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STAFF APPRAISAL REPORT

KOREA

VOCATIONAL SCHOOLS DEVELOPMENT PROJECT

MARCH 20, 1992

Country Department I
East Asia and Pacific Regional Office

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CURRENCY EQUIVALENTS

Currency Unit - Korean Won (W)

US\$1.00 = W 730
(November 1991)

WEIGHTS AND MEASURES

Metric System

FISCAL YEAR

January 1 - December 31

ACADEMIC YEAR

March - February

ABBREVIATIONS

| | |
|-------|---|
| BE | - Board of Education |
| EFB | - Education Facilities Bureau |
| ELPD | - Education Loan Projects Division |
| ICB | - International Competitive Bidding |
| KEDI | - Korea Educational Development Institute |
| KOMA | - Korea Manpower Agency |
| MOE | - Ministry of Education |
| O&M | - Operations and Maintenance |
| OSROK | - Office of Supply, Republic of Korea |
| PCR | - Project Completion Report |
| PPAR | - Project Performance Audit Report |
| SOE | - Statements of Expenditure |
| SOP | - Supervised Occupational Program |
| STD | - Science and Technical Division |
| TAP | - Technology Advancement Project |
| VED | - Vocational Education Division |
| VET | - Vocational Education and Training |
| VHS | - Vocational High School |
| VTI | - Vocational Training Institute |

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The report is based on the findings of a preappraisal mission which visited Korea during July-August 1991 and an appraisal mission consisting of Messrs. W.E. Rees (mission leader), S.Z. Sung and J.J. Stewart (consultants), which visited Korea during November 1991. Peer reviewers were Messrs. J. Segerstrom (ASTPH) and R. McGough (ASTPH). The documents were reviewed by Messrs. Bradley O. Babson, Chief, EA1PH, and Callisto Madavo, Director, EA1.

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MAP

KOREA

VOCATIONAL SCHOOLS DEVELOPMENT PROJECT

Loan and Project Summary

- Borrower : Republic of Korea
- Beneficiary : Not applicable
- Amount : US\$30 million equivalent
- Terms : Repayable in 15 years including 5 years of grace at the Bank's standard variable interest rate.
- Project Description : The objectives of the project are to assist in upgrading the skill training provided in selected vocational high schools and to enhance the effectiveness of vocational education. The project would include specialized equipment to be financed by the Bank (US\$30.0 million excluding contingencies) for technical, commercial and agricultural vocational high schools. The Government would finance complementary inputs related to making the equipment operational and maintaining it thereafter, namely local transportation and installation costs, O&M and consumables (US\$18.4 million). The project would also include policy studies (US\$0.2 million), to be financed by the Government, which would address problem areas in vocational education and make appropriate recommendations for their solution. The recommendations would be implemented according to an agreed action plan.
- Benefits and Risks: The project would provide selected vocational high schools with modern equipment which would be closely attuned to the increasingly complex equipment utilized in the industrial, commercial and agricultural sectors. This would result in improved training which would enhance the value of vocational high school graduates to prospective employers by increasing their usefulness immediately upon graduation and by improving their ability to adjust to technological change in the workplace. Policy improvements resulting from the studies of problem areas would lead to a more relevant and effective vocational education system. There are no major risks associated with the project.

Project Costs:

| | <u>Local</u> | <u>Foreign</u> | <u>Total</u> |
|------------------------------|---------------------------|----------------|--------------|
| | ------(US\$ million)----- | | |
| Technical Schools | 5.7 | 17.0 | 22.7 |
| Agricultural Schools | 2.9 | 8.7 | 11.6 |
| Commercial Schools | 1.8 | 5.5 | 7.3 |
| Policy Studies | 0.2 | - | 0.2 |
| <u>Baseline Cost</u> | <u>10.6</u> | <u>31.2</u> | <u>41.8</u> |
| Contingencies | | | |
| Physical | 0.5 | 1.6 | 2.1 |
| Price increase | 1.4 | 3.1 | 4.5 |
| <u>Subtotal</u> | <u>1.9</u> | <u>4.7</u> | <u>6.6</u> |
| <u>Total Project Cost /a</u> | <u>12.5</u> | <u>35.9</u> | <u>48.4</u> |

Financing Plan:

| | <u>Local</u> | <u>Foreign</u> | <u>Total</u> |
|--------------|---------------------------|----------------|--------------|
| | ------(US\$ million)----- | | |
| Government | 12.5 | 5.9 | 18.4 |
| IBRD | - | 30.0 | 30.0 |
| <u>Total</u> | <u>12.5</u> | <u>35.9</u> | <u>48.4</u> |

Estimated Disbursements:

| | <u>1993</u> | <u>1994</u> | <u>1995</u> | <u>1996</u> | <u>1997</u> | <u>1998</u> |
|----------------|-------------|-------------|-------------|-------------|-------------|-------------|
| <u>Bank FY</u> | | | | | | |
| Annual | 2.0 | 10.0 | 10.0 | 6.0 | 1.5 | 0.5 |
| Cumulative | 2.0 | 12.0 | 22.0 | 28.0 | 29.5 | 30.0 |

/a Does not include duties, taxes and fees estimated at US\$2.6 million.

**Economic Rate
of Return:**

Not applicable.

Map: IBRD No. 23476

KOREA

VOCATIONAL SCHOOLS DEVELOPMENT PROJECT

I. VOCATIONAL EDUCATION AND TRAINING IN KOREA

A. Introduction

1.1 An expanding education and training system in Korea has made a major contribution to the country's impressive growth over the past three decades. Growth and structural change in the economy were matched by adjustments in the education and training system to keep pace with these trends. In the 1960s when economic development was based largely on labor-intensive light industries (textiles, footwear, etc.), the demand for highly skilled workers was relatively modest and the major need was for developing the basic education and skills of a rapidly expanding workforce. Thus priority was given to the expansion of primary and lower secondary education with the result that universal primary education was achieved by 1970 and lower secondary for all by the late seventies. With the shift towards development of heavy and chemical industries in the 1970s and the increasing export orientation of industry in general, the demand for skilled workers increased rapidly and greater attention was given to vocational education and training. As industry evolved towards increasingly technology-intensive production and high export volumes in the 1980s, skill requirements became increasingly complex and fast-changing and more emphasis was therefore placed on improving the quality of skills training. At the same time, high technology development required an expansion of training of scientists and engineers with the result that the 1980s saw a rapid growth of enrollments in science and technology programs in the universities, especially at the graduate level.

1.2 Skilled workers or craftsmen occupy the base of the skill pyramid supporting technicians, trained in the junior colleges, and engineers and technologists who are university-trained. In Korea, a distinction is made between vocational education and vocational training although both systems produce skilled craftsmen. Vocational education is undertaken in public vocational high schools (VHSs) which are part of the public secondary education system (along with general high schools) under the overall direction of the Ministry of Education (MOE). Private VHSs receive financial support from, and are closely regulated by, MOE. Selected VHSs will be assisted under the proposed project. VHS students continue their general education while pursuing vocational specializations. Vocational training institutes (VTIs), which may be public or private, provide more narrowly-based skill training to school-leavers. Graduates of both types of institutions must take the same skill proficiency tests to qualify as an entry-level (Class II) craftsman. Employers regard the VHS graduate as having more broadly-based skills compared to the more narrowly-focused VTI graduate and the VHS graduate is often thought to be more flexible in fields where technology is changing rapidly and retraining needs are frequent.

1.3 In terms of the overall demand for craftsmen, the shift noted above towards more capital and technology-intensive production has retarded the growth of craftsman training while raising the demand for post-secondary tech-

nical skills. The output of craftsmen from the VTIs peaked in 1979 when it reached 129,000 and has since shown a downward trend to the output level of 75,000 in 1990.^{1/} Enrollment growth in the vocational high schools which started to taper off in the early 1980s, peaked at 917,000 in 1986 and had declined to 811,000 in 1990. This demonstrated that the vocational education and training (VET) system is to some degree responsive to market signals and is not as inflexible as VET systems in many countries, which continue to produce graduates irrespective of declining or changing demand in the labor market. However, the decline in VHS enrollments has also been influenced by the discontinuance in 1984 of the preference given to VHS graduates who applied to colleges and universities to continue their specializations at the higher level.

B. Vocational Training Institutes

1.4 The Government led the way in establishing vocational training in Korea under the first Vocational Training Law of 1967. This law resulted in the establishment of the first public VTIs. As the demand for skilled workers increased, the growth of public VTIs could not keep pace and the Government therefore decided that the private sector should become an important provider of vocational training. The Government also recognized that industry-based training was likely to be more adaptable to changing skill needs than training provided in formal institutions which by their nature were further removed from the labor market. Training subsidies were introduced to encourage private firms to undertake training and these were replaced in 1974 by mandatory training requirements (para. 1.9). These policies have determined the present structure of vocational training in Korea which comprises public sector VTIs and private sector in-plant training institutions and institutions "authorized" by the Government to provide training. The latter include training in office-related skills.

1.5 Public vocational training programs are from one to three years duration while private in-plant training lasts from 6 to 12 months and private authorized training from 3 to 6 months. The vocational training system comprised 284 centers in 1990 with an output of around 75,000 craftsmen.^{2/} The public sector accounted for 75 institutions with an output of about 25,240 craftsmen which represents about 26% of the training institutions and 34% of output. Public sector training is undertaken in centers managed by central government departments and local government bodies but the most significant organization is the Korea Manpower Agency (KOMA)^{3/}. It was established in

^{1/} The 1990 output of 75,000 represents a reversal of the trend. During 1979-89 outputs of craftsmen had declined from 129,000 to 57,900. It is possible that the increase will continue in future years, thereby reversing the downward trend of the previous decade.

^{2/} In addition, 700 master craftsmen, 190 instructors and 7,595 supervisors were trained in the system.

^{3/} Prior to a change of title in 1991, KOMA was known as the Korea Vocational Training and Management Agency.

1982 to centralize the administration of public vocational training institutions and to manage such central functions as textbooks and curriculum development, skills testing for both the public and private sectors and the preparation of skill and industry-specific demand projections. KOMA controls 34 VTIs which account for about 65% of the public sector training output. The structure of craftsman training in the VTIs is outlined in Annex 1.

1.6 KOMA centers traditionally drew their trainees from middle-school graduates and high school dropouts. However, with the achievement of near universal progression from middle to high school, increasing numbers of trainees are being recruited from among high school graduates who have followed the general education curriculum and are seeking skill training to improve their prospects of employment. Training expenses are met by the Government with the exception of a nominal charge for room and board which may be waived in cases of economic necessity. The curriculum is about 30% theoretical and 70% practical for the technical skills programs. The theory element breaks down into about 7% spent on general subjects and 23% on technical subjects. The practice element comprises basic practice (20%) and major practice (50%). Graduates of the programs usually achieve skill certification at the Class II craftsman level. Graduates from the KOMA centers enjoy very high pass rates in national skill tests and similar rates of employment on graduation--about 95% in both cases.

1.7 The training of craftsmen in the VTIs is focused strongly on training for the metal processing, transport and construction equipment, and electronics and communications industries. Taken together, these industry groups accounted for about 55% of the total output of craftsmen in 1990. On the other hand, output from courses serving textiles and wood processing accounted for only 12% of total outputs (Annex 2). This contrasts with the structure of craftsman training during the Fourth Five-Year Plan (1977-81) when outputs of craftsmen for metal processing, transport and construction equipment, and electronics and communications were only 39% of total outputs while craftsmen trained for textiles and wood processing accounted for 40% of total outputs. This reflects the changing structure of craftsman training in response to the restructuring of Korean industry which increasingly has moved away from relatively labor-intensive, low-skill industries such as textiles towards heavy industry and technology-intensive fields such as electronics and communications.

1.8 The private sector is responsible for the major effort in vocational training, accounting for 66% of the output of trained craftsmen in 1990. This represents a significant shift in private sector training which accounted for only 52% of training output in 1983. This trend reflects the Government's policy of shifting responsibility increasingly to the private sector which can more effectively identify skill needs and provide training more efficiently

than public sector institutions.^{4/} Large firms invest heavily in skill training and maintain well-managed, generously-funded training centers. Such individual centers account for about two-thirds of in-plant training. However, smaller firms lack the resources to establish training programs and, with lower skill needs, such programs are often not practicable. They therefore share training costs with groups of similar firms or rely on recruitment in the market or directly from the public sector institutions. About 60% of the graduates of KOMA training institutions are recruited by small and medium firms.

1.9 The shift of training efforts to the private sector disguised for a number of years a decline in the level of in-plant training of craftsmen. The growth in private sector training in the authorized training institutions, which focus mainly on office-related skills, has been steady in recent years. Authorized training produced around 6,500 craftsman-level workers in 1983 and this had grown to 23,500 in 1990, reflecting strong growth in the services sector of the economy. However, during 1983-89, outputs of craftsmen with technical skills from in-plant training institutions declined from around 21,000 to 16,300. This downward trend seemed to reflect the failure of the Government's long-term priority to boost in-plant training. When training subsidies were offered during 1968-71, training efforts increased but immediately declined when the subsidies were removed. In 1974, the Government made in-plant training of a certain percentage of employees (about 6.5% in the beginning but later reduced) mandatory for firms with over 500 employees (later reduced to 200). In 1976, a training levy was introduced to be paid by all firms subject to mandatory training which did not carry out this training. The proceeds of the levy are placed in the Vocational Promotion Fund which supports public sector vocational training. However, in 1990 there was an upsurge in outputs from in-plant training institutions with nearly 26,300 craftsmen graduating in that year.

1.10 The levy system does not seem to have been particularly effective in promoting in-plant training in the past, the 1990 result notwithstanding. Bureaucratic regulations involving the preparation and approval of training schemes made the levy system cumbersome, time consuming and expensive from the employer's point of view. Furthermore, the levy was determined annually on the basis of relative training costs in each industry. Cost data proved difficult to compile and keep up to date with the result that the levy fell well short of the actual cost of training. Many smaller employers found it cheaper to pay the levy, forego training and recruit in the labor market. Thus the levy came to be treated as just another business tax. The Government has adjusted the levy amount to cover a greater proportion of training costs-- in 1986 the levy was raised to a level which covered about 75% of the cost of training. This compared with a 25% coverage in 1979. The levy has been relatively unsuccessful because large firms were motivated to undertake training regardless of the levy, while smaller firms found it insufficient as

^{4/} Lee, Chingboon, Financing Technical Education in LDCs: Economic Implications from a Survey of 1985 Training Modes in Korea, World Bank Discussion Paper, September 1985.

an incentive to encourage training. Recently, the Government simplified the levy from an amount based on training costs to a payroll tax. This obviates the need to produce an annual survey of training costs for each industry but the impact of this change on the amount of training provided is not yet apparent. It may have contributed to the substantial increase in in-plant training in 1990 although the latter could also have been the result of accumulated demand from three years of double-digit growth in the economy.

C. Vocational High Schools

1.11 Secondary education in Korea comprises two streams - general and vocational - both of three years' duration (grades 10-12). General high schools are academically oriented and aim largely at preparation for higher education. Vocational high schools aim at continuing general education to grade 12 while at the same time providing sufficient vocational education to permit graduates to find employment in their fields of specialization. In 1990, enrollments in general high schools were about 1,473,000 and in vocational schools, around 811,000. Entry to both streams is based on scholastic record in junior high school, interviews and the results of entry tests.

1.12 Structure and Enrollments. The VHS system comprises several different types of schools. "Vocational" schools offer training in only one skill; "comprehensive" schools teach one or more skill and also have general secondary courses; "technical" schools (formerly called "engineering" schools) teach industrial skills with strong emphasis on machinery, electricity, electronics and engineering drawing; "commercial" schools focus mainly on clerical, secretarial, information processing and accounting; "agriculture" schools emphasize agriculture, horticulture and animal husbandry; and "fisheries and marine" schools focus on fishing, fish breeding, marine engine maintenance and navigation/communications. Enrollments in 1990 in the different types of schools were as follows:

Table 1.1: ENROLLMENTS IN VOCATIONAL HIGH SCHOOLS
(1990)

| Type of School | Enrollments ('000) | | | |
|----------------------|---------------------|---------------------|--------------------|---------------------|
| | Total | Female | % Female | % by Type |
| Commercial | 370.9 | 294.6 | 79.4 | 45.8 |
| Technical | 192.1 | 3.2 | 1.7 | 23.7 |
| Comprehensive | 181.1 | 114.2 | 63.1 | 22.3 |
| Agricultural | 40.6 | 5.7 | 14.0 | 5.0 |
| Vocational | 16.7 | 10.2 | 61.1 | 2.1 |
| Fisheries and Marine | 9.3 | 0.2 | 2.2 | 1.1 |
| Total | <u>810.7</u> | <u>428.1</u> | <u>52.8</u> | <u>100.0</u> |

1.13 Overall, females accounted for about 53% of total enrollments in 1990 and are heavily concentrated in the commercial schools and in office-related courses in the comprehensive schools. Details of enrollments by course and sex are given in Annex 7. About 97% of total female enrollments are in commerce, information processing, accounting and secretarial courses and the remainder mainly in horticulture. Females comprise 76% of total enrollments in these courses. This largely reflects the traditional preference of female students for office-related courses rather than technical skills courses and this bias seems to have strengthened even more as the services sector expanded rapidly in recent years. In 1982, 95% of total female enrollments were in commerce, secretarial and related courses.

1.14 Vocational high schools can also be classified by the type of organization that operates them namely public, private or national. The system of 587 schools is structured as follows:

- (a) 311 public VHSs (with total enrollments of 304,200) are operated under the general supervision of provincial or municipal boards of education;
- (b) 273 private schools (500,200) operated by individuals or under the supervision of corporations; and
- (c) three national schools (6,280) which are centers of excellence under the direct supervision of the Vocational Education Division (VED) of MOE.^{5/}

1.15 Management. There are three key levels in the management of the VHS system. First, the Ministry of Education (Annex 4) is responsible for the allocation of budgetary resources through the local boards of education (BE) (para. 1.16). MOE also exercises overall control over standards in both public and private schools. The latter include prescribed standards for equipment, teacher qualifications, curricula, student/teacher ratios etc. Second, local administration of the system is the responsibility of nine provincial and six municipal boards of education. Working within MOE-prescribed standards and procedures, the boards have the authority to allocate budgetary resources to schools and audit their accounts, set enrollment targets, appoint, assign and transfer teachers, plan and implement in-service teacher training programs, review the performance of schools etc. In respect of these activities, both public and private schools generally receive similar treatment. Third, individual schools are responsible for the selection of students (within the targets set by the boards), scheduling of classes, maintenance of buildings and equipment. Private schools are also able to recruit teachers directly subject to their meeting MOE-specified qualifications.

^{5/} The three national VHSs are public technical schools which were set up by presidential decree. As centers of excellence they are better endowed than the average VHS in terms of equipment, teachers and overall resource allocations.

1.16 The key management agency is the board of education (Annex 5) because it has direct responsibility for implementing MOE's policies and also for applying its standards and guidelines to school operations. From the perspective of the proposed project, the BEs are key agencies in the selection of participating schools and in the identification of equipment requirements. Boards of education have mostly elected members and have powerful staffs which are headed by superintendents who are also board members. Superintendents are appointed by the President and carry a rank equivalent to vice-minister. This is an indication of the status and authority of the boards. The administration of VHSs is the responsibility of the Science and Technical Division (STD) of the School Affairs Bureau of the BE. Staffing of a STD varies in size but typically it has around 10 senior education supervisory staff (usually former school principals) who undertake a major review of the performance of public and private schools every 2-4 years. Formal procedures exist for resolving any problems highlighted during school performance reviews culminating in direct intervention by the BE in the operations of delinquent schools. The decentralized management system is effective largely because the BEs have been delegated major responsibilities by MOE and have the prestige to attract able and influential people as members. The quality of the boards' staff is generally high and this leads to effective support for, and supervision of, individual schools.

1.17 Financing. The vocational high schools are financed mainly by budgetary allocations in the form of grants-in-aid and by tuition fees. In the case of private schools, endowments also provide some income. A relatively small contribution is also made by parent and teacher associations. Grants-in-aid are provided by MOE to the education boards on the basis of standardized unit costs for different types of schools and enrollment levels. The boards of education then allocate resources to each school based on a budget the school has prepared. Grants-in-aid finance the gap between the revenue generated by the schools and their total annual outlays. For private schools the grants are regarded as subsidies which are justified, in part, by MOE's control over private school tuition fees. These fees are always set equal to public school fees and reflect the view that since VHSs have traditionally served lower income groups, these groups should not be disadvantaged in access to a VHS if no public school is available.

1.18 The level of subsidy to private schools varies with their income but is in the range of 45-70%. Tuition fees for VHSs (W 150,000-441,600 p.a.) are often lower than fees for general high schools (W 220,800-441,600 p.a.) partly for the socio-economic reason of serving lower income groups, but also because the Government views vocational education as an economic investment while general education is regarded as an investment in the individual. Recognition that VHSs generally serve lower income groups is also reflected in the level of financial assistance awarded in the form of scholarships and fee exemptions. In 1990 about 35% of enrollments in VHSs received some form of financial assistance compared with about 16% of enrollments in general high schools. The average level of assistance was the equivalent of 83% of the annual minimum tuition fee for a VHS student compared with 56% for a general high school counterpart.

1.19 Curricula. Standard curricula are prescribed by MOE for each type of VHS, both public and private. The structure of each curriculum varies but in general averages about 35% for general, academic subjects, 50% for specialized, technical subjects and 15% for electives. The latter are work-related subjects which can be varied by the local boards of education according to skill needs in the local labor market. The VHS curricula are subject to major periodic reviews under the management of the Korea Educational Development Institute (KEDI). The fifth review has been completed and revisions, which are currently being implemented, are expected to be completed by the end of 1992. While the structure of the curricula remains largely unchanged following the review, some greater emphasis has been given to science and English and a data processing skills course has been introduced. The review process was rigorous and detailed and was undertaken in two parts. First, a study team of 270 teachers, academics and researchers reviewed the latest local and foreign research on curriculum development and then, through the use of questionnaires and visits to schools, examined the practical problems related to teaching the existing curricula. On the basis of these findings, a working group for curriculum revision comprising 453 members drawn from the schools, universities, research institutes and industry prepared draft revisions to the curricula. This process included visits to industry to obtain the views of employers on curriculum issues. On completion of the revised curricula, revision of textbooks commenced and this exercise is expected to be completed by the end of 1992. Textbook revision is carried out by KEDI assisted by consultants and the process is coordinated by MOE. Complementing these activities is the restructuring of the standard equipment list as described in more detail below (para. 1.23).

1.20 A key concern of the VHSs is to ensure that their curricula are relevant to the needs of employers thereby ensuring a high degree of employability of VHS graduates. Thus there needs to be a strong linkage between schools and employers. The schools need to be aware of current employment vacancies and be able to advise students accordingly. Employers need to advise schools on likely future needs for craftsmen and also provide feedback on the quality of graduates. The school-employer linkage is formalized in two ways. First, the Supervised Occupational Program (SOP) requires that all VHS students undertake up to six months of supervised occupational experience during their final year. This provides a valuable practical learning experience and also promotes contacts with employers which often lead to offers of employment on graduation. Second, the Educational Committees for School-Industry Cooperation bring together key personnel from the schools and local industry. The committees are involved in organizing the SOP, assisting in curriculum development and exchanging employment information.

1.21 The operation of the SOP and the Educational Committees varies among schools and is strongly dependent on the commitment of key personnel especially school principals and local managers. There is a need to review the linkages between schools and employers especially as they operate through the SOP and the Educational Committees and also to explore the development of informal linkages. Therefore the Government agreed during negotiations to complete a study by June 1993 which would make recommendations for

strengthening and expanding school-employer linkages. The Government also agreed to begin implementation of the study's recommendations by October 1994. Terms of reference for the study have been agreed.

1.22 Equipment. Standard equipment lists for each specialization taught in the VHSs are provided for each school. The lists represent the appropriate mix of types and numbers of equipment items necessary to teach the various curricula. None of the schools has been able to obtain 100% of the equipment in the standard lists. The three national VHSs come closest with 80-90% coverage but most schools are in the 40-60% range. In nearly all instances, the shortfall is in numbers of items rather than in the variety of equipment. The schools have responded by tightly scheduling the use of equipment and raising the numbers of students who can practice on particular items of equipment. This situation has led to efficient utilization rates for equipment but with some loss in the quality of learning because of crowding in the use of machines by students.

1.23 Periodic reviews of the standard lists, which accompany curriculum revisions, follow a similar process to the latter. Revision follows two main steps - a basic study and survey of conditions in the schools followed by revision of the lists with appropriate inputs from industry. The present review of the lists is in its final stages and there is already clear evidence that they are becoming outdated. The review indicates that significant differences are emerging between the levels of sophistication of equipment used for training in the VHSs and those of equipment in use in the workplace. The discrepancies are due to the fact that equipment in the schools has not been replaced and modernized fast enough to keep pace with the rapid changes in technology in recent years. Thus many items of equipment in the schools, in addition to being old and nearing the end of their useful lives, also bear little resemblance to the higher speed, greater precision and in many cases, automated equipment that VHS graduates encounter when entering the factory or office. Equipment to be financed under the proposed project would make a major contribution to updating equipment in selected schools to bring it closer in line with the needs of the workplace.

1.24 An innovative feature of the VHS system is the use of joint practice centers. Seven centers currently exist and MOE plans to expand the system to 24 centers. Their purpose is to provide VHS students with the opportunity to operate complex pieces of equipment similar to those being used in the workplace. The centers thus represent a potentially cost-effective way to share the use of expensive equipment between schools and to provide students with experience in an environment which resembles that to be found in the workplace. The centers will operate most effectively when their equipment is similar technologically to that found in industry, instructors are fully competent to utilize the equipment and are well informed about the industrial environment, and students are given sufficient practice time on equipment in order to gain familiarity with its operation. At present, the scheduling of student visits to the centers is tight, with too little time being spent on practice sessions. It is also unclear as to whether the equipment in the centers is equivalent to that found in industry. In view of the Government's intention to expand substantially the network of joint practice centers, it is important that new centers be properly staffed, equipped and have effective

student practice programs. These issues would be addressed in a study which the Government agreed, during negotiations, to complete by March 1993. The study would make recommendations for improving the operation of existing centers and the Government agreed to begin implementation of the recommendations by July 1994. Terms of reference for the study have been agreed.

1.25 The effective operation of workshop equipment depends to an important degree on adequate financing of operations and maintenance (O&M) and the supply of consumable materials. Major repairs to equipment are carried out satisfactorily at a centralized facility in Seoul. All basic maintenance is conducted in the schools by the staff and the effectiveness of this activity is dependent upon budget allocations. These vary somewhat among schools depending upon the priority placed on maintenance by the principals. But in general the budget is inadequate. The same pattern is to be found in the allocations for supplies of consumable materials. There is a need to review the procedures for estimating budgetary expenditures for O&M and consumables, to develop indicators such as unit costs and to monitor budgetary allocations and actual expenditures on O&M and consumables annually. A system needs to be institutionalized which would increase funding for O&M and consumables in the short run and ensure adequate funding in the long term. In response to these needs, the Government agreed, during negotiations, to complete a study by January 1993 which would make recommendations for improving the financing of O&M and consumables. The Government agreed to begin implementation of the study's recommendations by May 1994. Terms of reference for the study have been agreed.

1.26 Teachers. The vocational high schools in Korea have been able to attract well-qualified teachers in contrast to the common experience elsewhere. This is partly due to the relatively high prestige of teaching as a profession in Korea and also to relatively high salaries. The latter are not comparable to those in industry but the differences are not as large as are commonly found elsewhere. Classroom teachers of both vocational and general subjects are required to have a four-year degree plus additional units of pedagogy if they are not graduates of a school or faculty of education. At present, 35 universities and colleges are producing teacher candidates for the general subjects taught in VHSs and a mixture of 21 agricultural, engineering, fisheries and marine colleges are producing teachers for vocational subjects. Thus there is no shortage of candidates for teaching in the VHSs and recruitment is competitive. In 1989, 18,126 candidates applied for the 11,935 available teaching positions. Laboratory and workshop teachers are trained in two-year junior technical colleges and are classified as assistant teachers. However, practical teaching is not the sole preserve of assistant teachers - in schools where they are not on staff, the vocational subject teachers handle practical instruction.

1.27 Teachers are well qualified, with 93% having at least a bachelor's degree or equivalent. They are also highly experienced with 52% having over 10 years experience. Vocational teachers, whose background is largely pedagogical rather than industrial, spend periods in industry under the provisions of the Institutional Cooperation Act. There are also provisions under the Act for specialists in industry to hold appointments as part-time

lecturers in the schools. In-service teacher training is widespread and focuses mainly on upgrading skills for promotion. Courses are held during semester breaks in local universities and colleges.

1.28 Vocational high schools are staffed with teachers of general high school subjects and with teachers of vocational subjects. In terms of total teaching staff, the situation is reasonable with an overall student/staff ratio of 23:1. However, the endowment of teachers of vocational subjects is much less satisfactory, averaging around 50:1. It is not clear at this stage whether the future supply of vocational teachers will be adequate to support the planned expansion of the VHS system while also permitting the reduction of the student/staff ratio. Possible constraints on vocational teacher supply should be examined such as the availability of pre-service training places, the incentives available to attract teacher trainees, promotional prospects, etc.. It is also important that vocational teachers keep abreast of changes in industry and therefore the effectiveness of secondments to industry under the Institutional Cooperation Act should be reviewed. A further area of review is the availability of teacher support staff such as technicians and workshop assistants. During negotiations, the Government agreed to complete a study, which would address these issues and make appropriate recommendations by April 1993. The Government agreed to begin implementation of the study's recommendations by August 1994. Terms of reference for the study have been agreed.

1.29 Employment of Graduates. On completion of the three-year VHS course, graduates sit for a certification test for Class II Craftsman administered by the Ministry of Labor. Pass rates are around 75% which, although lower than those for VTI graduates, nevertheless represent a satisfactory achievement given the structure and objectives of VHS courses which are to produce both educated and skilled individuals. Since employment levels for VHS graduates are higher than the skill test rates, employers are clearly prepared to recruit some VHS graduates even without skill certification. In 1990, the status of about 91% of graduates for that year was identified, totalling about 250,000 graduates. Of this number, 9% entered higher education, 84% were employed, 6% were unemployed and the remainder entered military service. This represents a clear improvement over 1982 when only 58% were employed and 21% unemployed. However, 1982 was a recession year in the economy and this emphasizes the sensitivity of employment prospects for VHS graduates to overall economic conditions.

1.30 Planning for the future development of the VHS system should aim to maximize the employment of graduates. The system should be flexible enough to respond to changing demand for craftsmen in a labor market which itself is responding to rapidly changing technology. At present the demand for craftsmen is high with employers in the industrial and services sectors claiming that they are facing substantial shortages of skilled craftsmen. Information on the labor market, the status of the workforce and projections of future labor demand are produced by a number of agencies such as KOMA, Ministry of Labor, Korea Development Institute and the Economic Planning Board. In spite of the general availability of relevant data, MOE does not have any formal mechanism for planning the future growth and structural change in the VHS system in response to the changing demand for craftsmen. MOE has

responded to the general shortage of craftsmen with a policy that calls for the long-term expansion of VHS enrollments to achieve an enrollment ratio of 50:50 between vocational and general high schools, compared with the current ratio of 35:65 in favor of the general high schools. To achieve this by year 2000 would require a VHS enrollment of about 1.05 million in that year, an increase of 239,000 in annual enrollments over the 1990 level.

1.31 This proposed expansion, which represents a substantial potential investment, is not based on any systematic approach which draws on information relating to the skill structure of the workforce and how it is changing, the impact of technological change on the demand for skilled workers, the long-term growth prospects of different industrial sectors, etc.. A formal manpower planning model is not needed since these have failed too often elsewhere. What is needed is a mechanism which would provide for the systematic collection and analysis of relevant data and the provision of advice to MOE to guide its planning of the future development of the VHS system. During negotiations, the Government agreed to complete a study by July 1993 which would make recommendations for developing an appropriate planning mechanism. The Government agreed to begin implementation of the study's recommendations by November 1994. Terms of reference for the study have been agreed.

D. Bank's Experience in Education

1.32 The Bank has assisted Korea's technology development efforts through substantial support for the development of technical and scientific education and research.^{6/} Bank lending has been consistent with Korea's needs and priorities in education and has closely paralleled the increasing sophistication of Korean industry. It was recognized that the restructuring of industry towards more skill-intensive, high-technology production would require the continuous expansion and upgrading of technical skills. Thus as industry developed towards greater skill-intensiveness, Bank assistance to education moved from support for craftsman and technician training through professional engineering education to graduate engineering programs and associated research activities.

1.33 The Bank's initial involvement in the sector under four loans/credits, focused on the development of vocational and technical education at the secondary and post-secondary levels to strengthen the base of the system for producing technical personnel. Project performance audit reports (PPARs) for these projects concluded that they were in general well-conceived and successfully implemented. The first education project in Korea (Cr. 151-KO) supported the expansion of vocational high schools, junior technical colleges and teacher training. It also financed technical assistance and fellowships to strengthen the planning and administration of vocational and technical

^{6/} The Bank has also provided major support to technology development through directly financing R&D programs, strengthening intermediaries which finance R&D and providing credit for industrial development in general.

education. The PPAR for the credit (Report No. 1801-KO, November 22, 1977) concluded that physical implementation was satisfactory but that some delays were experienced in recruiting and utilizing the experts under the technical assistance component. The latter could have been overcome by more careful scheduling and a clearer definition of the experts' functions.

1.34 The second education project (Ln. 906/Cr. 394-KO) financed equipment for vocational high schools, junior technical colleges and undergraduate programs in science, engineering and education. The PPAR for the project (Report No. 4509, May 24, 1983) concluded that the project was implemented substantially as planned but with some delays due to over-optimistic scheduling. The third education project (Ln. 1096-KO) continued to support expansion and quality improvement in vocational high schools and junior colleges and for vocational training institutes under the Ministry of Labor. The project was implemented successfully and demonstrated the growing experience and competence of local project staff. The fourth education project (Ln. 1474-KO) supported a further expansion of VTIs and expansion and improvement of instructor training. The project completion report (PCR) for the project (Report No. 5516, March 8, 1985) concluded that the project was well designed, implemented efficiently and judged the project to be an excellent example of Bank/Borrower cooperation. It is reasonable to conclude that the first four projects demonstrated that the increased competence of local authorities led to improved project design and implementation. Project experience also demonstrated that there was a need to take a broader view of sectoral policies and issues after the implementation of four conventional projects. This was taken up in the two subsequent operations which were policy-oriented sector loans.

1.35 The first education sector loan (Ln. 1800-KO) concentrated on upgrading junior technical colleges and university colleges of engineering and management through the supply of equipment, staff development and institutional improvements in curriculum development, manpower planning, equipment maintenance and academic accreditation. The PPAR for the loan (Report No. 7252, May 24, 1988) indicates that the major lessons learned were: (a) a stable and responsible sector management agency was the key to successful implementation of the sector program; (b) the sector approach led to a quicker and more sustainable development of institutional capabilities; and (c) the additional time required for preparation was repaid in terms of more efficient implementation. Z/

1.36 The second education sector loan (Ln. 2427-KO), which incorporated these lessons, assisted in supporting improvements in graduate education in science and engineering, upgrading secondary school and college science programs, expanding graduate research programs, improving sector management and manpower monitoring and strengthening the financial base of private

Z/ The Bank's positive role in Korea's education sector under the first five lending operations is documented in the OED report titled Review of the Impact of World Bank Lending for Educational Development in Korea (Report No. 5950; December 4, 1985).

educational institutions. Implementation of the loan was satisfactory and it closed on schedule on June 30, 1989. The PCR for the loan concludes that its objectives were largely met. Policy and institutional improvements of particular relevance to science education were introduced in relation to accreditation of colleges of natural science and science education departments, upgrading and expanding staffing of these institutions and the planning of facilities and equipment; at the secondary level, a new experimentation-oriented science curriculum was introduced, a system to monitor student achievement in science developed, new examination and college admission procedures introduced and science teachers upgraded through in-service training.

1.37 Following these education projects the Bank turned its attention to supporting research activities in the universities and the national research institutes under three Technology Advancement Projects (TAPs) and the Universities Science and Technology Research Project. However, the first two TAPs also contained a component assisting science and engineering education. Ln. 3037-KO assisted in improving the quality of science and engineering education at the Korea Institute of Technology, a center of excellence for the under-graduate teaching of gifted students in science and mathematics. Ln. 3202-KO supported quality improvement at the Korea Advanced Institute of Science and Technology, the leading graduate school in science and engineering. The Universities Science and Technology Research Project (Ln. 3203-KO), although focusing exclusively on research will, nevertheless, have an indirect impact on teaching because of the close link between the research undertaken by faculty and their teaching responsibilities. In the recently-approved Vocational Education Project (Ln. 3314-KO), the Bank is reverting to assistance to vocational training in recognition of the continuing need for craftsmen to be trained to meet the increasingly complex skill requirements of the labor market. The project supports the upgrading of skill training in selected VHSs through the provision of modern equipment more closely attuned to conditions in the workplace.

II. THE PROJECT

A. Origin of the Project

2.1 The Government included the project in its CY91 list of projects suitable for external financing and formally asked the Bank for assistance in November 1990. Most of the preparation work was completed by the Government according to guidelines formulated by the Bank. The project was preappraised in July-August 1991 and appraised in November 1991.

B. Project Rationale, Objectives and Scope

2.2 The rapid change in technology in the workplace in Korea requires a training system that must adapt continuously to the rising demand for more advanced skills. An important part of this process is the regular updating of equipment in the VHSs to ensure that the training of craftsmen continues to be attuned to the increasingly complex technology being used in industry, commerce and agriculture. The proposed project would continue support for

equipment modernization included under the Vocational Education Project. In addition to this modernization process, the institutional weaknesses outlined previously need to be addressed in order to improve the effectiveness of vocational education and to ensure that the full benefit of the supply of new equipment would be gained. The project provides the opportunity to review these issues, propose appropriate remedies and ensure that the necessary actions are taken in a timely manner. The project would thus combine a direct contribution to raising the quality of vocational education, through the supply of up-to-date equipment, with value added in the form of institutional improvements aimed at strengthening the operational effectiveness of the VHS system.

2.3 The project has two major objectives: (a) to assist in upgrading the skill training provided in selected vocational high schools to ensure the continued employability of their graduates and to equip them to adjust more effectively to changing technology in the workplace; and (b) to strengthen the VHS system through introducing improvements in the link between schools and employers, more effective planning, improved staffing arrangements in the schools and more efficient operation of joint practice facilities.

C. Project Design and Description

2.4 The project includes equipment estimated to cost US\$30.0 million, excluding contingencies, to be financed by the proposed loan. This amount has already been determined by the Government and is fixed within the foreign borrowing program. Bank-financed equipment would be concentrated in three types of vocational schools - technical (US\$16.3 million, excluding contingencies), agricultural (US\$8.4 million) and commercial (US\$5.3 million). The equipment forms the core of the project but in order to ensure that it is utilized effectively, complementary inputs (US\$11.6 million excluding contingencies) must also be supplied. These would be financed by the Government and cover local transportation and installation of equipment, O&M and consumable materials. The Government would also finance all contingencies related to these components and to the equipment. The Government would also finance studies (US\$0.2 million excluding contingencies) which would address problem areas in vocational education and make appropriate recommendations for their solution (para. 2.9).

2.5 The status of equipment provision in the vocational high schools is measured against standard equipment lists which vary in content among the different types of schools. The average provision for all schools is about 53% ^{8/} with the best equipped being the commercial schools (57%) and agriculture schools (57%); followed by technical (51%) and fisheries/marine schools (49%). These figures indicate that the VHSs are considerably below standard requirements in terms of equipment provision. However, the situation is not as serious as it appears. Equipment deficiencies tend not to be so much in terms of the range of equipment but rather in the numbers of items. Thus the range of equipment is reasonably consistent with the curricula to be

^{8/} The average level of equipment provision will be raised to 61% under the recently approved Vocational Education Project.

taught but shortages of equipment items have led to the heavy scheduling of equipment use and above average numbers of students using equipment items for practice sessions. In a number of instances this has led to efficiencies gained from high utilization rates but in other cases excessive overscheduling has affected the quality of training. In addition, a number of equipment items are obsolete and need to be replaced in line with changing technology in the workplace. The proposed loan of US\$30 million would raise the overall average equipment provision to 69%, with commercial schools increasing to 74%, agricultural schools to 97%, and technical schools to 64%.^{2/}

2.6 The vocational high schools are under the overall control of the Ministry of Education but local administration is the responsibility of the provincial and municipal boards of education. Since the BEs are closest to the schools and therefore in the best position to understand their needs, they have been given the responsibility for selection of schools to participate in the proposed project. Each BE would select the schools to participate in the project mainly on the basis of the level of overall equipment provision in the schools, with the most disadvantaged being given priority. Account would also be taken in specific instances of new schools and newly-established departments in existing schools which need to be equipped with basic items. Attention would also be given to the need to replace worn-out equipment and to the requirements of the joint practice centers. Equipment for each school would be procured partly to meet some of the shortfall in standard equipment items and partly for updated equipment needed to teach more advanced technologies and replace worn-out items. The proportions would vary according to the needs of each school. In the interests of equity, public and private schools would be treated equally in the application of selection criteria for participation in the project. The actual level of participation of public and private schools would be determined following the application of selection criteria by each BE. During negotiations, the Government agreed that schools would be selected for participation in the project according to criteria acceptable to the Bank.

2.7 To ensure that equipment to be procured under the project reflects overall development priorities and their regional implications, the Education Facilities Bureau (EFB) of MOE has established an advisory committee comprising officials and outside experts which would assist in determining priority fields of study for each BE. On the basis of this committee's recommendations, EFB will allocate specific amounts of the loan proceeds to each BE for specific types of vocational schools. Consequently, each BE will receive from EFB a specific allocation of loan funds and identified priority fields of

^{2/} The relatively low increase in percentage provision for the technical schools does not reflect a lower priority but rather the fact that the technical schools' component is predominant in the overall standard equipment list for all VHSs. Although technical schools will be allocated 54% of loan proceeds, technical schools comprise 72% of the value of the overall standard equipment list.

study in which the funds will be spent. The BE will select the schools to participate in the project according to the criteria mentioned above (para. 2.6).

2.8 Each BE will form a committee of experts for each type of school to assist it in determining how the loan funds allocated to it will be disbursed among the schools. Members of this committee will visit each school to assess the status of equipment in each selected school and, together with school authorities, will prepare a final list of equipment to be procured for each project school within the guidelines regarding fields of study.^{10/} The Education Loan Projects Division of EFB, which is responsible for implementation of the project (para. 3.3), will forward specifications for standard items of equipment to each BE, as required, and will either review or prepare specifications for the more modern items of equipment not included in the standard lists of equipment at present. Each BE will group the equipment lists from the project schools for competitive bidding and will forward these packages directly to OSROK for procurement, with copies to ELPD. These procedures are represented diagrammatically in Annex 6.

2.9 An important aspect of project design is to identify problem areas in the VHS system, make appropriate recommendations for improvement and implement the recommendations according to a feasible timetable. The five problem areas previously identified (paras. 1.21, 1.24, 1.25, 1.28 and 1.31) would be studied by working groups organized by MOE. Most of the work would be done by officials of MOE and the local boards of education. Local consultants would be utilized as required. Expenditures on local consultants (US\$0.2 million, excluding contingencies) and any other local costs associated with the studies would be financed by the Government. Each working group would prepare a study which would include recommendations for improvements in the problem areas. Following Government's review and acceptance of the recommendations, they would be implemented by MOE. The studies would be carried out and their recommendations implemented according to an agreed action plan (Annex 7) which identifies, for each study, key tasks and dates for their completion. During negotiations the Government agreed to carry out the studies and implement their recommendations according to the action plan, unless otherwise agreed with the Bank.

^{10/} The process of selecting items of equipment to be financed under the project will be facilitated by the fact that schools have already identified their equipment needs as part of a survey of all vocational schools. These lists have been passed through the BEs to MOE where they have been reviewed by the Education Loan Projects Division (ELPD), assisted by the Vocational Education Division and outside consultants, to determine priorities for equipment items in relation to curricula. Thus each school selected under the project will already have a prioritized list of equipment needs and each BE's committee of experts will review these priorities in terms of the guidelines regarding fields of study (provided by EFB).

III. PROJECT COSTS, FINANCING AND IMPLEMENTATION

A. Costs

3.1 The total cost of the project is estimated at US\$48.4 million equivalent net of duties and taxes. The estimated cost by project component is summarized in Table 3.1 and by category of expenditure in Table 3.2. Detailed costs by component and category are given in Annex 8 and project expenditure by year and recipient in Annex 9.

Table 3.1: SUMMARY OF PROJECT COSTS BY COMPONENT

| | <u>Won Billion</u> | | | <u>US\$ Million</u> | | | <u>Foreign as % of Total</u> |
|------------------------------|--------------------|----------------|--------------|---------------------|----------------|--------------|--------------------------------------|
| | <u>Local</u> | <u>Foreign</u> | <u>Total</u> | <u>Local</u> | <u>Foreign</u> | <u>Total</u> | |
| Technical Schools | 4.2 | 12.3 | 16.5 | 5.7 | 17.0 | 22.7 | 75 |
| Agricultural Schools | 2.1 | 6.4 | 8.5 | 2.9 | 8.7 | 11.6 | 75 |
| Commercial Schools | 1.3 | 4.0 | 5.3 | 1.8 | 5.5 | 7.3 | 75 |
| Policy Studies | 0.1 | - | 0.1 | 0.2 | - | 0.2 | - |
| <u>Baseline cost</u> | <u>7.7</u> | <u>22.7</u> | <u>30.4</u> | <u>10.6</u> | <u>31.2</u> | <u>41.8</u> | 75 |
| Contingencies | | | | | | | |
| Physical | 0.4 | 1.1 | 1.5 | 0.5 | 1.6 | 2.1 | 76 |
| Price increase | 1.0 | 2.3 | 3.3 | 1.4 | 3.1 | 4.5 | 69 |
| <u>Subtotal</u> | <u>1.4</u> | <u>3.4</u> | <u>4.8</u> | <u>1.9</u> | <u>4.7</u> | <u>6.6</u> | 71 |
| <u>Total Project Cost /a</u> | <u>9.1</u> | <u>26.1</u> | <u>35.2</u> | <u>12.5</u> | <u>35.9</u> | <u>48.4</u> | 74 |

/a Does not include duties, taxes and fees estimated at US\$2.6 million.

Table 3.2: SUMMARY OF PROJECT COSTS BY CATEGORY OF EXPENDITURE

| | <u>Won Billion</u> | | | <u>US\$ Million</u> | | | Foreign as % of Total |
|---|--------------------|-------------|-------------|---------------------|-------------|-------------|-----------------------------|
| | Local | Foreign | Total | Local | Foreign | Total | |
| Equipment | - | 21.8 | 21.8 | - | 30.0 | 30.0 | 100 |
| Equipment trans- portation and installation | 1.2 | 0.1 | 1.3 | 1.6 | 0.2 | 1.8 | 10 |
| Operations and maintenance | 3.2 | 0.4 | 3.6 | 4.4 | 0.5 | 4.9 | 10 |
| Consumable materials | 3.2 | 0.4 | 3.6 | 4.4 | 0.5 | 4.9 | 10 |
| Consultants | 0.1 | - | 0.1 | 0.2 | - | 0.2 | - |
| <u>Baseline cost</u> | <u>7.7</u> | <u>22.7</u> | <u>30.4</u> | <u>10.6</u> | <u>31.2</u> | <u>41.8</u> | 75 |
| Contingencies | | | | | | | |
| Physical | 0.4 | 1.1 | 1.5 | 0.5 | 1.6 | 2.1 | 76 |
| Price increase | 1.0 | 2.3 | 3.3 | 1.4 | 3.1 | 4.5 | 69 |
| <u>Subtotal</u> | <u>1.4</u> | <u>3.4</u> | <u>4.8</u> | <u>1.9</u> | <u>4.7</u> | <u>6.6</u> | 71 |
| <u>Total project cost</u> | <u>9.1</u> | <u>26.1</u> | <u>35.2</u> | <u>12.5</u> | <u>35.9</u> | <u>48.4</u> | 74 |

3.2 Base costs are estimated at November 1991 prices. Equipment costs are estimated on the basis of master lists already drawn up and recent catalogue prices. Transportation and installation costs, the initial supply of consumables and the costs of operations and maintenance are based on recent experience in the VHS system. Consultant costs are based on current Government rates. Duties and taxes, allowing for exemptions, are estimated at US\$2.6 million.

3.3 The contingency allowance of US\$6.6 million (about 16% of baseline costs) includes contingencies for unforeseen physical conditions and for estimated price increases. Physical contingencies were estimated at 5% of baseline costs for equipment, consultant services, transportation and installation of equipment, consumable materials and O&M expenditures. Price increase contingencies were calculated for both local and foreign costs in accordance with the following expected annual average price increase percentages: foreign cost, 3.9% in FY92 and thereafter and local cost, 5.0% p.a. throughout. Accordingly, aggregated price increases are estimated at about 10% of baseline costs plus physical contingencies.

3.4 The foreign exchange component of US\$35.9 million (about 74% of total estimated project costs) has been calculated on the basis of the following foreign exchange percentages: equipment - 100%, transportation and installation - 10%, consumables - 10%, O & M - 10% and consultants - 0%.

B. Financing

3.5 The proposed loan of US\$30.0 million equivalent would finance about 84% of the estimated foreign exchange cost of the project or about 62% of total project costs net of duties and taxes. The Government would be responsible for the remaining 38% or US\$18.4 million equivalent. The loan amount is limited to US\$30.0 million by the foreign borrowing program and is therefore less than the foreign exchange cost of the project. The loan would finance 100% of the baseline cost of equipment with all contingencies to be financed by the Government. Loan funds would be made available to participating public and private schools as budget transfers from MOE through the local boards of education.

Table 3.3: FINANCING PLAN

| Category of Expenditure | Government | IBRD | Total |
|--|------------------------|-------------|-------------|
| | -----US\$ million----- | | |
| Equipment | - | 30.0 | 30.0 |
| Equipment transportation and installation | 1.8 | - | 1.8 |
| Operations and maintenance | 4.9 | - | 4.9 |
| Consumable materials | 4.9 | - | 4.9 |
| Consultants | 0.2 | - | 0.2 |
| Contingencies | 6.6 | - | 6.6 |
| <u>Total</u> | <u>18.4</u> | <u>30.0</u> | <u>48.4</u> |

Recurrent Expenditures

3.6 When fully operational, the project would generate recurrent costs for consumable materials and O & M estimated at US\$2.7 million p.a. This would be spread over approximately 280 schools thus averaging about US\$9,600 per institution. These additional expenditures could be accommodated by the institutions without difficulty.

C. Project Management and Implementation

3.7 Overall responsibility for project implementation would lie with the Education Facilities Bureau of MOE - an agency that has gained considerable experience in implementing Bank projects through its responsibility for earlier Bank operations. Physical aspects of the project would be handled

within EFB by the Education Loan Projects Division including relations with the local boards of education on equipment lists and specifications and with OSROK for equipment procurement. Assistance on educational issues would be provided by the boards of education and the Vocational Education Division of the Science and Technology Education Bureau of MOE. These bodies are adequately staffed with qualified and experienced personnel. An organization chart for MOE is given at Annex 4. The project implementation schedule is shown in Annex 10.

3.8 The Education Loan Projects Division would be responsible for routine correspondence and reporting to the Bank, and for financial and disbursement matters. ELPD has played this role in previous Bank projects and is experienced in project implementation. The bulk of the work in equipment procurement would be undertaken by OSROK, which is highly experienced in procuring equipment under the Bank's international competitive bidding (ICB) procedures. On the basis of equipment lists and specifications provided by the local boards of education, OSROK would prepare bidding documents, invite bids, evaluate them in conjunction with the BEs and make contract awards. The schools would be responsible for installation, initial testing and operation of the equipment, unless specified in the equipment contract that the supplier would perform these tasks. The schools, assisted by the Seoul Technical Repair Center if necessary, would also be responsible for maintenance and repair of the equipment including acquisition of spare parts, accessories and consumables, beyond the items and services initially supplied under the contract. The Vocational Education Division would be responsible for implementing the policy studies. VED would organize the working groups for each study and liaise with local boards of education as appropriate. VED would ensure that the studies were implemented according to the action plan and take responsibility for following up on the implementation of the recommendations of the studies, assisted by ELPD as necessary. The Bank would supervise the project twice yearly around March and September coinciding as far as possible with the preparation of the semi-annual progress reports (para. 3.14). Regional average coefficients would be applied for allocating resources to project supervision. Overall implementation issues would be handled by the task manager with technical aspects being the responsibility of a technical educator.

Status of Project Preparation

3.9 The advanced stage of project preparation would allow implementation to commence immediately after loan signing. Criteria for the selection of schools to be included in the project have been prepared and are acceptable to the Bank (para. 2.6). Standard equipment lists have been updated and schools have identified their equipment needs. Procedures are in place for reviewing and finalizing these needs. Terms of reference for the policy studies and the action plan for their implementation have been agreed with the Government. Funds are available in MOE's budget to finance the studies. Project management authorities have been identified and competent staff are available to handle implementation activities.

Procurement

3.10 Procurement arrangements are shown in Table 3.4. About 85% of the equipment would be procured on the basis of ICB procedures in accordance with the Bank's guidelines. Equipment items in contracts valued at less than US\$300,000 may be procured up to an aggregate limit of US\$4.5 million through shopping procedures allowing for the comparison of quotations from at least three suppliers. Local equipment manufacturers would be extended a 15% preference margin, or the prevailing customs duties, whichever is the lower, on bid evaluation under ICB. Local transportation, operations and maintenance costs on equipment would be financed by the Government under local procedures. Installation costs and costs of consumables, if not included in the equipment contracts, would also be financed by the Government. Local consultant services would be financed by the Government and procured under local procedures.

Table 3.4: SUMMARY OF PROPOSED PROCUREMENT ARRANGEMENTS

| Category of expenditure | <u>Procurement Method</u> | | | NBF | Total cost including contingencies |
|---|----------------------------|-----|---------------------|----------------------|------------------------------------|
| | ICB | LCB | Other | | |
| | ----- (US\$ million) ----- | | | ----- | ----- |
| Equipment | 29.4 (25.5) | - | 5.1 (4.5) | - | 34.5 (30.0) |
| Equipment transportation and installation | - | - | - | 2.1 (0.0) | 2.1 (0.0) |
| Operations and maintenance | - | - | - | 5.8 (0.0) | 5.8 (0.0) |
| Consumable materials | - | - | - | 5.8 (0.0) | 5.8 (0.0) |
| Consultants | - | - | - | 0.2 (0.0) | 0.2 (0.0) |
| <u>Total</u> | <u>29.4</u> (25.5) | - | <u>5.1</u> (4.5) | <u>13.9</u> (0.0) | <u>48.4</u> (30.0) |

Note: Figures in parentheses are the respective amounts financed by the Bank loan.

NBF: Not Bank-Financed.

3.11 In accordance with successful practices for procurement under ICB used in recent education and technology advancement projects in Korea, OSROK would not be required to refer equipment contracts to the Bank for prior review before making contract awards. However, complete bidding documents

including commercial terms, schedules of requirements and technical specifications would be sent to the Bank before each invitation to bid. Bid evaluation reports, documents and contracts would be retained by OSROK for ex-post review by Bank missions.

Disbursements

3.12 The proposed loan of US\$30.0 million would be disbursed over a period of 5.5 years (Annex 11). This corresponds to the standard disbursement profile for education projects in Korea which is 5.5 years. The completion date of the project would be June 30, 1997 and the closing date December 31, 1997. Disbursements would be made on the basis of (a) 100% of foreign expenditures for imported equipment or, 100% of local expenditures (ex-factory cost) for locally manufactured equipment; and (b) 65% of local expenditures for other equipment items procured locally. Reimbursement for each equipment contract of US\$300,000 equivalent or more, would be fully documented. Reimbursement for each equipment contract of less than US\$300,000 equivalent, would be made against statements of expenditure for which full supporting documentation would be retained in MOE, for review as requested, by visiting Bank missions. Administrative and accounting capability in MOE is adequate to support the SOE procedure.

3.13 To facilitate disbursements, a special account, maintained in US dollars, would be set up at the Korea Exchange Bank in an amount of US\$2.0 million, to cover the estimated average amount required to finance project expenditures for the next four months. Applications for replenishment of the special account would be submitted to the Bank on a quarterly basis or whenever the amount requested exceeds 50% of the initial deposit, whichever comes first.

Accounts, Audits and Reporting

3.14 MOE would maintain project accounts in accordance with sound accounting practices. During negotiations, the Government gave assurances that audited accounts, including the special account and statements of expenditure (SOE) would be sent to the Bank within six months of the end of the financial year. Audit reports would include a separate opinion for expenditures under SOE procedures. The Government would submit semi-annual progress reports to the Bank in about March and September and provide status reports for visiting missions.

D. Environmental Impact

3.15 The project will not have any negative impact on the environment. The equipment to be supplied under the project would be located in properly designed workshops which operate under standard safety procedures.

E. Impact on Women

3.16 The project would have its strongest impact on women through the provision of equipment to support educational improvements in the commercial schools. Although girls comprise nearly 53% of enrollments in the VHS system,

they account for 79% of enrollments in the commercial schools (Table 1.1). This reflects the traditional preference of girls for office-related rather than factory-related work. No discriminatory practices exist which would discourage females from enrolling in industrial skills courses and the present enrollment pattern is largely the result of individual preferences. High female enrollment in the commercial schools reflects the continued shift of women into better paying jobs in the economic mainstream. The project would contribute to producing better-trained female workers for the service sector.

IV. BENEFITS AND RISKS

A. Benefits

4.1 The project would assist in raising the quality of skill training in the vocational high schools. The project would help to ensure that trainees are trained on modern equipment more attuned to the high technology equipment utilized in the industrial, commercial and agricultural sectors. The improved training would enhance the value of VHS graduates to prospective employers by increasing their usefulness immediately upon graduation. Thus the continued employability of VHS graduates would be assured, and the productivity of the sectors in which they would be employed would be enhanced. The project would also improve the relevance and effectiveness of vocational education through strengthening planning and the link between schools and employers, improve staffing arrangements in the schools and increase efficiency in the operation of the joint practice centers. To the extent that vocational education tends to serve lower income groups, improvements in the system would benefit these groups.

B. Risks

4.2 There are no major risks associated with the project.

V. AGREEMENTS REACHED AND RECOMMENDATION

5.1 The Government has agreed to the following:

- (a) a study on strengthening school-employer linkages would be completed by June 1993 and implementation of the study's recommendations would begin by October 1994 (para. 1.21);
- (b) a study on improving the effectiveness of the Joint Equipment Centers would be completed by March 1993 and implementation of the study's recommendations would begin by July 1994 (para. 1.24);
- (c) a study on improving resource allocations to O & M and consumable materials would be completed by January 1993 and implementation of the study's recommendations would begin by May 1994 (para. 1.25);

- (d) a study on vocational teacher issues would be completed by April 1993 and implementation of the study's recommendations would begin by August 1994 (para. 1.28);
- (e) a study on the development of a planning mechanism to guide the future expansion of the VHS system would be completed by July 1993 and implementation of the study's recommendations would begin by November 1994 (para. 1.31);
- (f) schools would be selected to participate in the project according to criteria acceptable to the Bank (para. 2.6);
- (g) the studies would be carried out and their recommendations implemented according to the action plan, unless otherwise agreed with the Bank (para. 2.9); and
- (h) audit reports would be submitted by the Government to the Bank within six months of the end of each financial year (para. 3.14);

5.2 Subject to the above conditions, the project constitutes a suitable basis for a Bank loan of US\$30 million equivalent to the Republic of Korea for a term of 15 years, including 5 years of grace at the Bank's standard variable interest rate.

KOREAVOCATIONAL SCHOOLS DEVELOPMENT PROJECTStructure of Craftsman Training in Vocational Training Institutes
(1990)

| <u>Training Agency</u> | <u>No. of Training Centers</u> | <u>Output of Trainees</u> |
|------------------------|--------------------------------|---------------------------|
| <u>Public Sector</u> | | |
| KOMA | 34 | 16,395 |
| Central Government | 37 | 4,706 |
| Local Government | 4 | <u>4,140</u> |
| Subtotal | <u>75</u> | <u>25,241</u> |
| <u>Private Sector</u> | | |
| In-plant | 110 | 26,266 |
| Authorized | <u>99</u> | <u>23,501</u> |
| Subtotal | <u>209</u> | <u>49,767</u> |
| <u>Total</u> | <u>284</u> | <u>75,008</u> |

KOREA

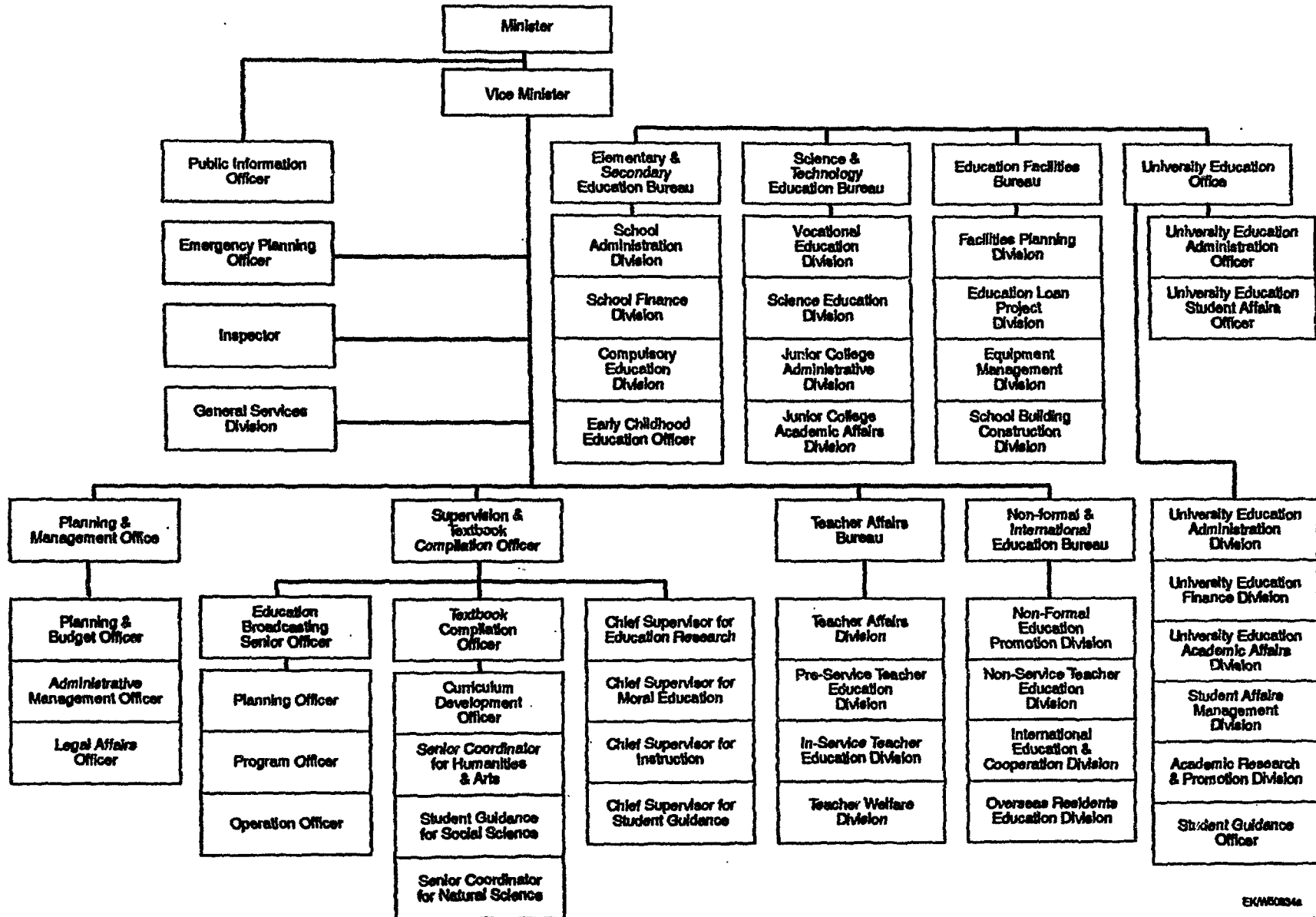
VOCATIONAL SCHOOLS DEVELOPMENT PROJECTOutput of Trained Craftsmen from Vocational Institutes

| Industry | Output of Trainees | | | |
|--|--------------------|------------|----------------|------------|
| | 1990 | | 1977-81 | |
| | No. | % | No. | % |
| Metal materials and manufacturing | 1,160 | 2 | 19,530 | 4 |
| Metal processing | 21,040 | 29 | 96,506 | 19 |
| Transportation and construction equipment | 11,892 | 16 | 67,827 | 14 |
| Electricity | 4,199 | 6 | 19,114 | 4 |
| Electronics and communications | 8,526 | 11 | 28,708 | 6 |
| Textiles | 4,577 | 6 | 110,381 | 22 |
| Wood processing | 4,775 | 6 | 88,464 | 18 |
| Chemistry | 1,554 | 2 | 22,986 | 5 |
| Printing | 355 | - | 6,809 | 1 |
| Mining | 55 | - | 9,989 | 2 |
| Handicrafts | 1,108 | 1 | 4,527 | 1 |
| Food Processing | 2,062 | 3 | 9,289 | 2 |
| Other | 13,705 | 18 | 11,609 | 2 |
| <u>Total</u> | <u>75,008</u> | <u>100</u> | <u>495,739</u> | <u>100</u> |

KOREAVOCATIONAL SCHOOLS DEVELOPMENT PROJECTENROLLMENTS BY COURSE IN VOCATIONAL
HIGH SCHOOLS - 1990Enrollments
('000)

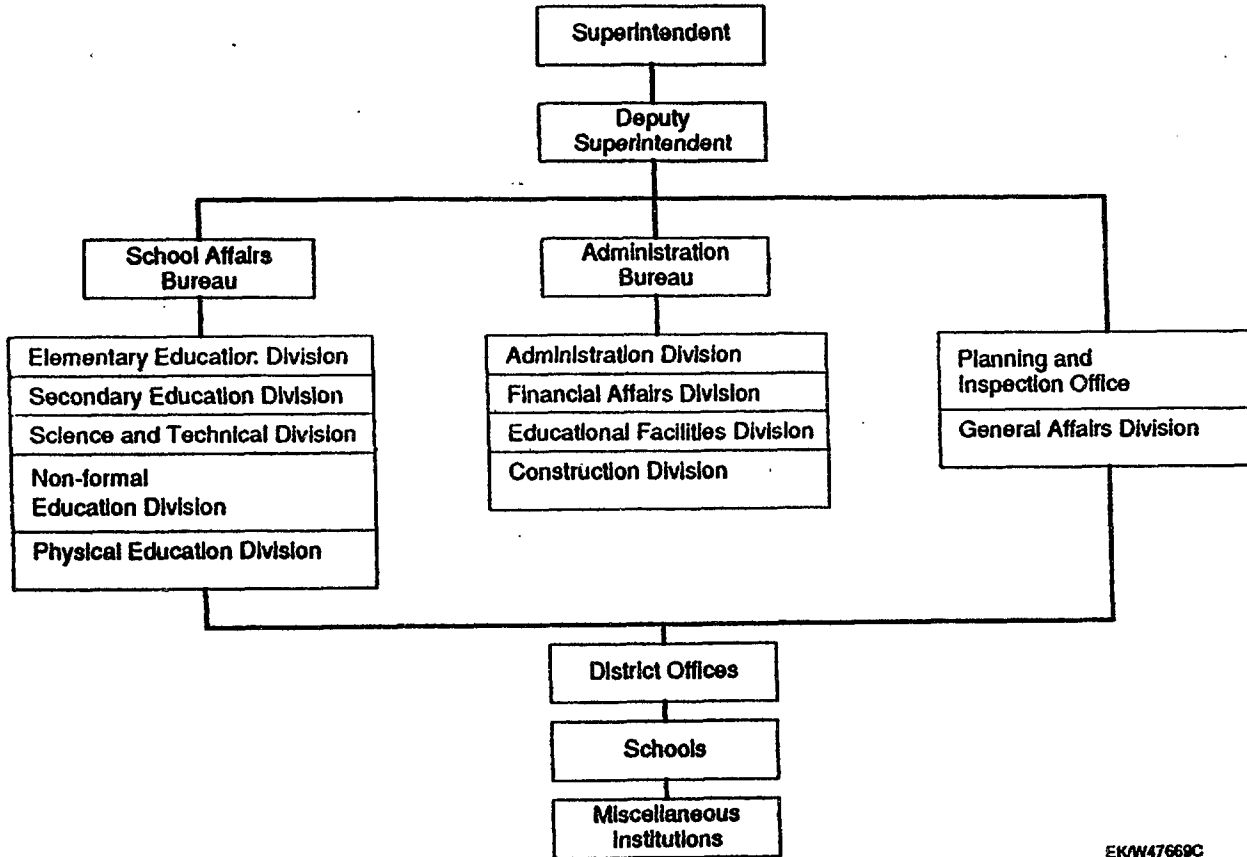
| <u>Course</u> | <u>Total</u> | <u>Female</u> | <u>% Female</u> |
|-----------------------------|--------------|---------------|-----------------|
| <u>Agriculture</u> | | | |
| Agriculture | 10.3 | 0.7 | 6.8 |
| Horticulture | 11.9 | 4.0 | 33.6 |
| Zootechnology | 12.1 | 0.1 | 0.8 |
| Forestry | 2.8 | 0.1 | 0.5 |
| Agricultural Eng. | 4.2 | - | - |
| Other | <u>8.3</u> | <u>1.6</u> | <u>19.3</u> |
| Sub-total | 49.6 | 6.5 | 13.1 |
| <u>Industry</u> | | | |
| Machinery | 62.7 | - | - |
| Electricity | 30.6 | - | - |
| Electronics | 28.4 | 0.8 | 2.8 |
| Chemical Eng. | 14.7 | 0.3 | 2.0 |
| Communications | 4.2 | 0.2 | 4.8 |
| Plumbing/Welding | 4.6 | - | - |
| Automobile | 3.1 | - | - |
| Architecture | 18.8 | 0.5 | 2.7 |
| Civil Eng. | 17.7 | - | - |
| Other | <u>13.6</u> | <u>0.6</u> | <u>4.4</u> |
| Sub-total | 198.4 | 2.4 | 1.2 |
| <u>Commerce</u> | | | |
| Commerce | 334.8 | 269.7 | 80.6 |
| Information Proc. | 67.7 | 54.8 | 80.9 |
| Accounting | 40.8 | 33.9 | 83.1 |
| General | 94.1 | 50.1 | 53.2 |
| Other | <u>11.5</u> | <u>8.1</u> | <u>70.4</u> |
| Sub-total | 548.9 | 416.6 | 75.9 |
| <u>Fisheries and Marine</u> | | | |
| Engine | 3.2 | - | - |
| Fishing | 1.9 | - | - |
| Communications | 1.5 | - | - |
| Navigation | 1.0 | - | - |
| Other | <u>2.5</u> | <u>0.2</u> | <u>8.0</u> |
| Subtotal | 10.1 | 0.2 | 2.0 |
| <u>Miscellaneous</u> | | | |
| | <u>3.7</u> | <u>2.4</u> | <u>64.9</u> |
| <u>Total</u> | <u>810.7</u> | <u>428.1</u> | <u>52.8</u> |

KOREA
VOCATIONAL SCHOOLS DEVELOPMENT PROJECT
Organization of the Ministry of Education



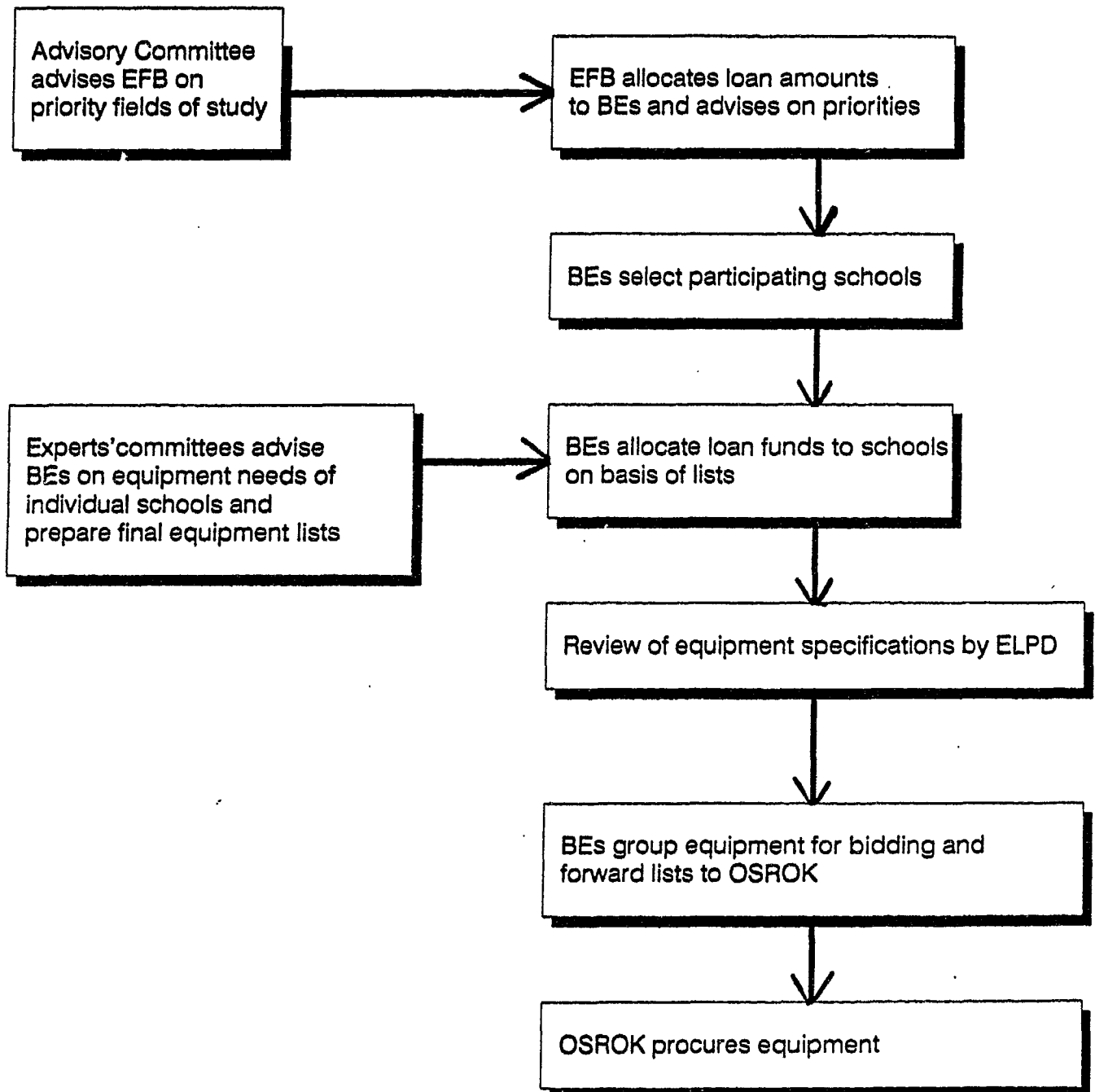
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KOREA
VOCATIONAL SCHOOLS DEVELOPMENT PROJECT
Organization of a Board of Education



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KOREA
VOCATIONAL SCHOOLS DEVELOPMENT PROJECT
Procedures for Equipment Procurement



KOREA
VOCATIONAL SCHOOLS DEVELOPMENT PROJECT
Action Plan for the Institutional Strengthening
of the Vocational High School System

| Policy Issue | Improve operation of Joint Practice Centers | Develop effective planning and resource allocation mechanism for consumables and O & M | Improve supply and quality of vocational course teachers | Improve links between employers and VHSs | Develop effective mechanism for planning future expansion and structural change in VHS system |
|--|--|---|---|---|--|
| Actions | | | | | |
| 1) Agree on TOR for studies: | November 1991 | November 1991 | November 1991 | November 1991 | November 1991 |
| 2) Identify membership of working groups: | March 1992 | March 1992 | March 1992 | March 1992 | March 1992 |
| 3) Study to commence by: | September 1992 | November 1992 | January 1993 | March 1993 | April 1993 |
| 4) Study to be completed by: | March 1993 | January 1993 | April 1993 | June 1993 | July 1993 |
| 5) Government's decisions on study recommendations by: | May 1994 | March 1994 | June 1994 | August 1994 | September 1994 |
| 6) Implementation of recommendations to commence by: | July 1994 | May 1994 | August 1994 | October 1994 | November 1994 |

Each study will contain a timetable for the implementation of its recommendations.

KOREA

VOCATIONAL SCHOOLS DEVELOPMENT PROJECT

Detailed Project Costs
(Won million)

| | Consultants | Equipment | Equipment Transportation and Installation | O & M | Consumable Materials | <u>Total Cost</u> | |
|-------------------------------|-------------|---------------|---|--------------|-------------------------|-------------------|-------------|
| | | | | | | Won M | US\$ M |
| Technical Schools | - | 11,899 | 715 | 1,949 | 1,949 | 16,512 | 22.7 |
| Agricultural Schools | - | 6,132 | 365 | 1,000 | 1,000 | 8,497 | 11.6 |
| Commercial Schools | - | 3,869 | 234 | 620 | 620 | 5,343 | 7.3 |
| Policy Studies | 146 | - | - | - | - | 146 | 0.2 |
| <u>Baseline Cost</u> | <u>146</u> | <u>21,900</u> | <u>1,314</u> | <u>3,569</u> | <u>3,569</u> | <u>30,498</u> | <u>41.8</u> |
| Contingencies | | | | | | | |
| Physical | 7 | 1,095 | 66 | 179 | 179 | 1,526 | 2.1 |
| Price Increase | 8 | 2,223 | 168 | 457 | 457 | 3,313 | 4.5 |
| <u>Subtotal Contingencies</u> | <u>15</u> | <u>3,318</u> | <u>234</u> | <u>636</u> | <u>636</u> | <u>4,839</u> | <u>6.6</u> |
| <u>Total Project Cost</u> | | | | | | | |
| Won Million | <u>161</u> | <u>25,218</u> | <u>1,548</u> | <u>4,205</u> | <u>4,205</u> | <u>35,337</u> | |
| US\$ Million | <u>0.2</u> | <u>34.5</u> | <u>2.1</u> | <u>5.8</u> | <u>5.8</u> | | <u>48.4</u> |

KOREA

VOCATIONAL SCHOOLS DEVELOPMENT PROJECT

Project Expenditure by Year and Recipient

| | Base Costs (Won million) | | | | | | Total Cost | |
|----------------------|--------------------------|---------------|---------------|--------------|--------------|------------|---------------|-------------|
| | 92/93 | 93/94 | 94/95 | 95/96 | 96/97 | 97/98 | Won M | US\$M |
| Technical Schools | 1,115 | 5,570 | 5,570 | 3,037 | 913 | 307 | 16,512 | 22.7 |
| Agricultural Schools | 810 | 2,730 | 2,730 | 1,621 | 409 | 197 | 8,497 | 11.6 |
| Commercial Schools | 307 | 1,722 | 1,722 | 1,117 | 307 | 168 | 5,343 | 7.3 |
| Policy Studies | 73 | 73 | - | - | - | - | 146 | 0.2 |
| <u>Baseline Cost</u> | <u>2,305</u> | <u>10,095</u> | <u>10,022</u> | <u>5,775</u> | <u>1,629</u> | <u>672</u> | <u>30,498</u> | <u>41.8</u> |
| Contingencies | | | | | | | | |
| Physical | 115 | 505 | 501 | 289 | 82 | 34 | 1,526 | 2.1 |
| Price Increase | 51 | 674 | 1,137 | 936 | 347 | 168 | 3,313 | 4.5 |
| Total Project Cost | <u>2,471</u> | <u>11,274</u> | <u>11,660</u> | <u>7,000</u> | <u>2,058</u> | <u>874</u> | <u>35,337</u> | <u>48.4</u> |
| Foreign Exchange | 1,786 | 8,349 | 8,675 | 5,190 | 1,514 | 677 | 26,191 | 35.9 |

**KOREA
VOCATIONAL SCHOOLS DEVELOPMENT PROJECT
Schedule of Implementation**

| CY Bank FY Quarter CY | 1992 | | 1993 | | | | 1994 | | | | 1995 | | | | 1996 | | | | 1997 | | | | 1998 | |
|---|------|---|------|---|----|---|------|---|----|---|------|---|----|---|------|---|----|---|------|---|----|---|------|--|
| | 92 | | 93 | | 94 | | 95 | | 96 | | 97 | | 98 | | 99 | | 00 | | 01 | | 02 | | | |
| | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 | 1 | 2 | | |
| Selection of Vocational Schools | | | | | | | | | | | | | | | | | | | | | | | | |
| Education boards notified | | | | | | | | | | | | | | | | | | | | | | | | |
| Proposals received & reviewed | | | | | | | | | | | | | | | | | | | | | | | | |
| Vocational schools selected | | | | | | | | | | | | | | | | | | | | | | | | |
| Equipment Procurement | | | | | | | | | | | | | | | | | | | | | | | | |
| Lists & specs prepared | | | | | | | | | | | | | | | | | | | | | | | | |
| Reviewed & approved | | | | | | | | | | | | | | | | | | | | | | | | |
| Bidding documents prepared | | | | | | | | | | | | | | | | | | | | | | | | |
| Invitation for bids | | | | | | | | | | | | | | | | | | | | | | | | |
| Evaluation & contract awards | | | | | | | | | | | | | | | | | | | | | | | | |
| Delivery, installation & testing | | | | | | | | | | | | | | | | | | | | | | | | |
| Warranty period | | | | | | | | | | | | | | | | | | | | | | | | |
| Studies | | | | | | | | | | | | | | | | | | | | | | | | |
| TORs prepared and group members identified | | | | | | | | | | | | | | | | | | | | | | | | |
| Studies conducted | | | | | | | | | | | | | | | | | | | | | | | | |
| Government decisions reached | | | | | | | | | | | | | | | | | | | | | | | | |
| Accepted recommendations implemented | | | | | | | | | | | | | | | | | | | | | | | | |
| Loan Processing & General Implementation | | | | | | | | | | | | | | | | | | | | | | | | |
| Negotiations | | | | | | | | | | | | | | | | | | | | | | | | |
| Board presentation | | | | | | | | | | | | | | | | | | | | | | | | |
| Loan signing | | | | | | | | | | | | | | | | | | | | | | | | |
| Effectiveness | | | | | | | | | | | | | | | | | | | | | | | | |
| General procurement notice announced | | | | | | | | | | | | | | | | | | | | | | | | |
| Project completion date | | | | | | | | | | | | | | | | | | | | | | | | |
| Closing date | | | | | | | | | | | | | | | | | | | | | | | | |
| Project Completion Report Due Date | | | | | | | | | | | | | | | | | | | | | | | | |

KOREA
VOCATIONAL EDUCATION PROJECT

Disbursements

| IBRD Fiscal Year | Disbursements | | | Disbursements Profile ^{/a} (%) |
|--------------------|----------------------------|------------|------------------|---|
| | Semester -----US\$----- | Cumulative | as % of Total | |
| <u>1992</u> | | | | |
| 1 | 2.0 ^{/b} | 2.0 | 6.7 | 1 |
| 2 | 0.0 | 2.0 | 6.7 | 3 |
| <u>1993</u> | | | | |
| 1 | 4.0 | 6.0 | 20.0 | 5 |
| 2 | 6.0 | 12.0 | 40.0 | 10 |
| <u>1994</u> | | | | |
| 1 | 4.0 | 16.0 | 53.3 | 23 |
| 2 | 6.0 | 22.0 | 73.3 | 44 |
| <u>1995</u> | | | | |
| 1 | 4.0 | 26.0 | 86.7 | 70 |
| 2 | 2.0 | 28.0 | 93.3 | 81 |
| <u>1996</u> | | | | |
| 1 | 1.0 | 29.0 | 96.7 | 92 |
| 2 | 0.5 | 29.5 | 98.3 | 97 |
| <u>1997</u> | | | | |
| 1 | 0.5 | 30.0 | 100.0 | 100 |

^{/a} Standard disbursement profile for education projects in Korea.

^{/b} Initial deposit in Special Account

KOREA

VOCATIONAL SCHOOLS DEVELOPMENT PROJECT

Selected Documents Available in the Project File

A. Reports and Studies Related to the Sector/Subsector

- A.1* Introduction to Science and Technology - Republic of Korea, MOST, 1988.
- A.2* Korea - Sector Survey of Science Education, IBRD, January 12, 1982.
- A-3* Impact of World Bank Lending for Educational Development in Korea: A Review, IBRD Report No. 5950, December 5, 1985.
- A-4** Lee, Kye-Woo, Human Resources Planning in the Republic of Korea, World Bank Staff Working Papers No. 554, 1983.
- A-5** Chang, Suk-Min, Challenges of Technological Changes on Technical Education, 1983.
- A-6** Lee, Chingboon, Financing Technical Education in LDCs: Economic Implications from a Survey of Training Modes in the Republic of Korea, Discussion Paper, Education and Training Series, World Bank, September 1985.
- A-7** The Korean Labor Market: Emerging Policy Issues, IBRD Report No. 6478-KO, February 2, 1987.
- A-8** Rutters, Klaus, Vocational Education in Korea, GTZ, August 1988.
- A-9** Lee, Sang-Joe, The Development History of Vocational Training Policies in Korea, KVTMA, September 1988.
- A-10** Vocational Training in Korea, Ministry of Labor, ROK, 1989.
- A-11** Linkages between the Macroeconomic Environment and Vocational Education and Training: A Case Study of the Republic of Korea, IBRD, undated.
- A-12** Shin, Se Ho and Ihm, Chon Sun, Vocational Education System in Korea: A Narrative on Historical Development, September 1988.

* - See Project File for the First Technology Advancement Project (Loan 3037-KO).

** - See Project File for the Vocational Education Project (Loan 3314-KO).

B. Reports and Studies Related to the Project

- B-1 The Proposed 9th IBRD Loan Project - Material for IBRD Mission, ELPD, July 1991.
- B-2 The School Curriculum of the Republic of Korea, MOE, undated.
- B-3 Vocational Education Project, ELPD/MOE, March 1991.
- B-4 Vocational High School Project Data, MOE, February 1990.

C. Selected Working Papers

- C-1 IBRD Working Paper - Action Plan and Terms of Reference for Institutional Studies

