms of facilities and teachers, 2) a number of high-achieving students from wealthy families move to urban schools and 3) private tuition systems are not available and/or are of poor quality.
- Basic infrastructure, teaching facilities and computers are poor in rural areas.

- Differences in the quality of teachers become greater in higher grades, according to principals interviewed. This is caused by a lack of deployment of teachers. One of critical constraints in assigning teachers to rural areas is the lack of teachers' accommodation.
- Schools in rural area provide more additional school hours in primary and O-Level in spite of difficult conditions. This is partly because only limited private tuition systems are available in rural areas. Classroom records are well maintained and fund raising is much higher in urban areas.
- Schools in rural area appreciate the support of the Zonal Office more, which may imply that these schools need more external support. However, support by In-service advisors is appreciated more in urban area. Computer facilities are significantly lacking in rural areas at schools.

Table 2.10 Gap Analysis between Urban and Rural Areas

				Urban	Rural	Plantation	Conflict
Present condition							
	Shares of enrolment in science cours	A-Level	%	43	29	7	31
Output							
	Pass rates	O-Level: Science	%	64	45	41	55
		O-Level: Mathematics	%	55	32	35	50
		A-Level: Physics	%	60	49	42	71
		A-Level: Mathematics	%	60	55	N.A.	67
Input: hardware							
	Basic infrastructure		Index	2.25	1.86	1.8	1.74
	Teaching facilities		Index	1.8	1.4	1	0.87
	Schools with computer		%	62	28	20	53
Input: human ware							
	Teachers at appropriate level of teaching*	Grade 1-5	%	77	72	85	68
		Grade 6-9	%	82	71	78	79
		Grade 10-11	%	83	71	71	86
		Grade 12-13	%	76	69	N.A.	91
Input: Management							
	Additional school hours	Grade 5	hours/week	4.8	8.8	7.4	9.2
		Grade 10-11	hours/week	6.1	6.8	6.8	4.5
		Grade 12-13	hours/week	5.7	5.4	6	4.8
	Classroom records**		%	59	32	70	38
	Fund raising		Rps/student/year	179	105	50	53
Overall evaluation by school**							
	Evaluation on Zonal Office		%	51	57	50	63
	Evaluation on In-service advisor		%	61	55	40	69
	Evaluation on equipment		%	39	36	20	6
	Evaluation on computer		%	16	6	20	0

Note
* Estimation by principals on ratio of teachers at appropriate level of teaching
** Ratio of schools answered 100% of classes properly maintain
*** Ratio of schools responded to Very Positive and Positive
Source: JICA Study Team

(2) Activities by Participatory Approach

10 schools surveyed reported their ongoing activities to improve quality education and school management by a systematic participatory approach, as summarized in Table 2.11. These include operation of remedial classes, joint monitoring of teaching progress with students and parents, cooperative activities to improve the educational environment with students, parents and communities, and activities to make efficient use of laboratories.

Table 2.12 shows the changes in O-Level pass rates of these 10 schools from 1997 to 2001. Average pass rates of these schools are significantly high, when compared to the national average. This indicates that schools with active participatory approaches tend to perform highly in academic achievement. Furthermore, in spite of a higher level of pass rates in 1997, these schools made further improvement in their pass rates in both science and mathematics. Their active participatory approach could be one of the factors contributing to this remarkable improvement in pass rates.

Table 2.11 Activities Reported for Quality Education

	School	Activities reported for quality education
1	Maliyadewa School	Weekly meetings called Achievement Study Circle to monitor achievement together with teachers and students
		Additional hours after school for teachers to prepare lessens for the following days and the required facilities to be supplied by the school
2	D.S. Senanayaka M.V.	Circle to make a full use of science laboratories for teachers and students by arranging time tables
3	Muruthawela K.V.	Joint activities to improve physical school environment after school hours in cooperation with students and teachers
4	Gothami B.M.V.	Activities of remedial teaching in mathematics for weaker students
5	Sangamiththa B.M.V.	One additional hours before and after school to discuss student problems and difficulties
6	Mahinda College	Joint activities called Clubs for Pupils to monitor progress of classes by teachers and senior students in order to cover the entire syllabus in O/L and A/L
7	St. Aloysius V.	Student-led organizations to provide communities with various services
		Display results of examination on school notice board to enable monitoring the progress by teachers, students and parents
8	Vishaka M.V.	Regular meetings with parents of Grade 5 students to discuss how to improve quality in teaching and learning
9	Sri Wajiragnana M.V.	Rearrangement of the school timetable for extra hours in the morning for lessons to improve language speech skills
10	Kingswood V.	Joint activities among teachers, students and parents to discuss achievement in learning, which is called Achievement Study Circle
		Joint activities by groups of students for improvement of school physical environment

Source: JICA Study Team

Table 2.12 Schools with Active Participatory Approach and Their Pass Rates

			O-Level Pass Rate from 1997 to 2001					
			Science			Mathematics		
	Name of School	Type	1997	2001	Change	1997	2001	Change
1	Co/Gothami BV	1AB	81	95	14	88	92	4
2	G/Sangamiththa BV	1AB	86	94	8	83	93	10
3	G/ Mahinda V	1AB	82	92	10	79	86	8
4	R/ St. Alloysius V	1AB	59	77	18	55	52	-2
5	K/ Maliyadewa BV	1AB	95	97	2	94	96	2
6	Kingswood V	1AB	89	92	3	80	86	7
7	Visaka BMV	1AB	52	86	34	55	71	16
8	M/I/ DS Senanayaka MV	1C	50	64	14	48	57	9
9	Thennakoon MV	1C	36	35	-2	35	20	-15
10	Sri Wajiragnana MV	1C	18	35	17	24	34	10
11	Muruthawela KV	2	21	54	33	21	32	11
	Average		**61**	**75**	**14**	**60**	**65**	**5**
	National Average		**39**	**54**	**15**	**41**	**44**	**3**

Source: JICA Study Team

(3) Correlation between Pass Rates and Educational Inputs

Table 2.13 shows a correlation between pass rates and selected educational inputs. Schools were ranked by average pass rates for these three years and grouped into three, namely top 1/3, mid 1/3 and bottom 1/3. For each group of schools, indicators of selected 7 educational inputs, i.e., extra tuition, basic infrastructure, homework, quiz, research works, additional school hours and Kaize activities, were calculated and compared to those of other groups. The results of the analysis are summarized below.

- Pass rates of science and mathematics in O-Level have a strong correlation with the ratio of students going to extra tuition systems. But, no significant correlation was observed in case of A-Level. This is because almost all A-Level students are going to extra tuition systems and therefore no meaningful difference among the groups exist.
- Pass rates of science and mathematics in O-Level have a clear correlation with indicators of basic infrastructure. But, no correlation for A-Level was evident. This is because most Type 1AB schools have a satisfactory level of basic infrastructure and therefore no significant difference among the groups exists.
- As for homework, quiz and research works, no meaningful correlation with pass rates was observed. This is because all schools have similar levels of these activities.

- Pass rates in all 4 examination results show clear correlation with additional school hours. This is because the activities are to prepare for O-Level and A-Level examination and therefore are directly related to pass rates.
- There exists some correlation between pass rates and activities by participatory approaches to improve quality education and school management. It was discovered that all top schools in A-Level physics are active in participatory approaches.

Table 2.13 Correlation between Pass Rates and Educational Inputs

			Unit	A-Level (Type 1AB)								O-Level (Type 1AB, 1C, 2)							
				Physics				Mathematics				Science				Mathematics			
				Top 1/3	Mid 1/3	Bottom 1/3	Correlation	Top 1/3	Mid 1/3	Bottom 1/3	Correlation	Top 1/3	Mid 1/3	Bottom 1/3	Correlation	Top 1/3	Mid 1/3	Bottom 1/3	Correlation
No. of Schools				12	12	11		9	9	9		33	33	31		32	32	31	
OUTPUT	Average pass rate for 99-01		%	77	59	39		75	50	28		85	55	35		83	47	27	
INPUTS																			
	1	Extra tuition systems	Index scale 1-5	4.9	4.3	4.5	x	4.8	4.9	4.8		3.8	3.3	2.4	xx	3.9	3.5	2.2	xx
	2	Basic infrastructure	No. of items	17	15	15	x	16	16	16		16	13	10	xx	16	12	12	xx
	3	Homework	Scale 1-5	4.8	4.9	4.6	x	5.0	4.6	4.8	x	4.8	4.8	4.5	x	4.7	4.9	4.7	
	4	Quiz	Scale 1-5	3.1	3.7	3.3		4.0	3.2	3.3	x	3.5	3.7	3.9		3.4	3.6	3.9	
	5	Research works	%	22	23	32		17	11	15	x	30	25	29		21	20	20	
	6	Additional school hours	Hours/week	6.0	5.7	5.1	xx	6.3	6.3	5.6	xx	6.4	6.3	5.5	xx	6.5	5.8	5.8	xx
	7	Participatory approach	%	100	75	75	xx	80	80	83		85	72	76	x	79	89	63	x

Remarks
1 Average ratio of students going to extra tuition: 5 for more than 80%, 4 for 79-60%, 3 for 59-40%, 2 for 39-20% and 1 for below 19%.
2 Average number of responds of "Good" and "Average" out of 25 items of basic infrastructure
3 Mean index of homework: 5 for daily, 4 for weekly, 3 for monthly, 2 for termly and 1 for yearly
4 Mean index of quiz: 5 for daily, 4 for weekly, 3 for monthly, 2 for termly and 1 for yearly
5 Average proportion of research works in the total teaching hours
6 Average of additional school hours
7 Share of schools with activities of participatory approach

Correlation
xx Strong positive correlation
x Some correlation
blank No or negative correlation

Note: Top 1/3 means schools ranked in a top 33% in terms of average pass rates for the last 3 years.
Source: School Survey, JICA Study Team

3 Mapping

In order to indicate differences in pass rates and indicators of educational inputs among provinces, selected data of the schools surveyed are mapped in Figure 3.1 and Figure 3.2, respectively.

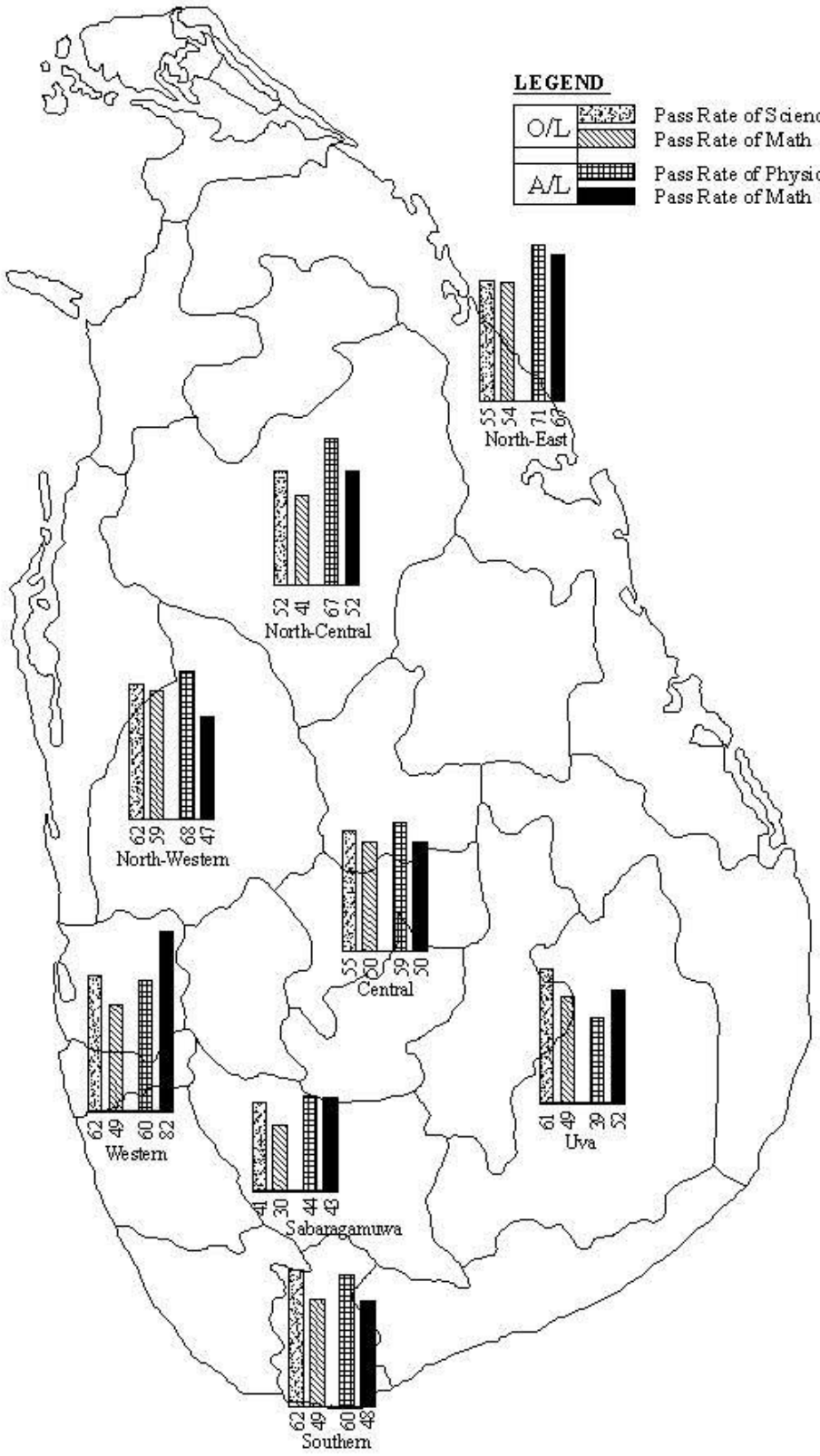


Figure 3.1 Mapping of Pass Rates by Province

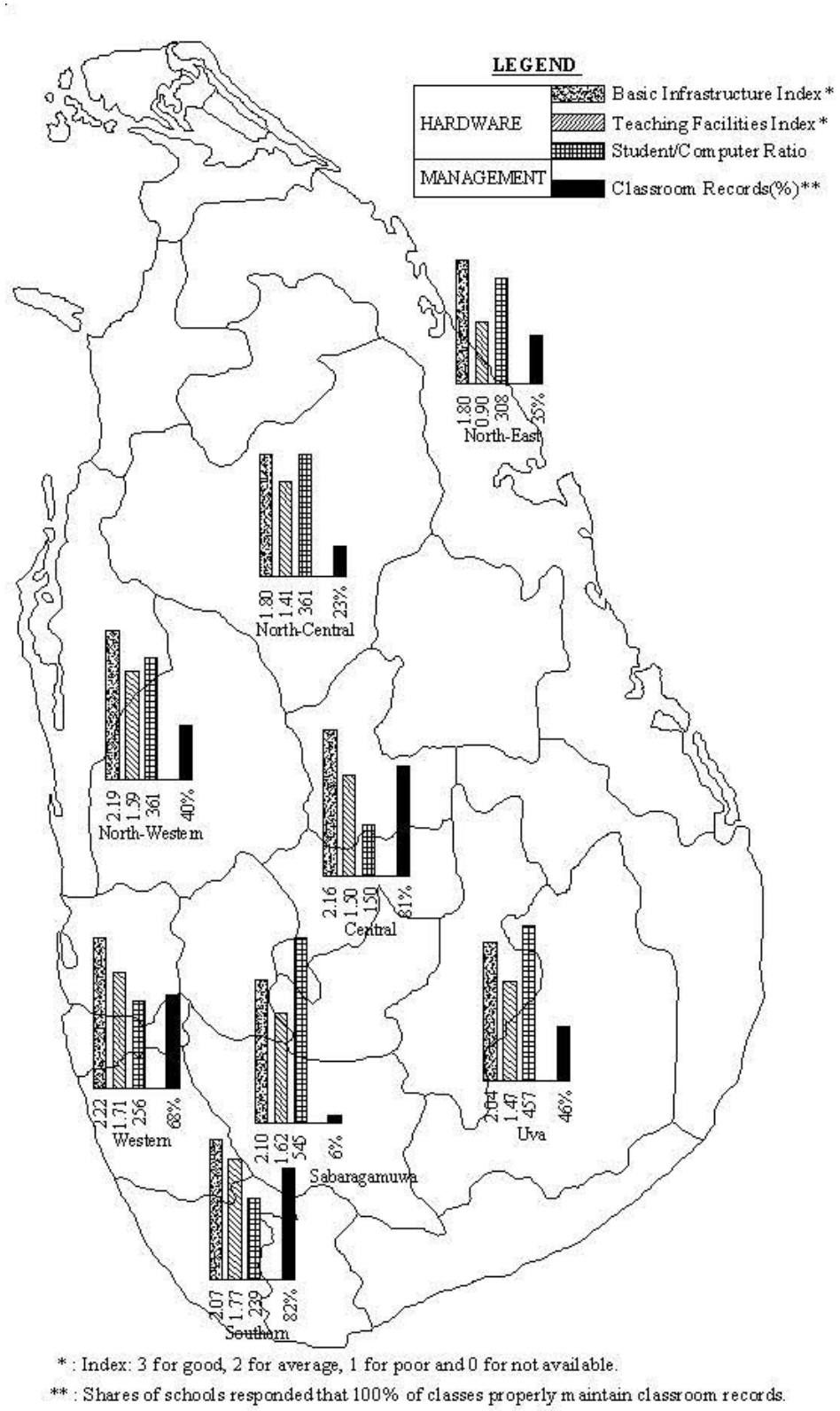


Figure 3.2 Mapping of Indicators of Educational Inputs by Province

Appendix 1-2

Survey on Industry and Manpower

APPENDIX 1-2 SURVEY ON INDUSTRY AND MANPOWER

A questionnaire survey [1] on industry related organizations (IRO) and representative companies (RCO) was conducted in order to obtain overview information and needs for science and mathematics education in the country.

1 Economic Prospect and Prospective Industry

1.1 Economic Prospect

The general view of the future economic prospect for Sri Lanka was relatively positive. In the questionnaire survey, 70% of IROs and 78% of RCOs responded as "Very Good" or "Good" to the question asking about the future economic prospect in the country.

Table 1.1 Economic Prospect

	IRO	RCO
Question	What is future prospect for industries?	What is the future prospect for your company?
1. Very good	0%	39%
2. Good	70%	39%
3. Bad	30%	0%
4. Very Bad	0%	0%
5. Cannot tell	0%	22%
Total	100%	100%

Source: Sample Survey on Industry and Manpower, JICA Study Team

1.2 Prospective Industry

In the questionnaire survey, IROs were asked to rank which industries had the most prospects for future. IT and tourism industries were selected as the best prospective industries. Services industry was next.

1 The questionnaire survey was conducted in February 2003. 10 industry related organizations, both Government and private, and 18 companies from various sectors such as communication/IT, manufacturing, etc., were selected as samples. List of samples are attached.

Table 1.2 Prospective Industry (IRO)

Industry	Percentage		
	1st rank	2nd rank	3rd rank
1. Agriculture	0%	0%	40%
2. Manufacturing	10%	0%	10%
3. Construction	0%	0%	10%
4. Trade	0%	20%	0%
5. Transport	0%	0%	0%
6. Communication / IT	30%	20%	20%
7. Finance	0%	0%	0%
8. Services	20%	20%	0%
9. Tourism	20%	40%	10%
10. Foreign Employment	20%	0%	10%

Source: Sample Survey on Industry and Manpower, JICA Study Team

When asked which potential industry could expect foreign investment, high rating was given to the IT industry followed by manufacturing, construction, and transport industries. Relatively low rating was given for the services industry. Expectations for the IT and tourism industries reflect national development policy.

Table 1.3 Industry Expecting Foreign Investment (IRO)

Industry	Percentage		
	1st rank	2nd rank	3rd rank
1. Agriculture	0%	0%	20%
2. Manufacturing	30%	0%	10%
3. Construction	20%	10%	10%
4. Trade	0%	0%	0%
5. Transport	20%	10%	10%
6. Communication / IT	30%	30%	20%
7. Finance	0%	0%	0%
8. Services	0%	30%	0%
9. Tourism	0%	20%	30%

Source: Sample Survey on Industry and Manpower, JICA Study Team

2 Demand for Manpower

2.1 Demand for Academic Qualifications

Demand for manpower in terms of academic qualifications was investigated during the questionnaire survey. IROs expect demand for higher qualifications such as diploma, bachelor degree or higher, while no demand for below diploma level.

Table 2.1 Demand for Qualification (IRO)

Qualification	%
1. Post Graduate	10%
2. Bachelor degree	40%
3. Diploma / Certificate	50%
4. A-Level only	0%
5. O-Level or below	0%

Source: Sample Survey on Industry and Manpower, JICA Study Team

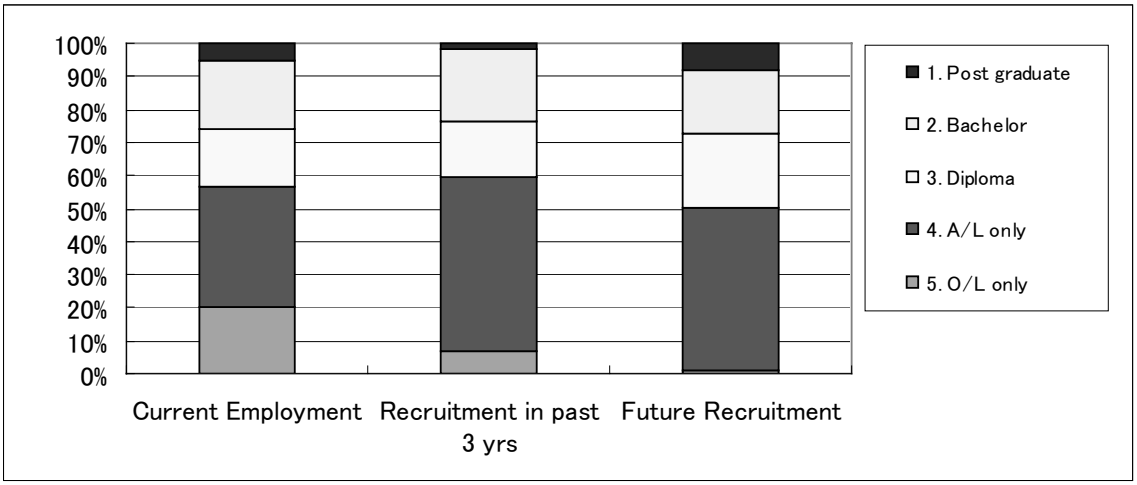
To survey the actual demand from the representative companies, structure of current employees, recruitment record in past three years, and future recruitment plan were investigated. As indicated in Table 2.2, the percentage of recruitment for O-Level has been declining to 7% and will decline to 1% in future from the current situation of 20%. This indicates that in Sri Lanka today A-Level qualifications have become the minimum requirement for jobseekers.

Table 2.2 Demand for Qualification

	Current Employment	Recruitment in past 3 yrs	Future recruitment
1. Post graduate	5%	2%	8%
2. Bachelor	21%	22%	19%
3. Diploma	17%	17%	23%
4. A-Level only	36%	53%	49%
5. O-Level only	20%	7%	1%
Total	100%	100%	100%

Source: Sample Survey on Industry and Manpower, JICA Study Team

In Figure 2.1, the transitional trend of academic qualifications is recorded. Considering the expected transition of national industry in the future, demand for A-Level qualifications in science/mathematics is projected to increase further.



Source: Sample Survey on Industry and Manpower, JICA Study Team

Figure 2.1 Demand for Qualification (RCO)

Table 2.3 shows the future recruitment plan for science/mathematics and arts/commerce graduates at A-Level for the RCOs. As indicated in Table 2.3, graduates from science/mathematics stream enjoy higher demand with diploma level qualifications or higher, but not with A-Level only. This indicates that there is a certain demand for specialized qualification in the area of engineering /technology more than in administration/commerce area, while demand for general qualification (GCE A/L) has no significant difference between them.

Table 2.3 Demand for Science/Mathematics Graduates and Art/Commerce Graduate

	A-Level in math/science		A-Level in art/ commerce		Total	
	No.	%	No.	%	No.	%
1. Post graduate	9	6%	2	1%	10	7%
2. Bachelor	25	16%	8	5%	33	21%
3. Diploma	20	13%	10	6%	30	19%
4. A-Level only	39	25%	44	28%	83	53%
Total	93	59%	64	41%	156	100%

Source: Sample Survey on Industry and Manpower, JICA Study Team

2.2 Qualitative Aspects

Demand for manpower in terms of qualitative aspects was also investigated in the questionnaire survey.

In Table 2.4, RCOs were asked to report which aspects they considered important for recruitment of staff. As predicted, academic qualifications was their top priority followed by English language skill, occupational skills, job carrier, and computer literacy.

Table 2.4 Important Aspects for Recruitment (RCO)

Important Aspect	%
Personality	22%
English language skill	44%
Family background	28%
Team work	6%
Academic qualification	50%
Occupational skill	44%
Job carrier (past experience)	39%
Computer literacy	39%

Source: Sample Survey on Industry and Manpower, JICA Study Team

Table 2.5 shows a comparison of qualitative aspects that both IROs and RCOs consider important. IRO considered practical application, English language skill, and communication skill are the most important aspects while RCOs considered

communication skill, teamwork, and practical application are requirements for employees.

Table 2.5 Qualitative Aspect for Employees

Sample Group	IRO						RCO		
Question	Most important aspect			Aspect lacking in			Aspect required		
Aspect	1st rank	2nd rank	3rd rank	1st rank	2nd rank	3rd rank	1st rank	2nd rank	3rd rank
1. Technical theory	10%	0%	0%	10%	0%	0%	0%	6%	0%
2. Practical application	50%	0%	0%	40%	0%	0%	28%	0%	6%
3. Basic engineering	0%	0%	0%	0%	0%	0%	0%	0%	0%
4. Managerial capacity	10%	10%	20%	10%	10%	10%	0%	0%	0%
5. English language skill	20%	20%	0%	20%	20%	10%	11%	17%	0%
6. Computer literacy	0%	0%	40%	0%	0%	30%	17%	6%	11%
7. Leadership	10%	10%	0%	20%	10%	10%	0%	6%	22%
8. Teamwork	0%	20%	20%	0%	20%	20%	11%	11%	39%
9. Communication skill	0%	40%	20%	0%	40%	20%	17%	33%	11%
10. Discipline	0%	0%	0%	0%	0%	0%	6%	17%	0%

Source: Sample Survey on Industry and Manpower, JICA Study Team

In Table 2.6, IROs were asked of their expectations from school education. Job related skills and English language skill were expected most.

Table 2.6 Expectation from School Education

Skills	1st rank	2nd rank
1. Technical theory	10%	10%
2. Job related skills	50%	30%
3. English language skill	40%	30%
4. Mgt. Orientation / Discipline	0%	10%
5. Communication / leadership	0%	20%

Source: Sample Survey on Industry and Manpower, JICA Study Team

3 Preliminary Assessment of Demand and Supply for A-Level Qualified

Most students do not join the labor market right after leaving A-Level, but seek higher education/training courses, etc. Besides, in many cases the demand from the market is not particularly toward A-Level qualification itself, but for higher qualifications including graduates from the tertiary education system. This fact makes estimates of demand and supply for the workforce for school leavers with A-Level science/mathematics background difficult. Because of this, preliminary assessments using available statistical data with some assumptions were conducted for analyzing future trends.

3.1 Demand Projection

According to the Labor Force Survey[2], the number of employed persons with qualifications of A-Level and above increased from 494,000 in 1993 to 936,000 in 2003 with an annual growth rate of 6.7%. Applying this growth rate, annual incremental employees with qualifications of A-Level and above in 2005 is estimated at approximately 66,000. Assuming that the proportion of recruitment of those with science/mathematics A-Level background is around 30%, approximately 22,000 school leavers with A-Level science/mathematics backgrounds will be needed in 2005.

3.2 Assessment

From the above, approximately 22,000 additional employees with A-Level science/mathematics backgrounds will be required in 2005. Considering that the number of qualified students for universities from science/mathematics stream was 17,965 in 2003, graduates from A-Level science/mathematics stream may become even short in order to fulfill the demand. As observed in the survey conducted by JICA Study Team, there is a steady trend that demand for persons with A-Level background is increasing in general. Therefore, in order to prepare for the future economic development, number of A-Level qualified students needs to be increased, while issues of mismatches between courses in tertiary education system and actual skills required by industries needs to be addressed.

Although the peace process is stagnating at present, growth of the economy of the country is still expected to accelerate in the future and demand for manpower will increase. Actual demand may easily exceed the above estimation and a strong need for the expansion of the A-Level science/mathematics stream may emerge in very near future.

[2] "Sri Lanka Labor Force Survey", the Department of Census and Statistics

FINAL REPORT
SUPPORTING REPORT

PART II PILOT PROJECT

THE MASTER PLAN STUDY FOR THE DEVELOPMENT OF SCIENCE AND MATHEMATICS IN THE PRIMARY AND SECONDARY LEVELS IN THE DEMOCRATIC SOCIALIST REPUBLIC OF SRI LANKA

FINAL REPORT: SUPPORTING REPORT
PART II PILOT PROJECT

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CHAPTER 1 DESIGN OF THE PILOT PROJECT

1.1 Objectives

The objectives of implementing the Pilot Project were:

- To identify and apply the school-based activities for improvement to the selected schools;
- To assess outcomes and their sustainability; and
- To incorporate results of the Pilot Project into the Master Plan.

1.2 Proposed Concept and Approach

1.2.1 Proposed Concept

The basic concept of the Pilot Project was to apply Educational Kaizen activities to the education sector. The Kaizen strategy is the most important concept in Japanese management, and is well known as one of the key factors for successful competitiveness in Japanese companies. Kaizen means continuous improvement involving everyone; top management, managers and workers. It was originally developed in the manufacturing sector, but now is applied in many sectors and in many countries. Kaizen activities include various methodologies of participatory approach such as 5S, suggestion system and Quality Control (QC) circle.

Based on the recognition that students are the customers in schools, the Pilot Project utilized the Educational Kaizen concept in order for schools to improve school management, quality of science and mathematics education and basic infrastructure/facilities.

The concept of Kaizen, as well as its application to education sector particularly to schools, is explained in an illustrated booklet attached (CD-ROM).

1.2.2 Approach to the Pilot Project

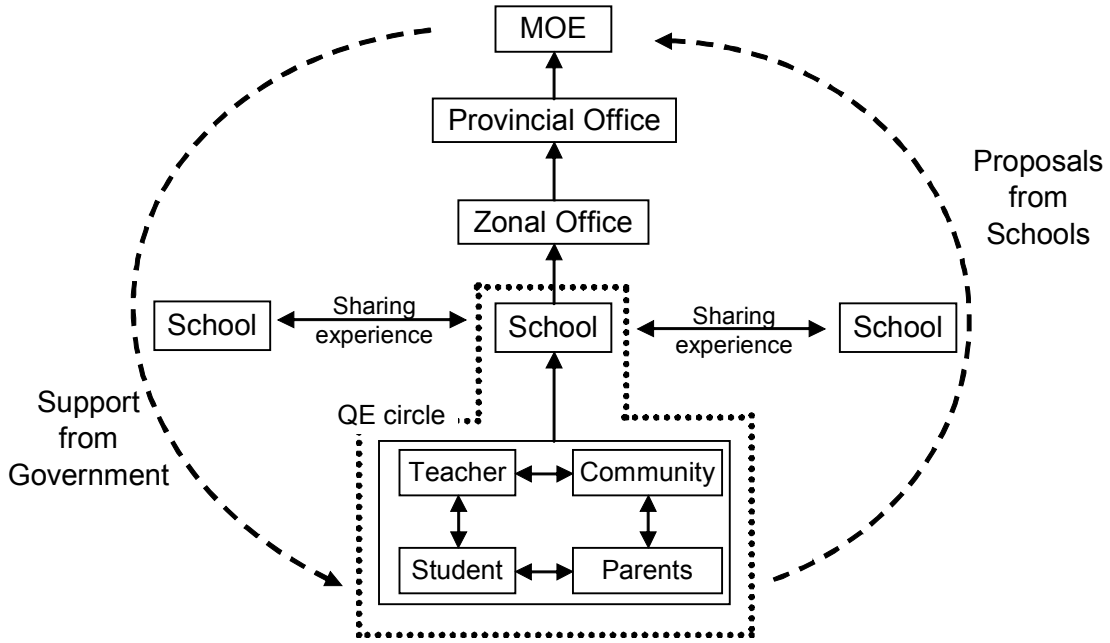
The Pilot Project was planned, implemented, monitored and evaluated on a school basis. Each pilot school formed several QE circles[1], depending on their needs. Each QE circle had individual tasks to be assigned by the school management. Educational Kaizen activities were implemented based on the initiative of QE circles, since members of QE circle know best what activities are most needed at their school. A QE circle consisted of teachers, parents and students of the pilot school as well as teachers and local government officers from outside the school community.

It is widely observed that facilities supplied by the Government are not always well matched to what are needed at school level. This unfavorable situation would

[1] "QE circle" stands for Quality Education circle, which is identical with Quality Control (QC) circle usually used in the industrial sector. Considering that Kaizen activities in the Pilot Project are implemented in the education sector, a word of QE circle is used in this report.

be eliminated by a school-based Educational Kaizen approach. It is also broadly perceived that the education provided by schools dose not exactly meet what the society expects. Such a mismatch should be minimized through joint activities of teachers and communities in QE circles.

Taking these situations into account, it was proposed that the high level decisions by MOE should be made based on lessons learned from Educational Kaizen activities initiated by QE circles. The budget should be planned to be allocated based on requirements from individual schools. The school-based Pilot Project was an attempt to introduce a bottom-up scheme in the education sector, as illustrated in Figure 1.2.1.



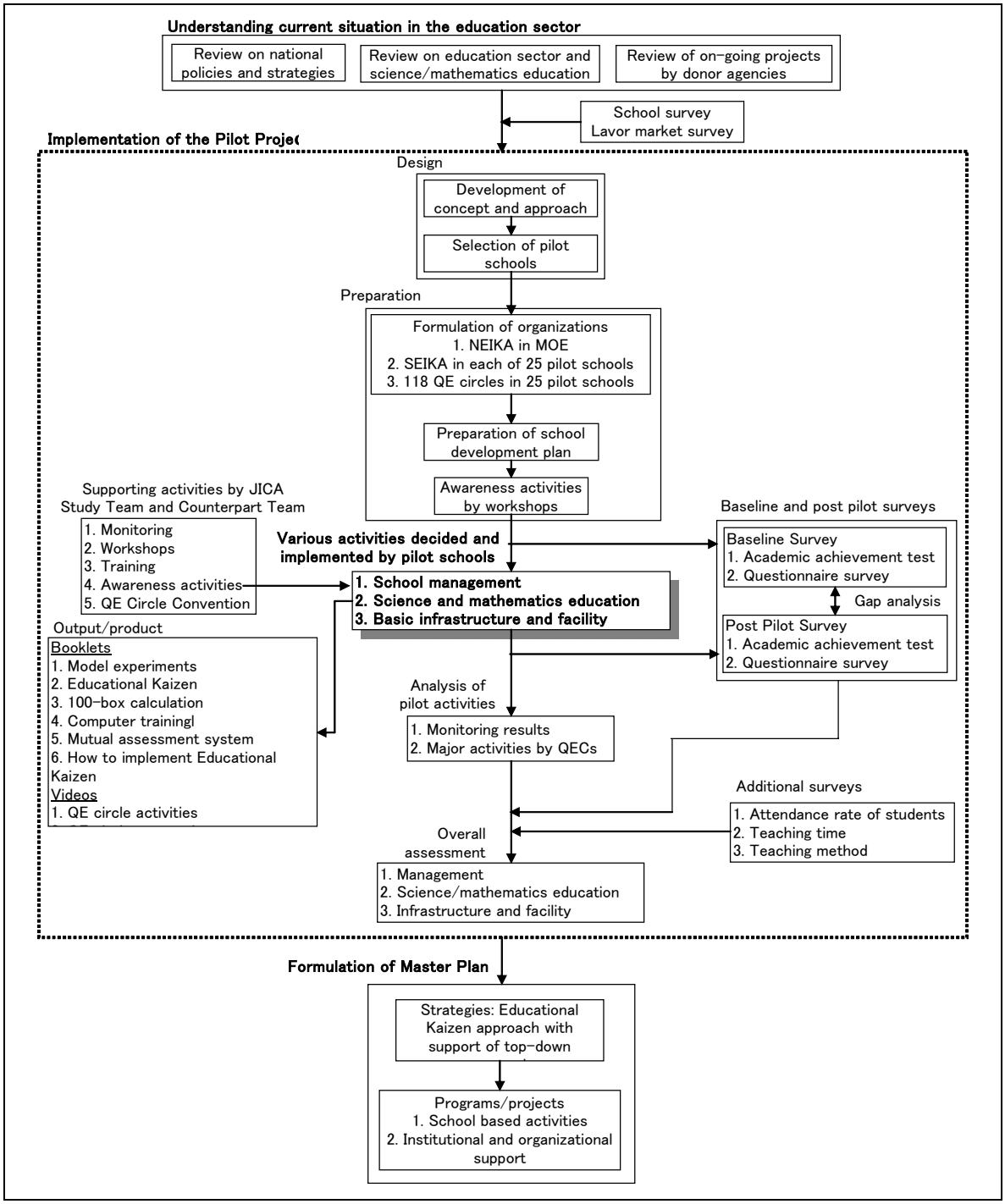
Source: JICA Study Team

Figure 1.2.1 School Based Approach

1.3 Overall Flow of the Pilot Project Implementation

The overall flow in implementing the Pilot Project is illustrated in Figure 1.3.1. Based on the understandings of current situation in the education sector in Sri Lanka, the Pilot Project was designed to prove that the school-based approach is one of the applicable and powerful strategies to improve the quality of education in science and mathematics.

In order to assess the impact by the Pilot Project, the Baseline Survey and Post Pilot Survey were conducted before and after the Pilot Project respectively. Through implementation of the Pilot Project, various outputs in the forms of booklets and video films were developed for dissemination of Educational Kaizen activities to all schools. The outcomes from the Pilot Project were incorporated in the Master Plan, based on the overall assessment and lessons learned.



Source: JICA Study Team

Figure 1.3.1 Overall Flow of Pilot Project Implementation

1.4 Selection of Pilot Schools

1.4.1 Selection Process and Criteria

The selection process of the pilot schools is as shown in Figure 1.4.1. First, 49 candidate schools were long-listed from: 1) schools in the School Survey conducted in January 2003; 2) schools visited by the JICA Study Team and the Counterpart Team; 3) schools recommended by MOE and NIE; and 4) schools

selected for the School Productivity Award 2002.[2]

Selection criteria for the long-listed candidate schools were: 1) performance of principals in managerial and educational leadership; 2) past efforts of the school to improve the educational environment; 3) cooperation with parents and OB/OGs; and 4) fair distribution by province, location and type.

Second, 25 schools were selected based on the evaluation of short proposals submitted by the 49 long-listed schools. Then, these 25 schools were finally selected as the pilot schools based on the evaluation of full proposals submitted by them.

		March	April	May	June	July	August	Sept.
	The JICA Study Team in Sri Lanka							
1	Long list of school candidates (49)							
2	Workshop for short proposal writing							
3	Development of short proposals							
4	Evaluation of short proposals							
5	Short list of school candidates (25)							
6	1st 2-Day Workshop for proposal writing							
7	Development of draft proposal							
8	School base workshops							
9	Submission of final proposal							
10	2nd 5-Day Workshop for final proposal							
11	Signing Agreement with pilot schools (25)							
12	First Disbursement of Fund							
13	Implementation of KAIZEN pilot projects							

Source: JICA Study Team

Figure 1.4.1 Selection Process of the Pilot School

Evaluation criteria of proposals submitted by the schools were: 1) impact on quality of education in science and mathematics; 2) impact on school management; 3) past efforts using a participatory approach; 4) proper selection of Educational Kaizen topics; 5) clear plan of proposed Educational Kaizen activities; and 6) the extent of community participation.

A joint evaluation team consisting of members of the JICA Study Team and the Counterpart Team worked together on the selection process, which was reported to MOE and JICA for the final approval.

1.4.2 Selected Pilot Schools

Location of the 25 selected pilot schools is shown in the Location Map and the pilot schools are listed in Table 1.4.1. The distribution of these schools by province, type and location is shown in Table 1.4.2.

[2] The School Productivity Award 2002 is a part of National Productivity Award 2002, organized by the Ministry of Employment & Labour. The objective is to inculcate in the minds of students the benefits that could be accrued by group activities for productivity and quality improvement.

Table 1.4.1 List of the 25 Pilot Schools

School ID					School Name	Enrolment
Ownership	Province	Type	Location	No.		
P	CP	1	S	1	K/Hindagala Maha Vidyalaya	600
P	CP	2	R	2	CP/GP/Rambukpitiya Maha Vidyalaya	598
P	CP	3	P	3	CP/N/St Andrews TV	65
P	CP	1	S	4	Mahaweli Maha Vidyalaya	889
N	NC	0	S	5	Ananda Balika National School	2,028
P	NC	2	R	6	A/Thammennapura Vidyalaya	298
P	NC	1	S	7	A/Mihintale Pathiraja Tennekoon Kanishta Vidyalaya	1,092
N	NE	0	U	8	St. Mary's College	1,786
N	NE	0	U	9	J/Vembadi Girls' High School	1,780
P	NE	0	S	10	J/Canagaratnam Madya Maha Vidyalaya	1,107
P	NW	0	S	11	NW/CH/Wen/ Girls College - Dankotuwa	1,670
P	NW	3	R	12	KU/Girl/Gonulla Kanishta Vidyalaya	100
N	NW	0	U	13	Maliyadeva Balika Vidyalaya	4,000
P	SB	2	R	14	Maduwanwela Sri Sarananda Vidyalaya	792
P	SB	2	R	15	R/Bala/Weli/Galpaya Vidyalaya	615
P	SB	2	P	16	KG/Golinda Tamil Kanista Vidyalaya	138
N	SP	0	R	17	H/Vijaya National College	711
N	SP	0	S	18	H/Rajapaksha Central College	3,594
P	SP	2	R	19	Muruthawela Kanishta Vidyalaya	435
P	UV	1	P	20	Poonagala Tamil Maha Vidyalaya	1,200
N	UV	0	U	21	MO/Dutugemunu Central College	2,311
P	WP	3	R	22	WP/GM/Imbulgoda Sunethradevi Kanishta Vidyalaya	320
N	WP	0	U	23	Isipathana College	4,214
P	WP	1	R	24	Minu/Katuwellegama Maha Vidyalaya	817
N	WP	0	U	25	Devi Balika Vidyalaya	2,100

Note: ***Ownership*** **N** = National **P** = Provincial
Type **0** = 1AB **1** = 1C **2** = Type 2 **3** = Type 3
Location **U** = Urban **S** = Semi-Urban **R** = Rural **P** = Plantation

Source: JICA Study Team

Table 1.4.2 Distribution of the Pilot Schools

Province	Type				Total
	1AB	1C	2	3	
Central	0	2	1	1	**4**
North Central	1	1	1	0	**3**
North Eastern	3	0	0	0	**3**
North Western	2	0	0	1	**3**
Sabaragamuwa	0	0	3	0	**3**
Southern	2	0	1	0	**3**
Uva	1	1	0	0	**2**
Western	2	1	0	1	**4**
Total	**11**	**5**	**6**	**3**	**25**

Location	Type				Total
	1AB	1C	2	3	
Urban	6	0	0	0	**6**
Semi-urban	4	3	0	0	**7**
Rural	1	1	5	2	**9**
Plantation	0	1	1	1	**3**
Total	**11**	**5**	**6**	**3**	**25**

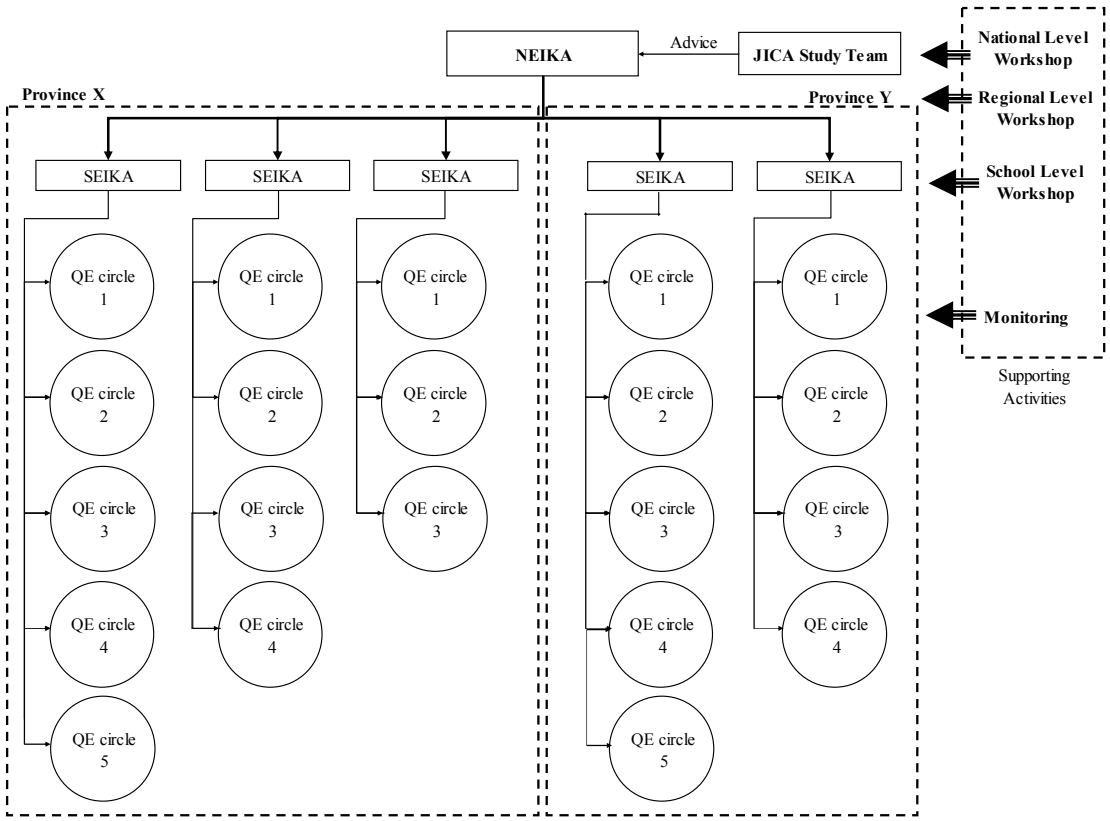
Source: JICA Study Team

CHAPTER 2 PREPARATION FOR THE PILOT PROJECT

2.1 Implementation Scheme

2.1.1 Overall Implementation Structure

An overall implementation structure for the Pilot Project is illustrated in Figure 2.1.1. The National Educational Initiative of Kaizen Activities (NEIKA) was established as a supervisory body in implementing the Pilot Project. The objectives of the NEIKA are to plan, to implement, to monitor and to evaluate the Pilot Project at the national level. In implementing the Pilot Project, a joint team consisting of NEIKA and the JICA Study Team was responsible for the selection of pilot schools and approval of the Educational Kaizen topics. The members consisted of 1) Additional Secretary of MOE, 2) Director General of NIE, 3) representatives of provincial offices, pilot schools and the Counterpart Team, and 4) representatives of the private sector. NEIKA meetings were held monthly.



Source: JICA Study Team

Figure 2.1.1 Overall Implementation Structure

Under NEIKA, each pilot school formed a School Educational Initiative of Kaizen Activities (SEIKA) with the objectives of planning, implementing, monitoring and evaluating the Educational Kaizen activities at the school level. SEIKA was responsible for selection of Educational Kaizen topics, formation of QE circles, budget proposal, procurement, preparation of progress reports and financial

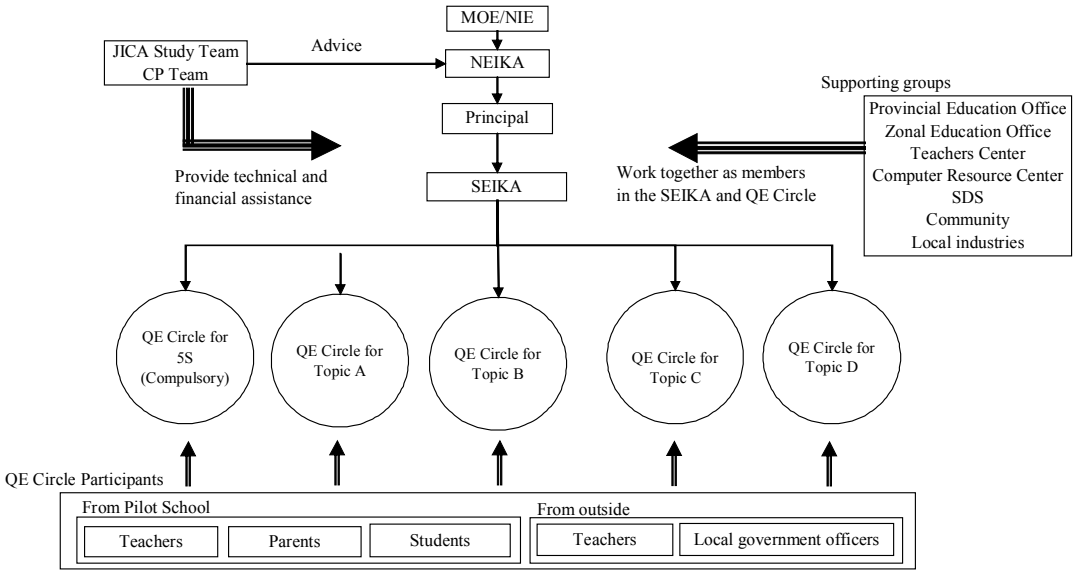
reports. Members of SEIKA consisted of 1) the principal, 2) director of education in science and mathematics in zonal education office, 3) In-Service Advisors in science and mathematics, 4) head teachers in science and mathematics, 5) representatives of SDS, 6) representatives of parents and so on. In order to maintain transparency in implementing the Pilot Project, involvement of representatives from outside the school was mandatory. SEIKA meetings were held about twice a month.

2.1.2 School Level Implementation Organization

The school level organization to implement the Pilot Project is illustrated in Figure 2.1.2. The JICA Study Team and the Counterpart Team provided technical and financial assistance to SEIKA. The JICA Study Team included national experts for Educational Kaizen activities and monitoring activities. SEIKA was also supported by zonal education office and neighboring schools.

QE circle consisted of teachers, parents and students, as well as teachers and local government officers from outside. QE circles had weekly meeting for 15 to 30 minutes after school.

The standard procedure and methods taken in the Pilot Project for implementing Educational Kaizen activities at schools are explained in the reference material attached (CD-ROM).



Source: JICA Study Team

Figure 2.1.2 School Level Implementation Organization

2.2 Preparatory Work for Implementation

2.2.1 Workshops and School Visits

(1) Two-Day Workshop in June 2003

A Two-Day Workshop was held on 12-13 June 2003, inviting two representatives from each pilot school. The objectives were to provide them with instruction on the preparation of proposals, including project log frame, detailed implementation plan as well as cost estimation. Through individual school interviews with the JICA Study Team and the Counterpart Team, topics of QE circles were tentatively decided. The program of the workshop is shown in Appendix 2-3.

(2) A Series of School Based Workshops in June and July 2003

The JICA Study Team together with the Counterpart Team visited 25 pilot schools for school-based workshops. A general meeting was held in the morning with the principal, teachers, parents, zonal officers, ISAs, OB/OGs and students. Individual interview with each QE circle was held in the afternoon. The numbers of participants ranged from 30 to 150 among the schools. Objectives, activities and costs of each QE circle were thoroughly discussed in detail.

(3) Five-Day Workshop in August 2004

A Five-Day Workshop was held on 4-8 August 2003, inviting four representatives from each pilot school. Through comprehensive discussions on proposals prepared by the pilot schools, the JICA Study Team, the Counterpart Team and each pilot school reached an agreement on the implementation of the Pilot Project. The program of the workshop is shown in Appendix 2-3.

2.2.2 Responsibilities for Implementing the Pilot Schools

The JICA Study Team and the pilot schools mutually agreed on the responsibilities for implementing the Pilot Project. The responsibilities of the JICA Study Team were:

- To transfer the agreed amount to the bank account of the pilot school according to the schedule of 30% for advanced, 40% for progress and 30% for final transfer
- To provide consulting services for Educational Kaizen activities
- To provide consulting services for quality improvement of science and mathematics education
- To provide monitoring activities to assist in the preparation of monthly reports and financial management

The responsibilities of the pilot schools in implementing the Pilot Project were:

- To open a current account at a branch of Bank of Ceylon, exclusively for

the execution of the Pilot Project

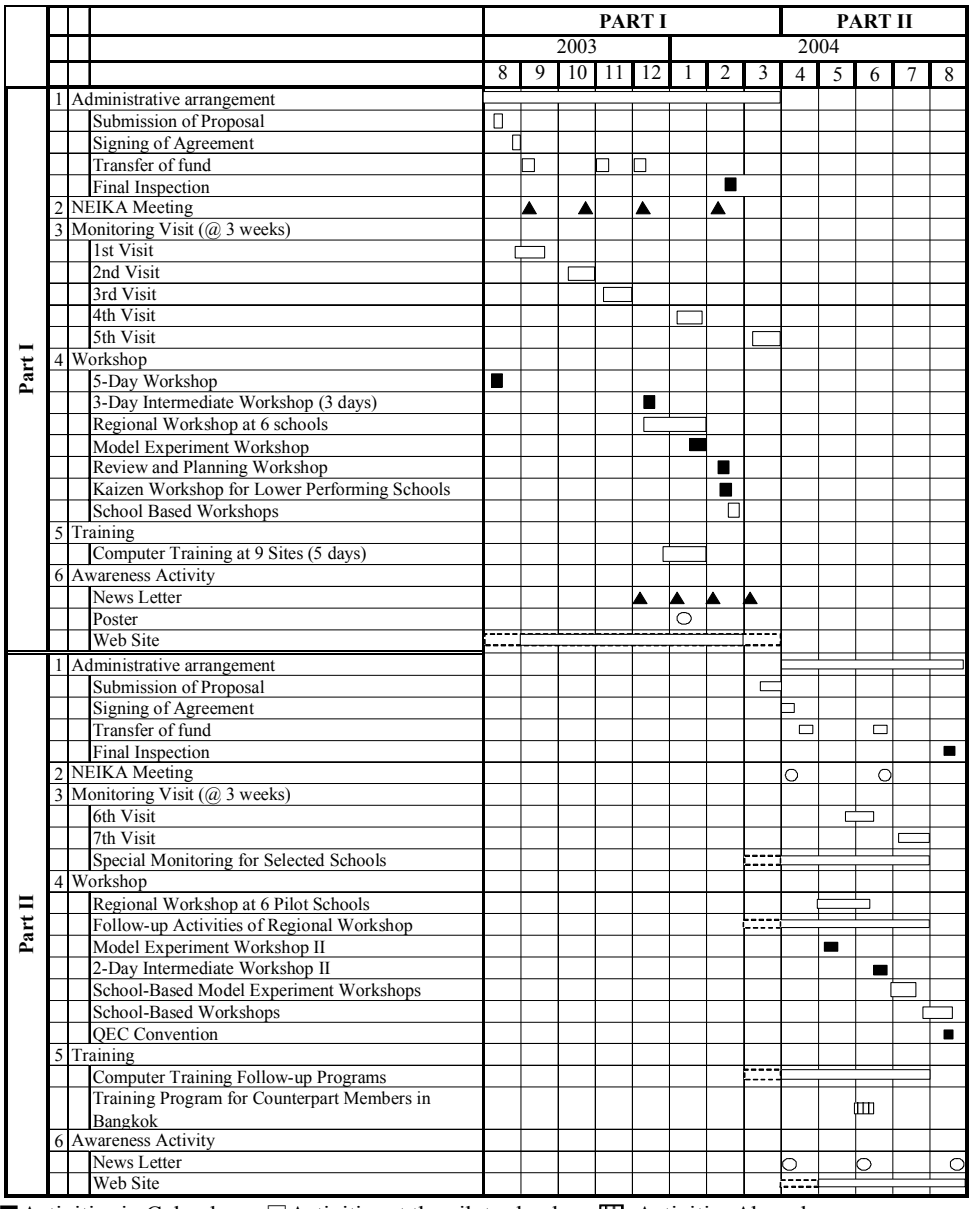
- To submit each monthly report by 7th of the following month, attached by a notebook of all receipts of the expenditures for the month
- To submit an activity report after completion of the Pilot Project, summarizing all activities and expenditures for the entire period of the Pilot Project
- To remit the unused balance to the JICA Study Team at the end of the Pilot Project
- To obtain approval from the JICA Study Team prior to purchasing an item costing more than Rs.10,000
- To obtain approval from the JICA Study Team to use contingency funds

CHAPTER 3 ACTIVITIES IMPLEMENTED BY THE PILOT SCHOOLS

3.1 Overall Review on Activities

All activities implemented in the Pilot Project are as listed in Figure 3.1.1 and Table 3.1.1. Implementation of the Pilot Project was divided into two parts, Part I from August 2003 to March 2004 and Part II from April to August 2004. The total estimated number of participants was around 20,000 person-days, as shown in Table 3.1.1.

Some of the selected photographs of various activities taken place during the Pilot Project can be found in Appendix 2-2.



Note: ■Activities in Colombo, □Activities at the pilot schools, ▥ Activities Abroad
Source: JICA Study Team

Figure 3.1.1 Overall Program Implemented in the Pilot Project

Table 3.1.1 List of Activities and Participants

	Activity		Date	Major Objective	Sites	Participants	Days	Total person per day
Part I	Seminar	Seminar on Progress Report I	23 May 2003	To present the Progress Report I to the stakeholders	1	35	1	35
		Seminar on Progress Report II	23 September 2003	To present the Progress Report II to the stakeholders	1	43	1	43
	Workshop	Workshop for Project Announcement	20 March 2003	To announce the project to long-listed schools	1	50	1	50
		2-Day Workshop	12 - 13 June 2003	To provide training and instructions on preparation of project proposals	1	49	2	98
		School-Based Workshops	23 June - 11 July 2003	To discuss preparation of project proposals	25	70	1	1,750
		Master Plan Brainstorming Workshop	18 - 19 July 2003	To identify the issues to be covered in the Study and appropriate strategies to achieve the short- and long-term goals	1	20	2	40
		5-Day Workshop for the Pilot Project	04 - 08 August 2003	To finalize the proposals and sign the agreement	1	99	5	495
		3-Day Intermediate Workshop	11 - 13 December 2003	To exchange experiences and ideas of QE Circle activities among the Pilot Schools	1	75	3	225
		Regional Workshops		To identify measures to improve school culture and environment through educational KAIZEN activities				
		Tamil-medium schools	16 December 2003		1	59	1	59
		North Central Province	17 December 2003		1	30	1	30
		Western Province	19 December 2003		1	37	1	37
		North Western Province	20 December 2003		1	30	1	30
		Southern & Sabaragamuwa	10 January 2004		1	59	1	59
		Central Province	11 January 2004		1	30	1	30
		Model Experiment Workshop		To promote interactive teaching and learning methods in science and mathematics through the demonstration of model experiments and projects				
		Primary ERA & Maths	20 - 21 January 2004		1	41	2	82
		Junior Secondary Science	22 January 2004		1	43	1	43
		Junior Secondary Maths	23 January 2004		1	43	1	43
		School-Based Workshops	13 - 15 February 2004	To disseminate the Educational KAIZEN activities to neighboring schools from the pilot schools	25	50	1	1,250
	Monitoring	1st Monitoring	27 August - 17 September 2003	To provide guidance on financial management and Monthly Report	24	40	1	960
		2nd Monitoring	07 - 23 October 2003	To provide guidance on implementation of educational KAIZEN activities and to monitor the progresses	24	40	1	960
		3rd Monitoring	06 - 25 November 2003	To provide guidance on implementation of educational KAIZEN activities and to monitor the progresses	25	40	1	1,000
		4th Monitoring	08 January - 03 February 2004	To monitor the progresses and guide the Pilot Schools toward the final stage of Project	25	40	1	1,000
		5th Monitoring	08 - 25 March 2004	To monitor the continuation of activities after the Project and their results	25	40	1	1,000
	NEIKA meeting	1st Meeting	23 September 2003		1	5	1	5
		2nd Meeting	22 October 2003		1	6	1	6
		3rd Meeting	01 December 2003		1	4	1	4
		4th Meeting	03 February 2004		1	5	1	5
	Computer Training	Southern Province -Matara	15 - 19 December 2003	To provide basic computer training for selected teachers of Pilot Schools	1	20	5	100
		Sabaragamuwa Province-Ratnapura	15 - 19 December 2003		1	14	5	70
		Western Province-Colombo	20 - 24 December 2003		1	19	5	95
		Central Province-Kandy	02 - 06 January 2004		1	18	5	90
		Uva Province-Badulla	02 - 06 January 2004		1	16	5	80
		North Central Province-Anuradhapura	10 - 14 January 2004		1	18	5	90
		North Western Province-Kurunegala	10- 14 January 2004		1	19	5	95
		North Eastern Province-Jaffna	22- 26 January 2004		1	16	5	80
		North Eastern Province- Trincomalee	07 - 11 February 2004		1	20	5	100
	Inspection	Final Inspection of Reports & Accounts	18 - 21 February 2004	To collect the reports and settle the accounts	1	100	1	100
							Sub Total	10,239

		Activity	Date	Major Objective	Sites	Participants	Days	Total person per day
Part II	Workshop	Regional Workshops II		To identify measures to improve school culture and environment through educational KAIZEN activities				
		Tamil-medium schools	24 April 2004		1	60	1	60
		North Central Province	25 April 2004		1	30	1	30
		Central Province	16 May 2004		1	30	1	30
		Western Province	22 May 2004		1	40	1	40
		North Western Province	30 May 2004		1	30	1	30
		Southern & Sabaragamuwa	18 June 2004		1	60	1	60
		Follow-up Activities of Regional Workshop	07 April - 30 July	To follow up the activities introduced in Regional Workshops at all 25 pilot schools	25	40	1	1,000
		Model Experiment Workshop II		To promote interactive teaching and learning methods in science and mathematics through the demonstration of model experiments and projects				
		ERA	08 - 09 May 2004		1	40	2	80
		Primary Maths	10 - 11 May 2004		1	40	2	82
		Junior Secondary Science	13 - 14 May 2004		1	46	2	92
		Junior Secondary Maths	15 - 16 May 2004		1	46	2	92
		2-Day Intermediate Workshop II	12 - 13 June 2004	To share ideas and experiences among 25 pilot schools and relevant education officers	1	85	2	170
		School-Based Model Experiment Workshops	22 June - 14 July 2004	To introduce interactive teaching learning experiences which learned in Bangkok	25	40	1	1,000
		School-Based Workshops II	31 July - 15 August 2004	To disseminate the Educational KAIZEN activities to neighboring schools from the pilot schools	25	50	1	1,250
		School-Based Management Workshop	31 August 2004	To share experience of school-based management implemented by donors	1	29	1	29
	Monitoring	6th Monitoring	13 - 15 February 2004	To provide guidance on financial management and Monthly Report	25	50	1	1,250
		7th Monitoring	27 August - 17 September 2003	To provide guidance on implementation of educational KAIZEN activities and to monitor the progresses	25	50	1	1,250
		Special Monitoring for Selected Schools	07 April - 31 August 2004	To encourage low-performing schools through educational Kaizen approach and consult managerial problems	11	50	3	1,650
	NEIKA	5th Meeting	07 April 2004		1	7	1	7
		6th Meeting	14 June 2004		1	7	1	7
		7th Meeting	06 September 2004		1	7	1	7
	Computer Training	Computer Training Follow-up Program (1)	22 April - 10 June 2004	To follow up computer skills which learned from the training for selected teachers of Pilot Schools	25	10	1	250
		Computer Training Follow-up Program (2)	22 April - 10 June 2004	To monitor their computer skills and consult technical problems faced in the Pilot Schools	25	10	1	250
		Computer Training Follow-up Program (3)	5 July - 24 August 2004	To confirm the achievement of the activities and conduct examination as a final evaluation.	25	10	1	250
	BKK Training	Training Program for Counterpart Members in Bangkok	31 May - 11 June	To provide teaching program on teaching science and maths at IPST, Bangkok	1	7	14	98
	QEC C	Quality Education Circle Convention	26 - 28 August 2004	To make presentation and display outputs of all 118 QE circles	1	350	3	1,050
	Inspection	Final Inspection of Reports & Accounts	19 - 25 August 2004	To collect the reports and settle the accounts	1	100	1	100
							Sub Total	**10,114**
							Grand Total	**20,353**

Source: JICA Study Team

3.2 Major Activities by QE Circles

3.2.1 Overview of QE Circle Activities

118 QE circles formed at 25 pilot schools. The number of activities implemented by 118 QE circles was 944.[3] In other words, on average, each QE circle executed around eight activities for the one-year project period. These activities were classified into three major groups as summarized in Table 3.2.1, namely (i) improvement of school management, (ii) improvement of science and mathematics education, and (iii) improvement of basic infrastructure and facility. The detailed information of the 944 activities is available in an Access file in the attached CD-ROM.

Each pilot school selected the Top 10 activities, 5 each from Part I and II.[4] These Top 10 activities were compared with all 944 activities, as shown in Table 3.2.1. The table shows that the share of activities related to science and mathematics education is bigger in the list of Top 10 activities than in all 944 activities, particularly activities related to experiment, project work and 100-box calculation. This implies that, in the view of the pilot schools, the most significant areas to be improved are activity based education and basic calculation skills. The detailed information of the Top 10 activities is available in an Excel file in the attached CD-ROM.

[3] Actual number of activities is larger than the figure mentioned here, since this indicates only major activities selected by the pilot schools.

[4] Selection was made by all SEIKA members, in consideration of 1) activities that had the biggest impact on science and mathematics education, 2) activities that most contributed to the improvement of school culture, 3) activities that they would recommended to other schools to implement, and 4) activities that they can confidently report to parents, OBs/OGs and provincial/zonal officers.

Table 3.2.1 Summary of Major Activities and Top 10 Activities Selected by the Pilot Schools

Category of Activities					Major Activities		TOP 10 Activities	
I	**Improvement of School Management**				**182**	**19%**	**45**	**19%**
I	a	1	5S	Booklet for 5S promotion, awareness program	28	3%	3	1%
I	a	2	5S	Suggestion system	26	3%	12	5%
I	a	3	5S	Patrol system	15	2%	5	2%
I	a	4	5S	Garbage management system	24	3%	2	1%
I	a	5	5S	Other (e.g., Shramadana campaign, 5S competition	40	4%	14	6%
I	b	1	Information management system	Attendance record	4	0%	0	0%
I	b	2	Information management system	Personnel database	3	0%	1	0%
I	b	3	Information management system	Student bio database	6	1%	1	0%
I	b	4	Information management system	Exam database	5	1%	0	0%
I	b	5	Information management system	Inventory list	2	0%	0	0%
I	b	6	Information management system	Other	5	1%	0	0%
I	c	1	Other	Other (e.g., mutual assessment, professional development)	24	3%	7	3%
II	**Improvement of Science and Mathematics Education**				**474**	**50%**	**141**	**58%**
II	a	1	Science	Teacher's manual	3	0%	0	0%
II	a	2	Science	Handout, workbook, question paper, assignment	64	7%	19	8%
II	a	3	Science	Experiment, project work	80	8%	26	11%
II	a	4	Science	Computer aided education	16	2%	5	2%
II	a	5	Science	Observation tour	16	2%	3	1%
II	a	7	Science	Other (e.g., wall paper, workshop, eshibition, student clubs)	23	2%	10	4%
II	b	1	Maths	Teacher's manual	3	0%	0	0%
II	b	2	Maths	Handout, workbook, question paper, assignment	77	8%	18	7%
II	b	3	Maths	Experiment, project work	38	4%	11	5%
II	b	4	Maths	Computer aided education	7	1%	3	1%
II	b	6	Maths	100-box calculation	43	5%	20	8%
II	b	7	Maths	Other (e.g., wall paper, workshop, eshibition, student clubs)	29	3%	3	1%
II	ab	1	Science/Maths	Teacher's manual	2	0%	0	0%
II	ab	2	Science/Maths	Handout, workbook, question paper, assignment	34	4%	12	5%
II	ab	3	Science/Maths	Experiment, project work	8	1%	2	1%
II	ab	4	Science/Maths	Computer aided education	9	1%	2	1%
II	ab	5	Science/Maths	Observation tour	1	0%	1	0%
II	ab	7	Science/Maths	Other (e.g., wall paper, workshop, eshibition, student clubs)	21	2%	6	2%

Category of Activities					Major Activities		TOP 10 Activities	
III	**Improvement of Basic Infrastructure and Facility**				**288**	**31%**	**57**	**23%**
III	a	1	Classroom	Classroom	14	1%	6	2%
III	b	1	Library	Building / room	6	1%	0	0%
III	b	2	Library	Books	21	2%	7	3%
III	b	3	Library	Lending system	19	2%	0	0%
III	b	4	Library	Other (e.g., reading competition, awareness program	27	3%	4	2%
III	c	1	Laboratory	Science laboratory	16	2%	6	2%
III	c	2	Laboratory	Mathematics Activity Room	17	2%	6	2%
III	c	3	Laboratory	Science garden / Harbal garden / Open air lab	38	4%	7	3%
III	c	4	Laboratory	Other	23	2%	4	2%
III	d	1	Computer/Multimedia	Computer	19	2%	2	1%
III	d	2	Computer/Multimedia	Network system	1	0%	0	0%
III	d	3	Computer/Multimedia	Multimedia facilities	8	1%	2	1%
III	d	4	Computer/Multimedia	Other	7	1%	0	0%
III	e	1	Printing facility	Roneo machine	1	0%	0	0%
III	e	2	Printing facility	Digital duplicator	3	0%	0	0%
III	f	1	Communication facility	Telephone	1	0%	0	0%
III	f	2	Communication facility	Internal addressing system	16	2%	1	0%
III	g	1	Sanitary facility	Toilet	3	0%	0	0%
III	g	2	Sanitary facility	Water facility	6	1%	1	0%
III	h	1	Electricity	Electricity	3	0%	2	1%
III	i	1	Teachers' quarter	Teachers' quarter	6	1%	2	1%
III	j	1	School environment	Campus map, directional signs, footpath, gate, etc.	30	3%	6	2%
III	k	1	Other	e.g., staff room, canteen	3	0%	1	0%
				Total	**944**	**100%**	**243**	**100%**

Source: JICA Study Team

3.2.2 School Management

182 activities were carried out for improvement of school management. The major findings are:

- There were 133 activities related to 5S, which indicates that all pilot schools made an extensive effort on 5S activities. Those included 28 for booklets for 5S promotion, 26 for suggestion system, 15 for patrol system and 24 for garbage management system.
- 25 activities were implemented for strengthening information management system, including development of attendance record, personnel database, student database and exam database.
- Many schools implemented activities related to introduction of mutual assessment system and professional development program in order to improve the school culture and professionalism of teachers.

Major activities related to school management are summarized below:

(1) Promotion of 5S

5S is a systematic method to achieve managerial and operational efficiency through continuous improvement by everyone's participation.[5] 5S can be considered as one of the powerful tools to change the school culture. The efficient management and operation system at school is also the necessary condition to upgrade the quality of science and mathematics education.

Based on this understanding, all of the pilot schools implemented various 5S activities, including booklets for 5S promotion, awareness campaign, suggestion system, school patrolling system, garbage management system, and 5S competition among classes and grades.

1) Booklet for 5S promotion and awareness campaign

Many schools prepared their original booklets for 5S promotion and distributed to parents, neighboring schools and zonal officers. In addition, the pilot schools organized workshops and meetings to disseminate ideas of 5S, through which many parents started 5S activities with their children at home.

[5] "School culture" in the report is defined as an overall school environment, which consists of managerial efficiency, quality of teaching services, working condition, participation of all parties concerned and so on.

Box 3.2.1 How 5S was Extended to the Community

Gonulla K.V. made strenuous efforts to deliver the concept of 5S, not only within the school itself but to the entire community. As soon as the Pilot Project started, teachers and parents cooperated in producing a series of their original booklets on 5S. Also, students of this primary school visited the houses and pre-school in the village to demonstrate 5S activities that they have acquired. A student of grade 4 activatedally reported the progresses of the houses where she introduced 5S. Through these activities, 5S has become part of life in their community.

"Not only has our school, but the whole village itself has changed since 5S was introduced."(Principal)

2) Suggestion system

The suggestion system is one of the practical methods in 5S, where anybody can submit suggestions to decision makers in a standard format. Most of the pilot schools introduced the suggestion system, which encouraged people to think and propose their own ideas to the principal and SEIKA. Teachers, students and parents became proud when their ideas were implemented. This enhanced their motivation to improve their school with a sense of ownership for the school.

Box 3.2.2 Why Suggestion System was Effective

A total of 12 pilot schools selected suggestion system as one of the Top 10 activities. Following are some of the reasons given by those schools:

Usually students are reluctant to express their ideas, but through the suggestion system, they realized that they too are responsible and important in the development of school.

Students actively participate in the school activities as they feel that their suggestions are implemented. Their keenness in the discussion of feasibility of the suggestions proves that they indeed take part in the development of school. The display of selected suggestions on the notice board is eagerly awaited.

3) Patrol system

Many pilot schools established patrol teams consisting of teachers, parents and students to monitor 5S activities with a check list. Since the patrol team's monitoring results were used for 5S competition, students were motivated to keep everything in order according to the 5S principle.

4) Garbage management system

Many schools developed efficient and effective garbage collecting system such as by installation of dustbins, polythene collection system, garbage recycling system for fertilizer, etc.

Box 3.2.3 Reducing the Waste

Some pilot schools took an initiative, such as anti-polythene campaign, to reduce garbage by promoting the use of containers instead of polythene bags to bring lunch to school.

Organic waste materials can be recycled by digging compost pits, which also is a good opportunity for students to study biology. The produced manure can also be used in school's botanical garden and organic farm, giving practical experience to students in learning science.

5) Shramadana

Shramadana is a custom in Sri Lanka, typically seen in villages, to offer voluntary (unpaid) expenditure of labor to help each other. Many schools periodically organized a Shramadana to clean the school premises and the surroundings, for which a number of parents and community members voluntarily came and help.

(2) Development of Information Management System

Some pilot schools introduced information management system by developing database and filing system for attendance record, personnel data, examination mark, library books and lending, and inventory. Some schools implemented this activity on a paper-basis while several schools adopted a computer-basis system after having computer training through the Pilot Project. These activities made managerial and administrative works of the school easy, prompt, accurate and efficient.

(3) Introduction of Mutual Assessment System

The mutual assessment system consists of principal's assessment by teachers, assessment among teachers and teachers' assessment by students. Due to a lack of real communication, school staff did not know their own shortcomings and therefore did not know how to improve themselves, which was a bottleneck in changing school culture. The mutual assessment system was an effective tool to bring a change to the school culture. A guidebook for introducing the mutual assessment system, with sample assessment sheets, is available in attached CD-ROM.

Table 3.2.2 Implementation of the Mutual Assessment System at Pilot Schools

School ID					School name	Between principal and teachers			Among teachers			Teachers' assessment by students		
Ownership	Province	Type	Location	No.		Agreed to implement?	Implemented?	Analyzed the results?	Agreed to implement?	Implemented?	Analyzed the results?	Agreed to implement?	Implemented?	Analyzed the results?
P	CP	1	S	1	Hindagala Maha Vidyalaya	○	○	○	○	○	○	○	○	X
P	CP	2	R	2	Rambukpitiya Maha Vidyalaya	○	○	○	○	○	○	○	○	○
P	CP	3	P	3	St. Andrews TV	○	○	X	○	○	○	○	X	X
P	CP	1	S	4	Mahaweli Maha Vidyalaya	○	○	○	○	○	○	○	○	○
N	NC	0	S	5	Ananda Balika National School	○	○	○	○	○	○	○	○	○
P	NC	2	R	6	Thammennapura Vidyalaya	○	○	○	○	X	X	○	○	○
P	NC	1	S	7	Mihintale Pathiraja Tennekoon K.V.	○	○	○	○	○	○	○	○	○
N	NE	0	U	8	St. Mary's College	○	○	○	○	○	○	○	○	○
N	NE	0	U	9	Vembadi Girls' High School	○	○	○	○	○	○	○	○	○
P	NE	0	S	10	Canagaratnam M.M.V.	○	○	○	○	○	○	○	○	○
P	NW	0	S	11	Wen/Girls College Dankotuwa	○	○	○	○	○	○	○	○	○
P	NW	3	R	12	Gonulla Kanishta Vidyalaya	○	X	X	○	X	X	○	X	X
N	NW	0	U	13	Maliyadeva Balika Vidyalaya	○	○	○	○	○	○	○	○	○
P	SB	2	R	14	Maduwanwela Sri Sarananda V.	○	X	X	○	○	X	○	○	X
P	SB	2	R	15	Galpaya Vidyalaya	X	X	X	○	X	X	○	○	X
P	SB	2	P	16	Golinda Tamil K.V.	○	○	○	○	○	X	○	○	○
N	SP	0	R	17	Vijaya National College	○	○	X	○	○	○	○	○	○
N	SP	0	S	18	Rajapaksha Central College	○	○	○	○	○	○	○	○	X
P	SP	2	R	19	Muruthawela Kanishta Vidyalaya	○	○	○	○	○	○	○	○	○
P	UV	1	P	20	Poonagala Tamil M.V.	○	○	X	○	○	X	○	○	○
N	UV	0	U	21	Dutugemunu Central College	○	○	○	○	○	○	○	○	○
P	WP	3	R	22	Imbulgoda Sunethradevi K.V.	○	X	X	○	X	X	○	X	X
N	WP	0	U	23	Isipathana College	○	○	X	○	X	X	○	○	○
P	WP	1	R	24	Katuwellegama Maha Vidyalaya	○	○	○	○	○	○	○	○	○
N	WP	0	U	25	Devi Balika Vidyalaya	○	X	X	○	○	○	○	○	○
Total numbers of schools (Yes: ○)						**24**	**20**	**16**	**25**	**20**	**17**	**25**	**22**	**18**
Total numbers of schools (No: X)						**1**	**5**	**9**	**0**	**5**	**8**	**0**	**3**	**7**
Total						25	25	25	25	25	25	25	25	25

Note: The table gives a summary of the status of each school as of 15th September 2004.
Source: JICA Study Team

Many pilot schools introduced the mutual assessment system, as shown in Table 3.2.2. It made the principals and teachers confident when their assessment results improved each time. It also made school culture open and school staff activated in most of the pilot schools.

Box 3.2.4 Impact of Mutual Assessment on School Culture

The introduction of mutual assessment system had a significant impact on school culture, where teachers are held in awe and fear while students are seen as passive receivers of knowledge taught by teachers. Below are some of the comments made by the pilot schools, after having implemented the system.

"75 suggestions were given to me through the principal's assessment done by teachers, most of which are very useful. I recognized a lot of my shortcomings that I must improve. I have a lot to learn. I hope to have a better result at the next assessment in three months."

"Students are the customers to whom we are catering education service. Therefore, they should be given the opportunity to put forward their views on the services that they receive at school. The school wants to give its best to the students and the students want to receive the maximum they can. Therefore, the rapport between them is essential. Student assessment of teachers has paved the way for the development of such a rapport."

3.2.3 Science and Mathematics Education

474 activities were carried out for the improvement of science and mathematics education. The major findings are:

- 175 activities (64 for science, 77 for mathematics and 34 for both) were implemented for the development of handouts, workbooks, question papers and assignments. Since 30 to 50 pages on average were developed by one activity, the estimated number of pages developed through these activities is around 7,000.
- 126 activities (80 for science, 38 for mathematics and 8 for both) were related to experiments and project works. This indicates that the pilot schools started introducing activity based education extensively through the Pilot Project.
- There were 32 activities (16 for science, 7 for mathematics and 9 for both) implemented for computer aided education. Since many pilot schools were not yet ready to use computer for education, this activity were limited only at the schools with well equipped computer facilities.
- 43 activities were performed for 100-box calculation, which implies that the pilot schools recognized the importance of strengthening students' basic calculation skills.

Major activities related to science and mathematics education are summarized below:

(1) Development of Teaching Materials by Teachers

Although the government supplies textbooks and teachers' guides, there is a strong need for teachers to develop teaching materials such as handouts, workbooks, question papers, experiment manuals, observation manuals and project work manuals. Hence, all pilot schools formed QE circles to develop teaching materials through group work among teachers and/or with assistance of external resource persons such as ISAs and university lecturers. Many of these teaching materials enhanced interactive teaching and learning method.

This activity provided teachers with the opportunities for self-learning and group-learning. It made teachers confident in teaching, since they used teaching materials that they developed by themselves. These teaching materials certainly help satisfy local needs for education at the school level. Most of the materials have been computerized and therefore can be easily modified and used every year.

Box 3.2.5 How Teaching Materials Benefit Teachers and Students

Since teachers guide students to learn by using assignment sheets prepared, the teaching and learning process became efficient. Students are more inclined toward self-learning than they were before.

As students and teachers are familiar with task sheets, it has become easy to complete teaching of a unit in a short time.

Students can study with assignment sheets even in the absence of teachers without wasting time.

118 task sheets were prepared for grades 2-5 students, enabling them to understand the subject contents well. Teachers can build up lessons methodically and with efficient time management.

Because of the workbooks prepared by teachers, students have the opportunity to do more activities after the lesson. Also they have the opportunity to put into practice what they learned in the classroom. Then they became more activated about learning.

(2) Promotion of Experiment and Project Works

Students have to acquire knowledge and skills to solve actual problems, applying what they learned in school and this requires activity based education and project works. Some examples include a survey on commodity prices, survey on environmental deterioration, drawing of charts that show weights and heights of students, measurements of classrooms, school buildings and campus, estimations of water volume in a pond, estimation of weight of objects, estimation of

construction cost, drawing of maps of campus and the neighboring area. Activity based education enhances various competency skills such as abilities of report writing, presentation, measuring, drawing graphs, experimentation, observation, record keeping and data analysis.

The role of teachers in such activity based education is to identify appropriate topics and to provide proper guidance from time to time. Topics should be carefully selected based on students' interests. Then, teachers design plans, prepare materials, develop instruction manuals and conduct the activities.

Based on this recognition, all of the pilot schools formed QE circles to develop and promote experiment and project work. At the same time, a series of model experiments were developed by the joint effort of the Counterpart Team, JICA study Team and several teachers selected from the pilot schools, in order to promote activity based and interactive teaching and learning process and to apply science and mathematics to daily life.

Furthermore, the Counterpart members participated in a 2-week training program for promotion of activity based and interactive teaching and learning in science and mathematics in June 2004, provided by IPST (Institute for the Promotion of Teaching Science and Technology) in Thailand. Following the program, the participants visited the 25 pilot schools and conducted school-based model experiment workshops to disseminate experimental topics learned at IPST. After learning the methods of model experiments, teachers adopted them in their class by using the equipments supplied by the Pilot Project. The instruction manual for model experiment was developed by the Counterpart members by carefully selecting the topics and providing necessary instructions, and can be found in the attached CD-ROM.

Box 3.2.6 Model Experiment

The model experiments have had a great impact on the teachers and students. Students became interested in learning science and mathematics through practical and their attitude changed.

The time between 2:00pm and 3:30pm on Fridays allocated for special experiments and experiences has become the most interesting time for grades 4 and 5 students.

(3) Promotion of 100-box Calculation

100-box calculation, developed by Japanese teachers, is aimed at enhancing the ability to concentrate and strengthening basic calculation skills in the four fundamental rules of arithmetic. At the same time, it contributes to students' eliminating a fear of studying mathematics, as they can gain confidence through

improving time and score of calculation. Improvement of basic calculation skills facilitates understanding of advanced science and mathematics in higher grades. Furthermore, students, as well as teachers, become punctual being aware of the importance of time, increase concentration power, learn to organize class operation efficient and recognize the importance of analysis. The instruction manual for 100-box calculation is in the attached CD-ROM. The standard and recommended method of conducting 100-box calculation is also explained in the attached video film produced by the JICA Study Team.

All pilot schools conducted 100-box calculation as one of the QE circle activities. Using materials supplied by the JICA Study Team, the pilot schools prepared calculation sheets and record sheets and started from addition, to subtraction, multiplication and division. The target grades differ among the pilot schools. In some schools, higher grade students helped in implementing 100-box calculation for lower grade classes.

Box 3.2.7 100-Box Calculation

100-box calculation contributed to improving students' basic calculation skills as well as concentration skills. The importance of speed and accuracy in calculation was well understood by students. The interest toward learning mathematics increased. This activity was also highly appreciated by parents.

In some of the pilot schools, 100-box calculation also played a role in reducing the number of latecomers to school. For example, because the exercise was conducted before the first period in the morning, and because students did not want to miss it, they developed a habit to come to school on time, ready to do the 100-box calculation exercise.

(4) Promotion of Open Class System

Open class system is aimed at improving teaching skills through observing teaching and learning process in a peer teacher's classroom and giving feedback. Those who were observed by other teachers became confident in their teaching skills after having constructive comments and suggestions from the observers. The observers also gained benefit, learning new methods and obtaining new skills from colleagues.

(5) Establishment of Science Corner

Science corner was established with health measuring instruments for height, weight, eyesight and blood pressure etc. The measuring equipment was supplied by the Pilot Project. Science corner was effective for students to learn how to use scientific instruments and be familiar with them. They also learned to put data in

tables and figures, which provided practical lessons on the use of mathematics in their daily life.

3.2.4 Basic Infrastructure and Facilities

288 activities were carried out for the improvement of basic infrastructure and facility. The major findings are:

- 14 activities were conducted for the improvement of classroom such as installation of partition, blackboard, chairs and desks.
- There were 73 activities for library, including 6 for building/room, 21 for purchasing books and 19 for lending system.
- 94 activities were performed for the development and improvement of laboratory, which include 16 for science laboratory, 17 for mathematics activity room and 38 for science garden, herbal garden and open air lab.
- There were 38 activities for computer/multimedia facilities.
- As for basic infrastructure, there were 15 activities, including 3 for toilet, 6 for water supply, and 3 for electricity. Two teachers' quarters were constructed.[6]
- 30 activities were carried out for the improvement of school environment, including installation of campus map, directional signs, footpath and gate.

In order to develop, repair and maintain school facilities, it was essential for the pilot schools to have continuous support and cooperation from parents, community, OB/OGs, well-wishers and so on. These supporting groups have to be involved in all aspects of the development process of basic infrastructure and facilities from planning, procurement, construction and inspection. In particular, cooperation of community includes supplying of locally available materials and labor at a concessionary rate.

[6] There are 6 activities listed under teachers' quarters in the table, as one of the two schools divided the construction work into 5 activities.

Box 3.2.8 Activities for Infrastructure/Facility Development

Vijaya National College installed movable partitions between classrooms in the hall. As a result, disturbance from the neighboring classroom has reduced, and teachers can do lessons more effectively and students can concentrate well.

In Maliyadeva B.V., teachers and students bound valuable books in the library to protect from damage.

Gonulla K.V. developed industrial unit, where a lot of miniature model equipments and facilities, such as irrigation system, dam and generator, casting, ceramic furnace and wood processing were installed. This provided students with opportunities to understand basic industrial works.

Galpaya Vidyalaya constructed teachers' quarter in cooperation with parents and community. They provided labor and locally available materials in a much lower price, which reduced the overall construction cost. Students also helped.

Dutugemunu Central College rehabilitated science laboratory with students, who learned skills for electric wiring and connection. The school could save money and it became a tool of their self-employment.

Golinda Tamil K.V. constructed science laboratory with the help of parents and community. They provided labor and locally available materials. This reduced a construction cost by 40%.

CHAPTER 4 SUPPORTING ACTIVITIES FOR THE PILOT SCHOOLS

4.1 Monitoring

4.1.1 Monitoring Activities

The monitoring team, consisting of members from the JICA Study Team and the Counterpart Team visited all pilot schools for seven times during the period of the Pilot Project.

The objectives of the monitoring activities are:

- To evaluate progresses of activities of QE circles
- To assist SEIKA and QE circle members in solving problems and constraints in implementing Educational Kaizen activities
- To assist in preparing monthly reports
- To monitor expenditure of SEIKA and QE circles for the Pilot Project

The monitoring team evaluated performance of the pilot schools through discussions with members of SEIKA and QE circles, interviews with teachers, students and parents as well as observation of classrooms. Although it was not easy to measure the level of performance of Educational Kaizen activities, the team tried to quantify it and use as a tool to motivate the pilot schools. The criteria to evaluate the performance of SEIKA and QE circles included 1) leadership of the principal and QE circle leaders, 2) level of participation of teachers, students and parents, 3) involvement of provincial/zonal officers and neighboring schools, and 4) outputs of Educational Kaizen activities in the area of school management and/or science and mathematics. The overall performance of the pilot schools was shown as an arithmetic average of marks given to SEIKA and QE circles, which was then informed to the pilot schools.

4.1.2 Monthly Report

The pilot schools prepared and submitted monthly reports to the JICA Study Team by using a form supplied by the JICA Study Team. The monthly report contains:

- financial summary showing the balance of the accumulated amount transferred by the JICA Study Team
- bank statement showing record of transactions as of the end of the month
- general and administrative expenditure (SEIKA)
- activities, progresses, problems and constraints, changes made in the original plan, activity plan for the next month, financial report indicating the details of expenditures (for each QE circle)
- receipt notebook in which all receipts are pasted

4.1.3 Inspection Program

The inspection program was conducted two times at the end of Part I and II each, inviting representatives of the 25 pilot schools. The objectives of the inspection

program are:

- To review all monthly reports submitted by the 25 pilot schools
- To assess progress of QE circles in comparison to the original plan described in the proposals
- To check final activity reports summarizing all activities in each Part
- To examine all expenditure and settle the account of the Pilot Project

4.2 Workshop

4.2.1 Intermediate Workshops

Intermediate Workshops were held two times inviting representatives of the 25 pilot schools. The programs are shown in Appendix 2-3. The workshops were conducted with the following objectives:

1) To share experiences among the pilot schools
   - Selected pilot schools made presentations on their progresses and how they solved problems
   - All pilot schools exhibited and demonstrated their outputs such as teaching materials, experimental equipments, awareness brochure, students' works, photographs, and so on
   - Group discussions were held on various topics, including school management, school facility development, 100-box calculation, science laboratory/garden, science experiment, teaching/learning materials, bridging course between O-Level and A-Level, library development and computer education

2) To learn activity based education through demonstration and practice of the model experiments
   - Participants learned the model experiments developed by the Counterpart Team and the JICA Study Team. Experimental equipments for these topics were supplied to the 25 pilot schools by the JICA Study Team.

4.2.2 Model Experiment Workshops

The objective of the model experiment workshops was to promote activity based and interactive teaching and learning methods in science and mathematics by practicing model experiments with the JICA Study Team and the Counterpart Team. It was organized with the recognition that the current exam-oriented and teacher-centered education has to shift to activity-based and student-centered teaching and learning.

Attention was paid to the following points in developing the topics:

For science:

- To enhance students' interest in science
- To develop creative thinking by trial and error
- To become familiar with scientific instruments

For mathematics:

- To learn how to use mathematics in daily life
- To understand how mathematics is important for life

Model Experiment Workshops were held two times, for four days from 20 to 23 January 2004 and for eight days from 8 to 16 May 2004. The program consisted of four sessions each, namely, (i) primary science, (ii) primary mathematics, (iii) junior secondary science and (iv) junior secondary mathematics. Two teachers were invited from each pilot school for each session. In addition, as its follow-up, School-based Model Experiment Workshops were held at the 25 pilot schools. The programs for these workshops are shown in Appendix 2-3.

For the four-day workshop, 40 topics were selected and developed jointly by the Counterpart Team and the JICA Study Team in consultation with a JICA Expert dispatched to NIE. For the eight-day workshop, half of the topics were selected from the ones proposed by teachers of the pilot schools. The instruction manuals for these topics were developed jointly by the teachers and the Counterpart Team.

After the workshops, the Counterpart members further refined and developed the topics, and prepared an instruction manual for model experiment, as in the attached CD-ROM.

4.2.3 Regional Workshops

A series of Regional Workshops were held at six pilot schools two times, inviting representatives of the pilot schools in nearby areas. Participants included the principals, teachers, zonal education officers, ISAs and parents. The objective of the Regional Workshops was to identify measures to improve school culture and environment through group discussions. The program is shown in Appendix 2-3. Subsequent to the Regional Workshops, follow-up workshops were held at the 25 pilot schools.

The discussion focused on how to change the school culture by introducing the mutual assessment system. In order to provide students with more favorable educational environment, the three mutual assessments were recommended to the pilot schools, that is, principal's assessment by teachers, teachers' assessment by teachers and teachers' assessment by students.

A guidebook was prepared by the JICA Study Team on how to introduce the mutual assessment system. It can be found in the attached CD-ROM, together with sample assessment sheet that can be used by schools.

4.2.4 School-based Workshops

School-based Workshops were held at each pilot school two times at the end of Part I and II each. The objectives of School-based Workshop are (i) to share the knowledge and experiences of Educational Kaizen activities gained through the Pilot Project with the neighboring non-pilot schools and (ii) to make each pilot

school a focal point for expanding Educational Kaizen activities to neighboring schools. Accordingly, the program was prepared by each pilot school. A sample program is shown in the Appendix 2-3.

Each pilot school invited around 40-70 participants (principals, teachers and parents) from the neighboring schools and provincial and zonal offices. The program includes: (i) explanation of the basic concept and benefits of Educational Kaizen activities; (ii) explanation of how SEIKA and QE circles function, and how the community can be involved; (iii) demonstration and explanation of outputs including newly developed original teaching/learning materials, experimental equipments, innovative teaching methodologies, newly built school facilities, Educational Kaizen ideas implemented through the suggestion system and; (iv) discussion of future plans for collaboration.

4.3 Training

4.3.1 Computer Training Program

Five-day Computer Training Program was conducted at nine venues, inviting 15 to 20 teachers from neighboring pilot schools including those who had no previous experience with computer. In addition, on-site computer training sessions were conducted three times at 25 pilot schools.

The objectives of the Computer Training Programs are to provide basic computer knowledge and skills. The program is shown in the Appendix 2-3. The topics included introduction to computer, Microsoft Word/Excel/PowerPoint, and internet & e-mail. Participants learned these topics with the samples that can be used at schools, such as preparation of students' exam marks sheet, calculation of average marks, ranking of marks and analysis of distribution of marks.

In addition, various technical consulting services were provided such as basic rules in using computer, appropriate environment for computer room, proper electric wiring system, networking, computer maintenance services, repair of computers and printers and countermeasures for computer virus.

All the materials used in the training program and follow-up sessions can be found in the attached CD-ROM. In addition, a supplementary guide pertaining to these materials was prepared as in the attached CD-ROM.

Box 4.3.1 Computer Situation at Schools

The team of computer experts arranged by the JICA Study Team, while visiting the pilot schools for computer training, found several computers and other hardware (such as printer and UPS) were unusable due to malfunction. The teachers had never made any attempts to repair or replace them, as they were not aware of such necessity.

When asked about the details of the equipments, the principal at one of the schools brought a letter received when they were first given the computers on a government project. The letter was regarding the distribution of computers, but it did not contain any information about the warranty or maintenance service. There was, however, the contact information of an agency in Colombo that supplied the equipments. The trainers advised the teachers to contact the agency, who agreed to undertake the repair of the equipments under warranty. The computers were eventually repaired and returned to the school through JICA Study Team.

To sum up, it is extremely important to provide, not only the hardware, but also the information on warranty as well as the training on how to keep the equipments in a good condition and what to do when in trouble. Any computer equipment, however expensive, can not be fully utilized unless properly maintained.

4.4 Awareness Activities and Publication

4.4.1 Website

Project Website was developed as a tool for awareness raising and information sharing among pilot schools. The website contained the information on topics, plans, activities, outputs and pictures of each QE circle. The pilot schools with the internet facility could enter the information through the internet. The URL of the website is http://www.jicakaizen.lk.

4.4.2 Newsletter and Poster

Seven issues of Monthly Newsletter, written in Singhalese and Tamil languages, were published (1,000 copies for each issue) and distributed to MOE, NIE, provincial/zonal offices and the pilot schools. The main objective of Newsletter is to disseminate Educational Kaizen activities to central and provincial government officials and non-pilot schools by introducing activities and progresses of selected high performing QE circles of the pilot schools.

Posters were also printed in English (1,000 copies), Singhalese (3,000 copies) and Tamil (1,000 copies) and distributed to MOE, NIE, provincial/zonal offices and the pilot schools. The poster presents the basic concept of the Educational Kaizen Pilot Project, as shown in Appendix 2-1.

4.5 QE Circle Convention

QE Circle Convention was held for three days in August 2004, inviting representatives of the 25 pilot schools, provincial and zonal offices and MOE/NIE officials. All 118 QE circles made presentations in seven parallel sessions. Also there was an exhibition, where the pilot schools demonstrated their outputs developed through the Pilot Project. The program is shown in Appendix 2-3.

The best three to four QE circles were awarded from each session, based on both monitoring evaluation and quality of presentation. The best performing principals and project coordinators were also awarded, based on evaluation by the monitoring team. Finally, the best pilot schools were awarded to those that demonstrated the highest achievement.

CHAPTER 5 ANALYSIS OF THE PILOT PROJECT

5.1 Analysis of Monitoring Results

Based on the performance evaluation obtained through the monitoring activities, the pilot schools were divided into three groups according to the overall performances and processes of improvement, that is, 1) stable performance, 2) rising performance and 3) stagnant performance, as shown in Table 5.1.1 and Figure 5.1.1. Brief case study on selected schools from each group is given in Table 5.1.2.

5.1.1 Overall Analysis

Most of the pilot schools successfully implemented the Pilot Project, based on the school development plan that they themselves had prepared. This proves that Educational Kaizen approach can be applied to various schools including small and poorly-equipped rural schools[7]. Attached in Appendix 2-4 is a collection of comments made by the participants of activities, such as SEIKA and QE circles, about the Pilot Project and its results.

Improvement of Educational Kaizen activities varied among the pilot schools, but it did not depend on academic level, school type, location and size.

The key success factor was the facilitative leadership of the principal. Where the principal was authoritative, the schools faced difficulties in achieving an improvement through Educational Kaizen approach due to the limited and inadequate communication among the principal, teachers, parents and the community.

When the principal was activated and facilitative, various constraints such as lack of communication, team spirit and transparency were eliminated and participation of parents and community gradually increased.

In case when the capability of the principal deemed not suitable for managing the Educational Kaizen activities, an activated teacher should be assigned the role of project coordinator to enhance the school management. However, when the principal was totally authoritative and/or not activated, even the efforts of capable coordinator and activated teachers could not lead to the expected results.

Quality of education could not be improved without an activated school culture. Having successfully achieved a change in the school culture, the pilot schools further strengthened their Educational Kaizen activities.

Teachers who have been working at the same school for many years sometimes showed resistance to change the prevailing school culture.

[7] The best school awarded at QEC Convention was given to Gonulla Kanishta Vidyalaya, a small rural school without sufficient facilities.

Table 5.1.1 Performance of Pilot Schools

Group 1. Stable Performance

No	School Name
8	St. Mary's College
9	Vembadi Girls High School
12	Gonulla Kanishta Vidyalaya
22	Imbulgoda Sunethradevi Kanishta Vidyalaya

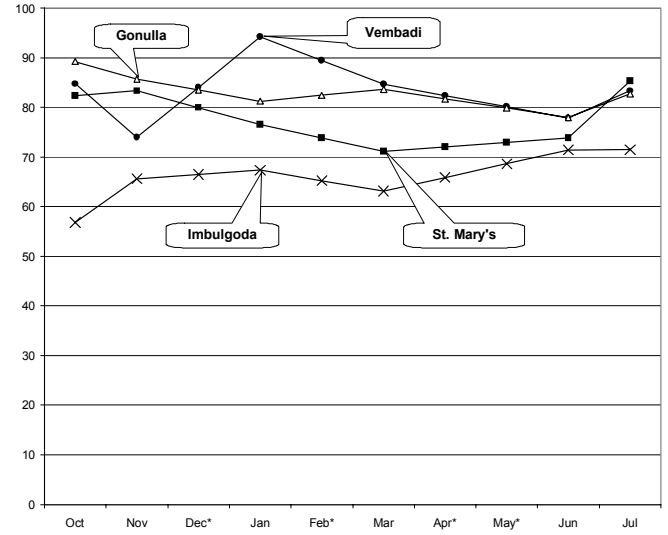
Group 2. Rising Performance

No	School Name
1	Hindagala Maha Vidyalaya
2	Rambukpitiya Maha Vidyalaya
3	St. Andrews Tamil Vidyalaya
4	Mahaweli Maha Vidyalaya
5	Ananda Balika National School
6	Thammennapura Vidyalaya
7	Mihinthale Pathiraja Thennakoon KV
11	Wen/ Dankotuwa Girls Collage
13	Maliyadeva Balika Vidyalaya
17	Vijaya National College
18	Rajapaksha Central College
19	Muruthawela Vidyalaya
20	Poonagalla Tamil Maha Vidyalaya
21	Dutugemunu Central College
24	Katuwellegama Maha Vidyalaya
25	Devi Balika Vidyalaya

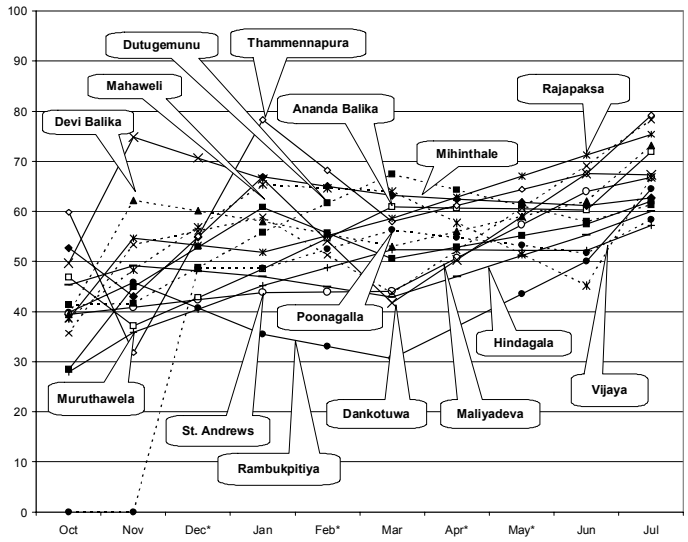
Group 3. Stagnant Performance

No	School Name
10	Canagaratnam Madhya Maha Vidyalaya
14	Maduwanwela Sri Sarananda Vidyalaya
15	Galpaya Vidyalaya
16	Golinda Tamil Kanishta Vidyalaya
24	Katuwellegama Maha Vidyalaya
23	Isipathana College

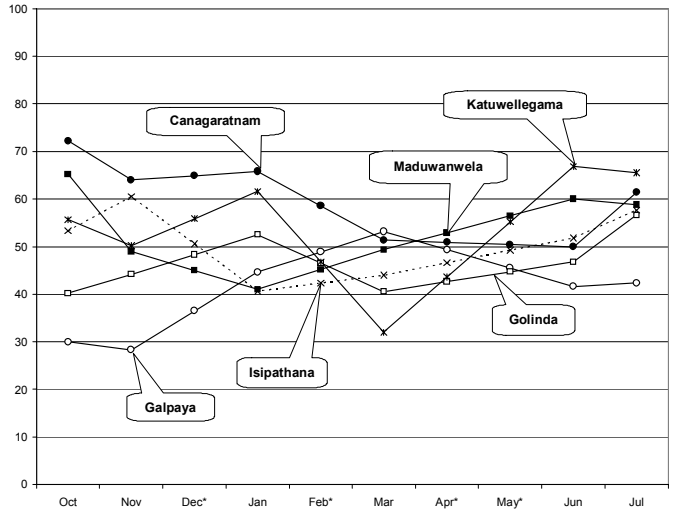
Source: JICA Study Team



(1) Stable Performance



(2) Rising Performance



(3) Stagnant Performance

Source: JICA Study Team

Figure 5.1.1 Progress of Educational Kaizen Activities at the Pilot Schools

Table 5.1.2 Case Study of the Three Different Groups

Group	School Name	*at the Early Stage* →	*at the Final Stage*
1	Vembadi Girls' High School	Educational environment has been favorable with sufficient human and physical resources as well as strong OG society. Academnic standard was also one of the highest in the area. Under the principal's facilitative leadership, the school was quick to grasp the concept of Educational Kaizen activities.	With a high level of participatioin, a steady improvement was achieved in both school management and educational activities. The school also took an initiative to introduce Educational Kaizen activities to the neighboring schools and share the knowledge and facilities with them.
1	Gonulla Kanishta Vidyalaya	Though this small school, located in a rural area, was with poor physical facility, enthusiasm was evident among principal, teachers and parents from the beginning. Principal's leadership and commitment to quality education won a wide participation from the community.	Participation of teachers, students, parents and the community was at a high level. Investment in facility development helped in bringing up the educational standard as well as changing the school culture. The school has become a focal point in sharing their resources with neighboring schools and expanding the Educational Kaizen activities.
2	Wen/Girls College - Dankotuwa	Already with a few years of experience in 5S, the school was known for solid management. However, the project revealed their weak point in that activities were dependent on only a few members and not all. When the principal was away from school for several months, activities fell stagnant.	The crucial stagnation during the principal's absense prompted the school staff to rebuild team work by strengthening information-sharing among themselves. Principal's facilitative role in promoting active participation of teachers was the key contributor in recovering the right path. Introduction of open class system also helped to improve teachers' culture as well as teaching skills.
2	Hindagala Maha Vidyalaya	Principal's absence at the initial stage of the project resulted in ineffective leadership at a later stage when he returned. There was only limited support from teachers and parents. Team work was insufficient among teachers, who felt the project brought unwanted extra burden to them.	The relationship between principal and teachers improved after they participated in the regional workshop, where they learned to openly exchange opinions and to change attitudes. Through the monitoring visits and mutual assessment, they further improved their communication and removed the misunderstanding among themselves. The school culture has changed completely over the course of the project.
2	Maliyadeva Balika Vidyalaya	This school has had sufficient physical and human resources. However, lack of awareness among staff members about the project hindered wider cooperation and participation within the school and community. There was no leadership to direct and facilitate activities.	Change in the membership of SEIKA and QECs affected positively in changing the overall school culture. With the assistance provided by the key members of staff, particularly by the newly appointed project coordinator, principal came to understand the Educational Kaizen concept and the leadership that was lacking at the beginning. Close communication and team spirit was built among teachers.

Group	School Name	***at the Early Stage*** →	***at the Final Stage***
3	Katuwellegama Maha Vidyalaya	Principal's leadership was lacking, as was his awareness about Educational Kaizen concept. Though a few teachers tried to change the situation, most teachers were skeptical about improving the school management and educational standard through Educational Kaizen approach. They faced a struggle in building team work and sharing information among teachers.	Through the discussion with monitoring team and the interaction with other pilot schools, teachers of this school realized that their activities were not as well accomplished as the others'. However, the stimulus was not so big to change the entire staff and keep things moving forward. The pervasive mood was often one of inertia. Communication among the staff needed to be improved.
3	Isipathana College	After the former principal was transferred during the project, the school faced a difficult managerial situation. In absence of principal for several months, staff morale declined and Educational Kaizen activities stagnated.	The new principal, who joined the school in the middle of the project, tried to grasp the Educational Kaizen concept and get the school back on track. However, it took some time for them to recover from the managerial problem arisen in the vacuum period. Also the principal himself was struggling to adjust to the new environment in a big school. Though some changes started to occur in teachers' understanding and motivation, improvement was too slow to be evident within the pilot project period.
3	Galpaya Vidyalaya	Principal's leadership and understanding was next to non-existent in carrying out the Educational Kaizen activities. Only a few dedicated teachers were involved in various aspects of the project, facing serious managerial problems.	In spite of the management problem of the school, substantial support and cooperation was given by the community to the activities, including construction of teachers' quarters. Teachers' attitudes changed progressively, from one that is passive and dull to the one that is driven by motivation and commitment. However, the crucial deficit in managerial capacities and leadership of principal hindered the school from attaining a noticeable improvement in performance.

Source: JICA Study Team

5.1.2 Stable Performance Group

The reasons why these pilot schools could achieve the stable performance during the Pilot Project can be summarizes below:

- The principal understood the concept of Educational Kaizen activities well from the beginning and recognized the benefits.
- The principal was a good facilitative leader.
- Because of the proper understanding of the concept, best suitable teachers were assigned as the project coordinator and QEC leaders.
- St. Mary's College and Vembadi Girls' High School are among the top leading schools in the area and had capable and motivated teachers. As the collaborative working culture was introduced through the Pilot Project, their performance was further enhanced.
- Gonulla K.V. and Imbulgoda Sunethradevi K.V. are small Type 3 schools located in a rural area and have limited human resources. However, the principals of these schools were activated and had clear vision to improve the school. Because of a small size of schools, it was relatively easy to make teachers understand the concept and benefits. In addition, the schools' close relationship with community enabled a high level of parent participation.

5.1.3 Rising Performance Group

The reasons why these pilot schools could raise their performance through the Pilot Project can be summarized below:

- It took time for the principal to properly understand the concept of Educational Kaizen and recognize the benefit, which is quite reasonable.
- In most cases, the school culture gradually changed through various interventions of the Pilot Project. Some of the contributing factors includes: 1) Problems were solved on site through discussion with the monitoring team; 2) Real communication was brought about through mutual assessment system; 3) Collaborative relationship grew up among teachers through open class system; and 4) Opportunities were given to exchange ideas and information among the pilot schools through a number of workshops as well as visits to other pilot schools.
- Most of these schools became confident especially after the school-based workshops, by seeing appreciation and satisfaction of participants from neighboring schools.
- Hindagala M.V. completely changed their culture after the regional workshop, where the principal discovered the importance of communication and how to improve it by introducing mutual assessment system. Similar change was seen at Rajapaksa Central College,

Muruthawela K.V. Dutugemunu Central College and Devi Balika Vidyalaya.

- St. Andrews TV dramatically improved its performance after getting the active involvement of the zonal office, because transparency increased.
- After receiving low marks of monitoring evaluation, Thammennapura V. was stimulated and changed their culture.
- Mihinthale P.T. K.V. had the capable and committed project coordinator. With her initiative, they have disseminated their outputs and methods to other teachers, including those in the neighboring pilot and non-pilot schools.

5.1.4 Stagnant Performance Group

The reasons why these pilot schools could not accomplish success results can be summarized below:

- Some of the principals in this group could not fully understand the concept and benefit of Educational Kaizen approach till the last.
- They thought that 5S was just cleaning and improving the physical appearance. They tried to "entertain" the monitoring team by showing the improvement in the environment, but it did not go beyond surface.
- In Isipathana College, the large school size made it difficult for the newly appointed principal to change school culture, since quite a number of old teachers showed resistance against a change.

5.2 Analysis of QE Circle Activities

5.2.1 Quantitative Analysis

A total of 944 activities were reported by the pilot schools, indicating that a great number of school staff, parents, students and provincial/zonal officers actively participated in activities to improve almost all kinds of challenges existing in schools. It shows that they are ready to cooperate with school-based activities, when certain conditions are met.

All 944 activities classified into categories were analyzed according to school type and locations, as shown in Table 5.2.1. Although the analysis shows no significant differences in activities among schools in different types and location, the following findings were observed reflecting the needs of the pilot schools:

(1) Analysis by school type

Type 3 schools did more activities for 5S. This indicates that as these schools lacked proper educational environment, they have prioritized 5S activities.

Type 1AB schools had fewer activities for experiment and project work. This might indicate that Type 1AB schools focused on more theory-oriented education targeting at the national examinations.

Type 1AB schools had more activities for computer aided education. It is

presumably because Type 1AB schools were relatively better equipped with computer facilities and had human resources available for computer aided education.

In Type 1C schools, there were not many activities for improving laboratory. These schools have no science stream in A-Level and they focused on other activities.

(2) Analysis by location

5S was implemented more in rural and plantation schools, which was because those schools were in need of proper educational environment.

Plantation schools had more activities related to school management and basic infrastructure/facility than others. This is understandable since those schools are generally poorly equipped and 5S activities were implemented together with facility improvement.

Urban and rural schools were more active in experiment and project work, which proved that the activity base education is widely accepted, irrespective of the school type.

Activities for teachers' quarter were done by two schools in rural and plantation areas. These schools have serious difficulties in obtaining teachers because of their isolated location.

Table 5.2.1 Major Activities Classified by Categories

Category of Activities		Major Activities								
			By Type				By Location			
		Total	1AB	1C	2	3	Urban	Semi-Urban	Rural	Plantation
I	**Improvement of School Management**	**19%**	**19%**	**19%**	**19%**	**21%**	**18%**	**18%**	**21%**	**23%**
	5S	14%	13%	14%	15%	18%	12%	11%	18%	17%
	Information management system	3%	3%	1%	3%	3%	3%	3%	3%	4%
	Other (e.g., mutual assessment, professional development)	3%	3%	4%	1%	0%	3%	5%	0%	2%
II	**Improvement of Science and Mathematics Education**	**50%**	**48%**	**51%**	**53%**	**51%**	**49%**	**53%**	**52%**	**41%**
	Teacher's manual	1%	1%	0%	1%	1%	1%	2%	0%	0%
	Handout, workbook, question paper, assignment	19%	18%	17%	21%	16%	18%	23%	16%	18%
	Experiment, project work	13%	10%	17%	13%	22%	15%	8%	18%	6%
	Computer aided education	3%	5%	3%	3%	0%	4%	4%	2%	6%
	Observation tour	2%	2%	1%	3%	1%	0%	2%	3%	2%
	Other (e.g., wall paper, workshop, eshibition, student clubs)	8%	9%	5%	9%	6%	6%	9%	9%	4%
	100-box calculation	5%	4%	8%	4%	5%	4%	5%	4%	5%
III	**Improvement of Basic Infrastructure and Facility**	**31%**	**33%**	**30%**	**28%**	**28%**	**33%**	**30%**	**27%**	**37%**
	Classroom	1%	1%	2%	1%	2%	1%	2%	2%	2%
	Library	8%	8%	11%	5%	8%	9%	6%	7%	13%
	Laboratory	10%	10%	4%	12%	14%	9%	12%	11%	4%
	Computer/Multimedia	4%	5%	4%	3%	0%	6%	3%	1%	10%
	Printing facility	0%	1%	0%	0%	0%	1%	0%	0%	0%
	Communication facility	2%	3%	2%	1%	0%	1%	4%	1%	0%
	Sanitary facility	1%	1%	0%	1%	1%	1%	0%	2%	0%
	Electricity	0%	0%	1%	0%	0%	0%	0%	0%	1%
	Teachers' quarter	1%	0%	3%	0%	0%	0%	0%	0%	5%
	Campus map, directional signs, footpath, gate, etc.	3%	3%	3%	3%	3%	4%	3%	3%	2%
	e.g., staff room, canteen	0%	0%	0%	0%	0%	1%	0%	0%	0%
Total		**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**
		944	**414**	**162**	**268**	**100**	**234**	**276**	**333**	**101**

Source: JICA Study Team

5.2.2 Qualitative Analysis

(1) School Management

Principal and teachers tend to work individually in schools. Communication practice is rather limited and information is shared only among a small number of staff members. No critical issues are discussed in the staff meeting and no decisions are made. Consequently, there is no school culture to make them activated and cooperate with each other. Although a considerable amount of inputs such as training, equipment supply, infrastructure development have been undertaken for schools through various projects in the past, outcome could not be at a satisfactory level under this situation. This was a real situation in most of the pilot schools.

The Pilot Project challenged this most fundamental but complicated task, applying Educational Kaizen approach. In all pilot schools, the school culture started to change, through which 1) teachers became activated, 2) teachers started to work together, 3) teachers pay more attention to students, 4) teachers started to think and act by themselves, and 5) parents started to participate in school activities. Although it was a time consuming and difficult process, the pilot schools started to move forward. Eventually, teachers noticed that they can solve most of their problems through team work, and their experience of problem solving made them confident, activated and happy.

Based on the overall experience of the Pilot Project, it can be said that schools should start with 5S activities and mutual assessment system in order to develop the foundation for Educational Kaizen activities.

Table 5.2.2 is a list of tips on how to improve communication skills. It points out some of the typical practices hindering smooth and effective communication, which can be amended by even a small behavioral change and attention.

Table 5.2.2 List of Tips for Better Communication

DO ask or consult the person in charge if you are uncertain about something.	**DON'T** just wait until somebody comes and clarifies it for you. **DON'T** be afraid or ashamed to ask a question.
DO get into the habit of writing things down.	**DON'T** come to a meeting empty handed. **DON'T** ever think you will remember something completely for sometime after you have heard about it – people do forget.
DO always keep a notebook with you.	**DON'T** write on a piece or scrap of paper – it will most likely get lost when you need it.
DO define each person's tasks and responsibilities clearly and let everybody know who is supposed to do what by when.	**DON'T** assume or expect somebody will do the job sometime.
DO make a realistic estimate of things – especially about your own capacity. If you can't complete your tasks as agreed, promptly inform all the parties concerned.	**DON'T** commit yourself to something you know you cannot work to.
DO develop a proper information sharing system – relevant documents should be circulated among those concerned and the master file should be available for anybody's view at any time. "I don't know" is no excuse.	**DON'T** assume that others will get the same information you get from somewhere else.
DO listen actively. Active listening means not only listening to the words but also observing the expressions and gestures of the speaker.	**DON'T** come to a conclusion just after you have heard only a part of the story.
DO speak clearly and distinctly.	**DON'T** expect others to understand what you say when it is not clear to yourself.

Source: JICA Study Team

1) Promotion of 5S

Most of the pilot schools successfully introduced 5S. 5S activities gave positive impacts on the school culture. As such, these activities were effectively expanded to students' homes and neighboring schools. Such a movement certainly gave a positive influence on the quality of education provided at schools.

However, it seems that some of the schools still do not fully understand the concept of 5S correctly. Some people misunderstand that 5S is just a method of housekeeping. 5S is a systematic approach to eliminate waste of time, money and materials by everyone's involvement. 5S covers all aspects of our life such as communication practice, information management, data integration and filing system. Everybody has to have a spirit to improve every activity around us in a systematic way.

Without everyone's involvement, 5S activities can not be sustainable. Continuous effort of the pilot schools has to be maintained together with internal and external monitoring activities.

2) Development of information management system

Many pilot schools developed information management system. Most of them are still in paper based system, while several pilot schools, in which human resources were available, developed computerized information management system.

However, it was observed that data collection was not accurate in some pilot schools. Moreover, many pilot schools did not analyze data to identify problems and find countermeasures. Despite that teachers have gained computer skills at the computer training provided by the Pilot Project, many pilot schools did not start using these skills to computerize their paper based information management system.

3) Introduction of mutual assessment system

The mutual assessment system is well introduced at all pilot schools and had favorable responses from the majority of school staff, although there were some resistances at the beginning. The introduction of the system gave significant impact on school staff. Constructive comments and suggestions lead them to improve their shortcomings, and motivated them to get better results in the next assessment.

The introduction of the mutual assessment system accelerated changing school culture toward a full implementation of Educational Kaizen activities through everyone's involvement in most of the pilot schools. This system has to be maintained to encourage school staff to make individual progress and to improve school culture.

(2) Science and Mathematics Education

Teachers heavily depend on teachers' guide supplied by MOE and expect to gain new things only by participating in training and seminars that the principal assign them to attend. They seldom study on their own to collect the latest information related to science and mathematics and rarely develop their original teaching method and teaching materials. Activity based and interactive teaching and learning is not a very popular method among teachers, since they are not so confident to practice it. As a result, their teaching method remains conventional and students lose interest in science and mathematics. Moreover, teachers do not find it joyful to teach, and leave school to go home at 2 p.m. sharp. This was the typical working attitude of many teachers in the pilot schools.

Recognizing that improvement in the quality of education in science and mathematics is not possible without changing teachers' attitude, the Pilot Project challenged to promote self-learning activities through Educational Kaizen approach. Through QE circle activities, teachers learned to think, plan and develop teaching materials and activity based and interactive teaching and learning. The open class system made teachers become confident in their teaching skills. 100-box calculation proved to be an effective tool to strengthen the basic calculation skills.

As a result, teachers understood that they could improve their teaching skills by self-learning to a large extent, when they worked together and taught each other. In addition, they recognized that teaching is a joyful work. Although it takes more time to ensure the change, things started moving forward.

Having achieved a change in school culture, schools should start with the open class system, which makes teachers' communication effective and, as a result, makes them confident. This should be followed by the development of teaching materials and promotion of experiment and project works.

1) Development of teaching materials by teachers

Enormous amount of teaching materials was developed by teachers, which gave significant benefits to students. These teaching materials certainly helped teachers to teach effectively and efficiently and made it easy for students to understand subjects.

However, there are areas to be improved. For example, many of teaching materials were rather exam-oriented and were far from activity based and interactive teaching and learning. Also, still some of the teachers are reluctant to develop their own teaching materials.

The next step would be to upgrade the quality of teaching materials so as to stimulate students' interests toward science and mathematics and to develop their creative way of thinking.

2) Promotion of experiment and project works

A number of activities related to experiment and project works were undertaken. It enhanced activity based and interactive teaching and learning method and successfully increased students' interest toward learning science and mathematics.

However, some parents, particularly in popular urban schools, rather prefer theory-oriented education to experiment and project works. They request teachers to focus more on the preparation for the national examinations. Due to this pressure from parents, some teachers in these schools hesitated to expand experiment and project works in teaching. The teachers should persuade parents to understand the importance of experiment and project works, as it increase students' interests in science and mathematics, helps students to understand theories easily, and in the end improves examination results.

Moreover, many of activities developed by teachers of the pilot schools were rather non-scientific or only demonstration of scientific magic and selected topics were mostly outdated. In science in particular, they should use the latest topics in the world. Experiment should be linked with theories, while project work should provide students with opportunities to think about the design, approach, data collection, analysis and presentation.

In this connection, a series of model experiments were developed through the Pilot Project and were introduced in the pilot schools. This impacted teachers and students and brought out their innovative ideas and approaches. These model experiments should be implemented more extensively and modified by the teachers of the pilot schools.

3) Promotion of 100-box calculation

All pilot schools introduced 100-box calculation to improve four basic operation of arithmetic. Most of the students showed remarkable results. They enjoyed the exercise, became confident and eliminated the fear of mathematics. In addition, students, as well as teachers, knowing the importance of time, became punctual, increased concentration power. 100-box calculation is proved to be a powerful tool with little cost.

However, in some schools, it took a long time to make teachers understand the concept and correct method. For instance, some teachers just let students repeat 100-box calculation everyday without teaching any skills, while some others just conducted the exercise every day without doing any analysis of results. As a result, students could not complete the division part within one year and the full benefit has not come to the students yet.

4) Promotion of open class

Many pilot schools introduced the open class system and became aware of its usefulness. Open class system is effective to improve teaching skills of teachers while no cost is required. Teachers became confident in their teaching after having comments and suggestions from the colleagues who observed their lessons. Observer teachers also gained benefit, learning new skills from colleagues.

However, as the open class system was introduced in the pilot school only in the Part II, this system is still in an experimental stage and therefore the benefit has not fully come to students yet. The pilot schools should continue this activity to upgrade their teaching skills, developing their own method to teach each other, which will enhance communication among teachers.

5) Establishment of science corner

Some of pilot schools established science corner and allowed for students and parents to use health measuring instruments freely. They became familiar with the use of instrument.

However, in many schools these instruments were not frequently used. Moreover, they did not utilize them to make tables and figures of data, which would be good practical lessons to use mathematics for daily life.

(3) Basic infrastructure and facilities

Most of the pilot schools improved basic infrastructure and facilities with the support from parents and community. Since the pilot schools prepared their school development plan together with parents and community, a strong sense of ownership arose, enabling the fullest cooperation from parents and community. As a result, the pilot schools constructed facilities such as teachers' quarters, science laboratory, and library at around 50 to 70% of the ordinary cost. Many pilot schools invited neighboring schools to use their facilities on a regular basis, through which an inter-school collaboration was initiated.

However, since this was the first experience for the pilot schools to make a plan and design, procure materials, and monitor the construction works, they had difficulties in managing such a process, and inefficient use of budget was observed in some schools.

Some pilot schools had difficulties to purchase expensive equipment such as printing machine, multi-media projector and computer and printer, since they did not have the up-to-date information on these equipments as well as on suppliers.

5.2.3 Analysis of Supplementary Tables and Figures

Selected tables and figures prepared by the pilot schools and presented at the QE Circle Convention are shown in Appendix 2-5. These tables and figures indicate

the progresses of the pilot schools in various areas.

Box 5.2.1 Progresses Reported by the Pilot Schools

Below are some of the progresses identified by the pilot schools.

- Attendance rates of students increased after promoting experiments and project works.
- The number of student latecomers decreased.
- Leaves taken by school staff reduced.
- Teachers' perception on students' attitudes and behaviors improved.
- The number of suggestions increased.
- Average marks of term test increased after introducing interactive teaching and learning.
- Submission of weekly assignment increased.
- Basic calculation skills improved through 100-box calculation.
- The number of students entering the science and mathematics streams increased.
- The number of library books used increased.
- The number of students who use the laboratory increased.
- The number of students who use the internet increased.
- Parents' participation in school activities increased.

CHAPTER 6 LESSONS LEARNED

Lessons learned through QE circle activities during the Pilot Project were summarized as shown in Table 6.1.1 and lessons learned through activities to support QE circles were summarized as shown in Table 6.1.2.

Table 6.1.1 Lessons Learned from the Pilot Project (1)
－Through QE Circle Activities －

Activity	Result	Lessons Learned
I. School management		
Overall	School culture changed and school staff became activated in most of pilot schools through Educational Kaizen activities. Also, school management was strengthened and became more efficient in those schools.	• Educational Kaizen activities can be applied to the education sector to strengthen management, education and infrastructure/facility. • Schools could change their culture through a combination of Kaizen methods such as QE circle activities, 5S, suggestion system, and raise the motivation of teachers and cooperation of parents. • Key factor in improving school culture was the good communication practice, which gradually developed through Educational Kaizen activities. • However, it took a long time for all school staff to fully understand concept of Educational Kaizen. Continuous effort is needed to penetrate Educational Kaizen activities.
Formation of SEIKA	All pilot schools formed SEIKA, consisting of 15 to 25 members from school staff, parents, OB/OG, zonal officers and neighboring schools.	• The success factors of SEIKA were: 1) facilitative leadership of the principal; 2) open discussion among representatives of different groups in the school/community; 3) transparency in decision-making process including financial matter; 4) regular meetings; and 5) maintenance of minutes of meeting. • When a proper mechanism was developed, schools were able to work collaboratively with different groups in and outside the school, which was the very first experience for most of them. • Transparency can be maintained if SEIKA members from outside the school were involved. Particularly involvement of zonal officers was essential. • SEIKA meeting should be held every month and meeting minutes, with signature of all members, should be maintained for the record. Meeting should be chaired by the principal in a facilitative manner so that discussion becomes open and fruitful. • Financial report submitted by QE circle needs an approval of SEIKA and all receipts have to be signed

		by the majority of SEIKA members in order to avoid misuse. • If the appointment of key positions such as project coordinator and QE circle leader deemed to be inappropriate, SEIKA has to take an immediate action to replace them. • If the principal is not capable enough to manage the Educational Kaizen activities, he/she should transfer some of his/her roles and authority to appropriate staff member in charge, and encourage him/her to lead the activities while protecting him/her from unnecessary pressure.
Formation of QE circles	118 QE circles were formed, consisting of 10 to 15 members including school staff, parents, students, ISAs. Each QEC had one topic, comprising several activities.	• The success factors of QE circle were: 1) facilitative leadership of QE circle leader; 2) understandings of goals, objectives, approaches and expected results; 3) frequent and open discussion for decision making; and 4) understanding of individual members' roles and responsibilities. • QE circle meeting should be held twice a week, even just for 15 minutes after school, in order to discuss problems, progresses and to confirm tasks and assignment. QE circle leader must chair the meeting in a facilitative manner so that discussion becomes open and fruitful. • When a QE circle is functioning well, teachers are willing to work even after 2 PM. • However, it is not easy for all QE circle members to understand the benefit of and commit themselves to the activities. QE circle leader should share the results with them and try to make family-like culture. Through this process, many QE circle members experienced the feeling that they suddenly became one family.
Implementation of 5S	All pilot schools implemented 5S as one of the QE circle activities.	• 5S should be the starting point for Educational Kaizen activities, since it is a systematic approach to minimize waste of time, money and materials. • However, many misinterpreted 5S as merely a physical improvement and house keeping at first. The solution was to utilize local experts to make them fully understand, as there is no language barrier and they have an appropriate understanding of local conditions and culture. On-site consultation was essential in ensuring the understanding of 5S concept. • Though it took time, QE circle members gradually started understanding the benefits of 5S through

		frequent discussion among themselves. Subsequently, 5S activities have been spreading to students' families and neighboring schools.
Introduction of suggestion system	All pilot schools introduced suggestion system, in which suggestions from school staff, students and parents were sought and selected for implementation.	• Suggestion system was an effective tool to encourage people to think about and contribute toward improvement of school. For most of the pilot schools, suggestion system was new and unfamiliar; therefore, at the beginning there were only few suggestions and most of them were mere requests. • A reward system that some schools introduced, in which the persons who submitted the best suggestions are acknowledged, helped to raise the motivation to participate in suggestion system. • Students become proud when their ideas were implemented. This enhanced their motivation and made them feel a sense of ownership of school.
Introduction of mutual assessment system	Most of the pilot schools introduced mutual assessment system, which has three types of assessment – principal's assessment by teachers, teachers' assessment by peer teachers, and teachers' assessment by students.	• The mutual assessment system helped to make school culture open and school staff activated. • Mutual assessment system was an effective tool to change school culture. When school staff was properly explained its benefit and necessity, most of them agreed to implement it, although it took a long time for some schools to adopt it. • Teachers realized that a lack of genuine communication among them was the bottleneck in changing the school culture. They must know their own shortcomings in order to improve themselves. • This was the first time for teachers to be assessed on and informed of their strengths and weaknesses by others (i.e., the principal, peer teachers, and students). Although there was no such culture in Sri Lanka as to evaluate each other, most of the principals and teachers showed positive reaction after receiving the assessment results, admitted their shortcomings and were determined to improve them one by one. Periodic implementation of mutual assessment gave a motivation to school staff, as they could see their own progress through the assessment results.
Development of information	Some pilot schools introduced information management	• One of the key factors to improve school management was to disclose all information to school staff. • Most of the pilot schools earlier kept back all documents sent from the JICA Study Team in a

management system	system by developing database and filing system for attendance record, personnel data, examination mark, library and inventory.	cupboard in the principal's office. After understanding of Educational Kaizen concept, however, the pilot schools developed proper system to file and circulate the documents. They learned how school management could be made easy by developing, upgrading and maintaining filing system properly. • For a majority of schools, paper based data management was more appropriate at this moment. A few schools introduced computerized data management. Schools should gradually shift from paper based to computer based information management system.
School-based workshop	All pilot schools organized two school-based workshops, inviting 40 to 60 participants from neighboring schools, in order to demonstrate and disseminate the QE circle activities and outputs.	• Pilot schools have the capacity to plan, arrange and conduct a workshop. • Organizing a workshop made school staff motivated, as they felt proud to show their experience of the Pilot Project to the participants from neighboring schools. It also made them unite and work in a team spirit through the process of preparation. • Workshop is a good way to share know-how and outputs among schools, and to develop inter-school communication.
II. Science and mathematics education		
Overall	Many teachers started to think of the ways to improve the quality of science and mathematics education.	• Quality education is not possible without teachers' motivation. • Through Educational Kaizen activities, teachers learned to work cooperatively to improve quality of education, which they rarely did before. • Teachers could make various efforts to improve quality of education such as developing teaching materials, upgrading laboratory facilities, introducing practical lessons and interactive teaching and learning, conducting extra class. They realized that teaching is not just a job but a service to students. • One of the constraints for teachers to think of new and original teaching and learning method was that they misunderstood that they had to follow exactly what is said in the teachers' guides and syllabus. There was the same misunderstanding in some of the zonal officers too. • It takes time to change teachers' attitudes and it takes even more time for students to really benefit from the changed teachers' attitudes and teaching methods. A continuous effort by school is a must

		with necessary assistance from MOE/NIE as well as provincial/zonal offices.
Development of teaching materials	All pilot schools developed enormous amount of teaching materials, most of which are computerized and can easily be modified and used for years.	• If facilities, such as computer, printing machine and stationery, are available, teachers are willing to develop teaching materials with their own ideas and knowledge. • Computer training should be provided to teachers. Teachers have to be multi-skilled including computer literate, but such perception is still low. Those with no or little computer skills had to outsource even simple typesetting work.
Introduction of open class	Some pilot schools started introducing open class system within school, in which a teacher is assessed on his/her teaching process by colleagues.	• The open class system was effective to improve teaching skills of teachers and to enhance communication practice within the school. Although they were shy at first, when teachers recognize benefit of having open class, they agreed to invite colleagues to observe their teaching in class and asked for suggestions to improve any shortcoming. • Teachers who were observed became confident in their teaching after having comments and suggestions. • Teachers who observed also gained benefit, learning new skills from colleagues.
Promotion of model experiments	All pilot schools implemented model experiments in order to promote practical and interactive teaching and learning process and to apply science and mathematics to daily life.	• Teachers showed very keen interest in model experiments and implemented them in their class. A number of model experiments were developed in a joint effort of a JICA expert, Counterpart Team, teachers of the pilot school and JICA Study Team, through which teachers learned how to develop and prepare equipments and instruction manuals. • At first, most of teachers did not understand real meaning of interactive teaching and learning, but they only knew the words. They grasped the idea after attending the model experiment workshops. This implies that only by doing experiments by themselves they could achieve the real understanding. • Teachers were hesitant to adopt interactive teaching and learning method in the class, because they were not confident enough in doing so and were afraid of having questions from students that they

		may not have an answer to. But through experiencing practical lessons at workshops, having discussion with colleagues, they gained confidence. Students' response was also favorable. • Recognizing that students enjoyed model experiments and increased their interest in science and mathematics, teachers were motivated and became confident in their teaching.
Introduction of 100-box calculation	All pilot schools introduced 100-box calculation to strengthen the skills for four basic operation of arithmetic, which was invented and has become popular in Japan.	• It was proved that 100-box calculation is a powerful method to strengthen basic calculation skills of students in Sri Lanka. • Most of the students enjoyed the exercise, became confident and eliminated the fear of mathematics, realizing their calculation skill improved in speed and accuracy day by day. • Furthermore, students, as well as teachers, knowing the importance of time, became punctual, increased concentration power, and learned to make the class operation efficient. They also recognized the importance of analysis. • However, in some schools, it took a long time to make teachers understand the correct concept and method. For instance: 1) some teachers just let students repeat 100-box calculation exercise everyday without teaching any skills of calculation; and 2) some teachers just conducted 100-box calculation everyday without doing any analysis of calculation results.
Establishment of science corner	Some pilot schools established science corner with measuring instruments of height, weight, eyesight and blood pressure, in order for students to become familiar with the use of scientific equipments.	• Science corner was effective for students to learn how to use scientific instruments and mathematics skills for their life. In general, students in Sri Lanka are not so familiar with the use of instruments and application of theory. When they were allowed to use health measuring instruments freely, they were excited as it was very much related to their own health. • First they were did not care to measure accurately, but with some practice, they improved the accuracy. • Students also learned to make tables and figures using the data, which provided them with practical lesson to use mathematics for daily life.

III. Basic infrastructure and facilities		
Overall	Most of the pilot schools improved basic infrastructure and educational facilities with the support from parents.	• When pilot schools were allowed to prepare their development plan based on their needs and priority, they could improve basic infrastructure and educational facilities with a strong sense of ownership. • Because of this ownership, many pilot schools have the fullest cooperation of parents. • A cooperative culture was developed among school, parents and community.
Improvement of basic infrastructure	Many pilot schools improved basic infrastructure such as water supply, road, power supply and garbage management in cooperation with parents, students and OB/OGs.	• With the support from parents, the pilot schools constructed such facilities as teachers' quarters, science laboratory, mathematics room, library, science garden at around 50 to 70% of ordinary cost. • Improvement of basic infrastructure made students more disciplined. Water supply system, for instance, provided students with habits of cleaning and hygiene. • Since this was the first experience for school to make a plan and design, procure materials, and monitor the construction works, they had difficulties in managing such a process. A supporting scheme by provincial and/or zonal office is needed to promote this kind of school-based activities. • Inefficient use of budget was observed in some schools. A standardized bookkeeping system should be established with a financial monitoring system by provincial and/or zonal office.
Upgrading of educational facilities and office equipment	Many pilot schools upgraded educational facilities based on their needs.	• Upgraded educational facilities such as laboratory and library motivated students to study science and mathematics with increased interests. • Many pilot schools invited neighboring schools to use their facilities on a regular basis. • Teachers' quarters enabled teachers to conduct extra class. Classroom partition enhanced efficiency of class operation and concentration of students. Upgraded library increased a number of books lent. • Some pilot schools had difficulties to purchase expensive equipments such as printing machine, multi-media projector, computer and printer, since they did not have the up-to-date information on these equipments as well as their suppliers. Such types of equipments should be supplied through centralized distribution system.

Table 6.1.2 Lessons Learned from the Pilot Project (2)

– Through Activities to Support QE Circles –

Activity	Result	Lessons learned
I. Preparation		
Overall	During the 5-month preparation, 25 pilot schools were selected and provided with orientation and guidance on school development plan and financial management.	• It was not easy to make school staff understand the concept, objective, approach and implementation scheme of the Project, since the nature of the Project was completely new to them. • Transparency can be maintained under a rule that every receipt required signatures of majority of SEIKA members for approval. Financial report should be open to everybody. • Since all pilot activities were designed and implemented through discussions between JICA Study Team and Counterpart Team, know-how and experience of the Project were shared. However, since Counterpart members could not be involved in all activities on a full-time basis, some administrative and financial skills could not be transferred well. These skills are critical for government officials, when SBM is introduced.
Selection of pilot schools	25 pilot schools were selected from 49 long-listed schools identified by JICA Study Team and Counterpart Team.	• Selection of pilot schools should be based on not only the quality of the proposal, but also the capability of the principal and associated zonal director. The capability of the principal is very important. The principal should be a facilitative type of leader and activated to change the school. • Pilot schools should not be scattered island wide, as this makes monitoring activities time-consuming and difficult.

Orientation to pilot schools including preparation of school development plan	In order to explain outline of the project, a series of workshops was conducted. 2-day workshop in Colombo, inviting representatives of pilot schools, and school-based workshops at the 25 pilot schools, followed by a 5-day workshop in Colombo.	• As in the Sri Lankan culture, participants did not raise any questions at workshops, even if something was not clear. Small group discussion among themselves should be utilized to address their questions. • Language was another barrier. Although it took time, careful and accurate translation into Sinhala and Tamil was necessary. • Without a genuine understanding of the project concept and recognition of their benefit, nothing could move on. Some schools gained a full understanding immediately after briefing of the Project, but for other schools it took some time to understand the concept and benefit. • It took time to prepare school development plan, but it was important for schools to have a consensus among the staff.
Financial arrangement	Allocation of budget among pilot schools was decided based on the number of students and the school's location (urban, semi-urban, rural and plantation).	• The size of budget should have been carefully decided based on school development plan in addition to school size and location. Fund should be released to each pilot school in small installments, confirming monthly expenditure (amount and its proper use). • Training on basic accounting practice should be provided before the Project starts. The training should include how to handle invoice, receipt, bank check, bookkeeping, banking and financial report, etc. Some teachers wrote blank checks, accepted unofficial receipts (written in a scrap of paper without signature or seal) or forgot to receive receipts. Petty cash was allowed and kept with some teachers, but the balance amount was not correct every time.

Institutional arrangement to support QECs	JICA Study Team and Counterpart Team (MOE/NIE) were involved in all activities of the Pilot Project, such as monitoring, workshop and inspection.	• Since the approach of the Project was completely new in the country and therefore had to be proceeded by trial and error, the Pilot Project was managed by JICA Study Team and Counterpart Team. However, involvement of provincial and zonal officers was one of the key factors for sustainability. • Provincial and zonal offices were not so much involved in the Pilot Project in Part I, although the pilot schools were requested to include representatives from provincial and zonal offices in SEIKA. • Involvement of zonal officers became active in Part II after the workshop to brief progress and constraints from Part I and to request their assistance for Part II. • Participation of provincial/zonal officers in school-based activities made the pilot schools more active and transparent. The Project should have involved them more from the beginning, although this might have caused a slow and time consuming implementation.
II. Workshop and convention		
Overall	A range of workshops were held, both in Colombo and at the pilot schools, to facilitate the Educational Kaizen activities. A total of over 7,000 person-day was involved.	• Inter-school network gradually developed among nearby pilot schools and they started exchanging resources such as teaching materials. Some schools held joint workshops. • Teachers became confident through conducting model experiments jointly with other teachers, Counterpart Team and JICA Study Team at the workshops. It was the first experience for most of teachers to do this kind of experiments in an interactive teaching and learning manner. They realized how it can attract the interests of students.
Intermediate workshop	Intermediate workshops were held two times in Colombo, inviting representatives of pilot schools.	• Intermediate workshops provided the pilot schools with an opportunity to exchange ideas and experiences. It helped schools to become more active and teachers to become confident in teaching. The participants learned activity based and interactive teaching and learning methods through demonstration and practice.

Model experiment workshop	A series of model experiment workshops were held, i.e., for 4 days in January and 8 days in May 2004 in Colombo, and for one day at each of the 25 pilot schools in June and July 2004.	• For the 8-day workshop, half of topics were selected from proposals submitted by teachers of the pilot schools. Those teachers were called for a 3-day preparatory workshop to develop an instruction manual. They learned how to plan and conduct experiment in interactive teaching and learning method. Other teachers also started thinking of creating new model experiments, which was rarely observed before. • In order to disseminate model experiment, Counterpart Team visited and held school-based model experiment workshops at the 25 pilot schools. All science and mathematics teachers of the pilot schools learned face-to-face and developed confidence in introducing model experiment in their class. • Skills and knowledge of most teachers for experimental lesson are still rather limited, because they have not had necessary training. Most of the activities they developed were not up to the standard and lacked originality. Therefore, model experiments need to be further developed by the initiative of NIE.
Regional workshop	A series of regional workshops was held twice at 6 pilot schools. Also, follow-up workshops were held at the 25 pilot schools.	• The workshops used small group discussions and role play to illuminate the issues in school culture. It was the first experience to discuss real problems and constraints that individual teachers face everyday at school. • The discussion was concluded with an introduction of a system to assess each other in order to change the school culture. Most of the participants agreed to adopt three kinds of mutual assessments: 1) principal's assessment by teachers; 2) teachers' assessment by teachers; and 3) teachers' assessment by students.

QEC Convention	3-day Quality Education Circle Convention was held and 118 QE circles made presentations of their 1-year pilot activities.	• QEC Convention provided participants with opportunities to exchange ideas and information and to develop personal and inter-school network for further collaboration. It also provided opportunities to observe outputs of QE circles, such as teaching materials and experimental equipments. • Opportunities to make a presentation in front of audience gave the motivation, by which pilot activities were stimulated toward the end of the Project. • Teachers prepared high quality presentation materials using PowerPoint. • Listening to other schools' presentations, participants learned valuable lessons from many Educational Kaizen activities. • Various awards encouraged school staff to achieve remarkable results. • Administrative arrangement of QEC Convention was not easy and it took time and cost, as the size of the event was large. But government officials should be capable of managing it efficiently and productively in order to continue these activities every year, which is an important part of Educational Kaizen activities.
III. Support and supervision		
Overall	JICA Study Team, together with the Counterpart Team, provided support and guidance to the pilot schools through monitoring activities and training, both in Colombo and on-site.	• On-site consultation was the most and only effective way for pilot schools to gain a full understanding among all members. Even if they have a lot of questions and unclear points, they rarely raise questions at workshops and never call and ask questions to clarify or confirm. Therefore, regular monitoring visit is a necessary and powerful tool to ensure information transfer to school. It was not enough to transfer information only by workshops and documents. • Regular financial inspection is critical, such as verifying purchased items, receipts, amount of money spent, bank statement, etc., since pilot schools were not so much familiar with financial management.

Monitoring	Monitoring team, consisting of JICA Study Team and Counterpart Team, visited pilot schools 7 times and conducted one-day monitoring activities at each school by having meetings with SEIKA and individual QE circles.	• Monitoring encouraged the pilot school to boost their activities, particularly after the evaluation marks were announced to all schools. This implies that competition and continuous pressure is helpful to raise the level of performance when schools are to do something new. • Monitoring team had a lot of feed-back from pilot schools, which was rather unexpected. The Pilot Project could not go smooth without regular face-to-face communication through monitoring activities. • Measures were taken for the schools that monitoring team identified as having difficult problems and low performance. Special monitoring visits were made by resource persons to address the key issues. • Monitoring enhanced transparency at school, since all matters were discussed with monitoring team at SEIKA meeting. This helped the principal and project coordinator to remove the pressure in using the fund provided by the Pilot Project.
Computer training	A series of computer training was held at each pilot school for 3 to 4 times.	• One of the most critical factors causing the low level computer usage was the poor maintenance condition of computer. Other constraints included a lack of computer literacy of teachers, no proper network system and no internet connection. • On-site computer training at school was the most efficient way for teachers to enhance computer use for their daily works. • Computers that many of the pilot schools had were in an inappropriate condition such as non-air-conditioned room, dusty room, no UPS and no virus protection. • Students did not have much opportunity to use computer. Because of no supervisors available, computer rooms were locked most of time after 2PM in many schools and students were not allowed to use freely even during the school hour. • Teachers' excuse was always that there is no time to use computer. But, after gaining computer skills and realizing its usefulness in preparing teaching materials, many teachers started using computers.

Inspection program	Inspection program was held two times for Part I and II. Pilot schools were requested to submit activity report and financial report as well as monthly reports, which were carefully checked by JICA Study Team and Counterpart Team.	• This activity provided pilot school with practical and efficient on-the-job training to prepare summarized report of pilot activities and financial report. Such skills are extremely important when implementing SBM. • In spite of careful guidance to prepare these documents, however, quality of reports submitted by some of the pilot schools were not at a satisfactory level, while several schools prepared well-written reports. • Since most of teachers did not have experience of preparing this kind of reports, they had difficulties in presenting specific information and concrete ideas in writing. Writing skills need to be strengthened for meaningful and practical communication.
Reference materials	Instruction materials were provided on the concept of Educational Kaizen and how to implement 100-box calculation	• The instruction materials, provided in the three languages (English, Sinhala and Tamil), helped to disseminate the idea and know-how to the pilot schools. • These materials should be visually attractive and reader-friendly, with pictures, diagrams and figures. Bookish text-only documents were not effective, as many will not take the time to read them through.
Newsletter	7 issues of newsletter on Educational Kaizen activities were published and distributed among pilot schools and provincial/zonal offices	• Teachers were motivated and encouraged when their QE circle activities were taken for a Newsletter article with photographs and quotes. • Because the newsletter tried to cover as many QE circles as possible in the 7 issues, most of the articles were short of deep and thorough information and lacked impact.
Website	Website was developed and maintained as a tool for awareness raising and information sharing among pilot schools.	• The number of accesses to the project website did not increase, although an enormous amount of time was spent for the data entry. This is largely due to high cost for the internet in Sri Lanka, since most of schools use dial-up internet connection and phone call is expensive. At this moment, conventional paper-based medium seemed more appropriate for distributing information in Sri Lanka.

Appendix 2-1

Poster
‘Let’s Change Our School by Educational Kaizen Activities’

MINISTRY OF HUMAN RESOURCES DEVELOPMENT, EDUCATION AND CULTURAL AFFAIRS

NATIONAL INSTITUTE OF EDUCATION

JICA Japan International Cooperation Agency

Let's Change Our School by Educational Kaizen Activities

Educational Kaizen Means ..

- Continuous improvement by everyone's involvement
- School-based approach
- Step-by-step approach

Students presentation of science project.

- Change the school culture by participation and commitment of teachers, parents and students

- Promotion of interactive and competency-based teaching & learning
- Achievement of efficient and effective school management

Students working on mathematics exercise.

Students engaged in group work.

The Master Plan Study for the Development of Science and Mathematics in the Primary and Secondary Levels

concept and design : Reza Dilshard Kareem

Appendix 2-2

Photos of the Pilot Project

1. School Management

5S

School environment has become dust free and pleasant. [Muruthawela K.V.]

Keys are kept in an organized manner so it is easy to find them. [Maliyadeva B.V.]

Directional signs are installed in the school campus. [St.Mary's College]

Campus map was fixed with the support from parents. [Maduwanwela SS V.]

Suggestion System

A number of suggestions are submitted through the suggestion system. [Maduwanwela SS V.]

Information Management System

Filing system was introduced to enhance information management at school. [St.Mary's College]

2. Science and Mathematics Education

Development of Teaching Materials

Teachers made a large number of original teaching materials. [St.Mary's College]

Teachers tried to make the classroom activities interesting. [Katuwellegama M.V.]

Teachers learn to use computer in order to make teaching materials. [Muruthawela K.V.]

Interactive Teaching and Learning

Model experiment
[St.Mary's College]

Model experiment
[Wen/Girls' College – Dankotuwa]

Science experiment in the laboratory [Dutugemunu Central College]

Students have more opportunity for activity-based learning [Vijaya N.C.]

Generating solar power [Gonulla K.V.]

Making scientific equipments [Devi Balika V.]

100-Box Calculation

Working on 100-box calculation exercise [Maduwanwela SS V.]

Senior grade students help conduct the exercise for junior students [Vijaya N.C.]

3. Basic Infrastructure and Facilities

School Building

Original situation in September 2004
[Muruthawela K.V.]

Rehabilitated school buildings in January 2004 [Muruthawela K.V.]

Much improved science laboratory
[Ananda Balika National School]

Model paddy field built within the school
[Gonulla K.V.]

Bio-gas unit
[Dutugemunu Central College]

Organic farm
[Maliyadeva Balika V.]

Teachers' Quarters

Foundation stage in September 2003
[Galpaya Vidyalaya]

Mid-stage in November 2003
[Galpaya Vidyalaya]

Completion in March 2004
[Galpaya Vidyalaya]

4. S upporting Activities

(a) Monitoring

SEIKA members discuss with JICA Study Team.
SEIKA represents various groups and individuals within and outside the school community.

(b) Workshops
Intermediate Workshop

Pilot schools brought their outputs and exchanged ideas at the exhibition

(c) Model Experiment Workshops

Explaining how to observe behavioral pattern of insects by using maze

Listening to melody chip operated by solar battery

Understanding the concept of "+" and "–" by using colored water gauge

Measuring wind direction by simple hand-made equipment

Lifting up a balloon made of polythene seats by heating

Measuring height by simple apparatus

Regional Workshop

Participants actively discuss in groups

School-Based Workshop

Experience of the Pilot Project was Shared with neighboring schools

QE Circle Convention

All 118 QE circles made presentations on their activities and achievements

The best QECs were selected