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China:

Socialist Economic Development

(In Nine Volumes)

Annex G: Education

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CURRENCY EQUIVALENTS

The Chinese currency is called Renminbi (RMB). It is denominated in yuan (Y). Each yuan is subdivided:

1 yuan = 10 jiao = 100 fen

Exchange rates used in this report are as follows:

1977 \$1.00 = Y 1.828

1978 \$1.00 = Y 1.661

1979 \$1.00 = Y 1.541

WEIGHTS AND MEASURES

Chinese statistics are usually in metric units; in addition, mu and jin are often used:

1 mu = 0.1647 acres = 0.0667 hectares (ha)

1 jin = 0.5 kg

FISCAL YEAR

January 1 - December 31

TRANSLITERATION

The Pinyin system is used in this report.

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EDUCATION IN THE CHINESE CONSTITUTION

"The state devotes major efforts to developing education in order to raise the cultural and scientific levels of the whole nation. Education must serve proletarian politics and be combined with productive labor and must enable everyone who receives an education to develop morally and physically and become a worker with both socialist consciousness and culture."

"Citizens have the right to education. To ensure that citizens enjoy that right, the state gradually increases the number of schools of various types and other cultural and educational institutions and popularizes education."

1. DEVELOPMENTS IN EDUCATION

1.01 In few other countries has the education system been more exposed to changes in the political climate than in China since 1949. Education has been used more consistently than elsewhere as an instrument for transforming traditions, attitudes and behavior, and for introducing new skills and knowledge. The overall aims of education policy have been to develop students' moral, intellectual and physical faculties, and to train workers in both socialist consciousness and culture.

1.02 Traditional Chinese education was based on private tutors and academies and was in many ways similar to the system that prevailed in classical Greece. However, its primary purpose was to train and select civil servants. It was highly competitive. It might in theory have been open to all but in practice it excluded the poor and women. It never addressed itself to the education of the masses. Some changes occurred in the 1860s, when the teaching of natural sciences and foreign languages was introduced. After the arrival of the Europeans and Americans in the late nineteenth century, schools and universities were established by missionary societies and other agencies; these were modeled after institutions in the home countries of the foreigners, and although they had wider educational objectives, these were not very relevant to Chinese needs. With the creation of the Republic in 1912, China's education system gained a more contemporary structure, but it still gave little consideration to the educational needs of the masses, particularly of those in rural areas. Education continued to be available to the few with high income or social status.

Trends Prior to 1966

1.03 1949-58. The Government that assumed power in 1949 inherited an education system that was small, fragmented and semicolonial. There was a shortage of manpower at all levels and the percentage of illiterates was at least 80%, despite China's long literary tradition. The number of students in primary education was 24 million, giving an enrollment ratio of only 25%. The number of students in secondary education was 1.3 million and the enrollment ratio about 3%; in tertiary education, there were 120,000 students or 0.3% of the relevant age group. The total population of China was about 540 million at that time, and it may be estimated that less than 70 million people (or 20% of the working age population of 340 million) had received no more than a full primary education, with the corresponding figures for secondary and higher education at 4 million and 185,000, respectively.

1.04 Education was regarded as a vital instrument for socialist development. However, the state of the economy during the period of restoration of the early 1950s prevented major development of the education system. Only gradual changes were possible, and financial allocations to education were modest. Many important reforms were nevertheless executed: for example, educational institutions were nationalized, the university structure was changed, textbooks were improved and teachers were retrained. Serious

attempts were made to promote adult education and eradicate illiteracy among the masses. Furthermore, a new education administration was established within the Ministry of Education to coordinate plans and implement programs.

1.05 Formal education comprised, and still comprises, the traditional three hierarchical stages of primary, secondary and tertiary education. Students completed six years of primary education, three years each of junior and senior secondary education (in China, called lower and upper middle schools), and finally four to five years of university education./1 The system thus provided a total of 16-17 years of education.

1.06 Senior secondary and tertiary education, patterned after the Soviet model, became increasingly specialized. The system was highly competitive and achievement oriented, an approach that fitted easily with the tradition of examinations. The system at the secondary and tertiary levels was designed to provide more trained manpower. At an early stage, the Government also established the "key" concept in education as a means of identifying ability regardless of socio-economic background. According to the key system, selected educational institutions at all levels received the best teachers, facilities and equipment and were open only to students who did well in examinations./2

1.07 1958-65. The proper balance between the emphasis on mass education and the need for high quality and specialized training has often been difficult to achieve. The development of education during the following three decades reflects attempts to reconcile these needs - the need for mass education, which for financial reasons might be obtained only at the expense of the quality of education, and the need for high quality training, which would provide the skilled manpower necessary for rapid economic development.

1.08 The Great Leap Forward movement, which began in 1958, was an attempt to sharply accelerate development throughout the economy, largely through local initiatives. In education, plans were made to increase student enrollments quickly, and especially to increase the number of students with worker or peasant backgrounds. Production work was included and emphasized in the curricula as a means of linking the classroom to society and theory with practice. Work also provided a source of income for the schools, and factories were opened to generate funds for expanding and operating the schools. The introduction of the "minban gongzhu" concept (management by the people with the assistance of government) in education was an important innovation, since it encouraged local authorities to construct schools using their own means and to hire teachers from among their own ranks, with minor

/1 And some shorter college courses.

/2 Three reasons have been given for establishing key schools: (a) they serve as models, (b) they use scarce financial resources well, and (c) they turn out highly qualified manpower.

financial support from the central government. Spare-time schools were expanded and half-time schools were introduced to combat illiteracy and meet the training needs of production units. As in other sectors of the economy, however, too many demands were placed on limited resources and the proper balance between quantitative and qualitative development was not achieved. By 1960, the Great Leap Forward movement had resulted in economic chaos and severe economic difficulties throughout the country. The serious economic situation caused major reductions in enrollments in primary and secondary education and led to a setback to educational development.

1.09 By 1961, China's education system had reverted to its previous form. Educational policy and administration were once again centralized; emphasis was placed on achievement. The quality of enrolled students was increasingly stressed. Selected schools and universities were again designated key institutions. Efforts were made to improve the education system, while following the policy of popularization and mass education, and to continue the steady developments of the early and mid-1950s.

The Cultural Revolution

1.10 The Cultural Revolution (1966-76) had a profound impact on China's education system. During the early tumultuous years of the Revolution, schools and universities were closed throughout China. Some primary and secondary schools did not open for two or three years, while universities and postsecondary institutions remained closed till the early 1970s. The education system was completely revamped.

1.11 During this period, vocational and technical secondary schools were almost completely dismantled and their facilities turned into residences or factories. Admission criteria were changed; political background (including, for example, class status of parents and grandparents) rather than ability became the key for entry. Tests disappeared at all educational levels.

1.12 The importance of formal schooling was de-emphasized. The length of schooling was shortened for primary, junior secondary and senior secondary education from 6:3:3 years, to 5:3:2 or even 5:2:2 years.

1.13 University education underwent drastic changes. The existing system was considered bourgeois and to favor students with wealthy or intellectual backgrounds. Through an open-door policy, entrance for students from rural areas and the working class was facilitated. Courses were shortened to three years. Many regular university professors accused of bourgeois attitudes were sent to the countryside for "re-education" and were often replaced by less qualified staff.

1.14 At all educational levels, management of the education system was decentralized, with local governments and communities playing an important role in decision making. Revolutionary committees directed schools and universities.

1.15 Productive labor was greatly emphasized and political education was much increased at the expense of academic subjects. Children in primary schools were required to spend four weeks each year in productive labor and secondary students six weeks. Two years' work in factories or communes was a prerequisite for postsecondary studies. Peasants, workers and members of propaganda teams who were often inadequately qualified were recruited as teachers, with a view to bridging the gap between school and the rest of the community and assuring the politicization of education.

1.16 When primary and secondary schools eventually fully reopened during the later years of the Cultural Revolution, educational opportunities were increased. Primary school enrollment increased by 30%, or over 30 million children. Expansion in secondary education was even faster: 300%, or 40 million students.^{/1} By contrast, in higher education, enrollment was curtailed through the continued closure of many institutions; in addition, a strong bias against advanced studies restrained the intake to universities. Postgraduate education was abolished.

1.17 The quality of education suffered at all levels. Many new teachers were poorly trained, and there was a shortage of qualified teachers and learning materials.^{/2} Much equipment had been destroyed, and library books had even been burnt. The curricula allowed little room for intellectual development and cognitive achievement. In the universities, basic and theoretical research was greatly affected. "Practicalness" and "redness" were given greater priority than "expertness."

Developments Since 1976

1.18 Since the Cultural Revolution, China's educational policy has again been modified. To provide the manpower necessary for rapid economic development, the Government has decided to give increased priority to education generally, and in particular to concentrate additional resources on specialized institutions and higher education. Key schools and universities have been reinstated and new ones have been founded. While the inequities that the key institutions may create are recognized, the authorities consider that the key concept offers the most cost-effective way of training the manpower China needs and overcoming the disruptions caused by the Cultural Revolution.

1.19 Other steps have been taken to reverse many changes adopted during the Cultural Revolution. The quality of education is being stressed, and

^{/1} This was partly a statistical artifact, since the sixth year of primary school became the first year of secondary school (para. 1.12).

^{/2} The sharp expansion of secondary school enrollment, in particular, was often possible only by "promoting" teachers from the primary to the secondary school level, while peasants and workers were recruited to replace them in the primary schools.

there is a renewed emphasis on theoretical and basic research and training. Productive labor remains part of the curricula, but it now comprises work considered particularly appropriate for the students' fields of study. Admission and progression are again based on scholastic ability and achievement, and examinations have been reinstated in the education process. Postgraduate studies are being encouraged.

1.20 The administration of education again rests with the Ministry of Education, which has a major responsibility for planning policy formulation, standardization, curriculum development, teacher supply, and quality control and improvement. At the same time, attempts are being made to transfer increased financial responsibility for primary, secondary and college education to local governments.

Summary

1.21 The development of education in China since 1949 has been impressive, despite the disruption during the Cultural Revolution (Table 1.1). The number of primary school graduates has increased by 305 million from the 1949 figure of 70 million. Since 1949, senior secondary schools have graduated 51 million students, compared to 4 million during the previous 30-year period; for university graduates, the corresponding figures are 3 million and 185,000. Two out of three adult Chinese are now literate. These are impressive figures by any standards. Qualitative developments have been less satisfactory, since expansion was sometimes achieved at the expense of quality; this was especially true of developments in secondary education during the Cultural Revolution. Attempts have been made to bridge the gap between school and the world of work during most of the period since 1949, notably through the schools in factories and factories in schools. These attempts have contributed to China's impressive development of nonformal education opportunities, especially at the university level where enrollments totalled almost 0.9 million students in 1979. The types of education offered include night school and correspondence courses, spare-time university programs, and training given to workers and peasants at institutions run by their factories, enterprises and counties.

Table 1.1: GROWTH OF EDUCATION, 1949-79

	1949	1958	1965	1979
<u>Primary</u>				
Schools ('000)	347	777	682	924
Enrollment (millions)	24.4	86.4	116.2	146.6
Enrollment ratio (%)	25	67	70	93
<u>Secondary</u>				
Schools ('000)	5.2	28.9	n.a.	147.3
Enrollment (millions)	1.3	8.5	14.4	60.3
Enrollment ratio (%)	2	17	16	46
<u>Higher</u>				
Universities/colleges	205	791	434	633
Enrollment (millions)	0.12	0.66	0.67	1.02
Enrollment ratio (%)	0.3	1.6	1.4	1.6

2. MANPOWER

Educational Profiles

2.01 Overall, the development of China's education system since 1949 has much improved the educational profile of the country's manpower. The educational profile was, however, lowered as a result of the decrease in higher and technical/vocational education and training during the Cultural Revolution. Because of the closure of schools and universities, China has had to forego the estimated 2 million middle-level technicians and 1 million college and university graduates who would otherwise have been graduated during the late 1960s and early 1970s. There is now a scarcity of skilled manpower in many sectors of the economy. Simultaneously, the quality of education suffered (para. 1.17), and a generation of Chinese (160 million) now in their twenties and early thirties received an education that was misoriented and low in quality.

2.02 The estimated educational attainment of China's current population (1979) in the 25+ age group is compared with data for neighboring Asian countries in Table 2.1. The educational profile of China is based on estimates of the number of school graduates at different educational levels since 1949, while data on other countries were obtained from Unesco statistics. Some Unesco data are from the 1970 census and profiles change in a few years for countries with expanding education systems. The table shows, nevertheless, that China compares well with many of its developing country

neighbors in having a fairly low "no schooling" rate and a satisfactory percentage of primary school graduates. However, China has the lowest proportion of higher education graduates. As expected, the profiles for Japan and the USSR are far superior to that of China.

Table 2.1: EDUCATIONAL PROFILES: CHINA AND OTHER ASIAN COUNTRIES
(percentage of population in the 25+ age group) /a

Countries	No schooling	Incomplete primary education	Complete primary education	Junior secondary education	Senior secondary education	Higher education	/b
China	38	16	31	10	4	0.7	
Philippines	20	-----56-----		-----14-----		9.6	
Thailand	34	-----61-----		-----4-----		1.1	
Korea (Rep.)	-----	-----73-----		-----22-----		5.6	
Hong Kong	29	-----42-----		10	---19---		
Singapore	48	-----29-----		-----21-----		2.0	
India	72	-----23-----		-----4-----		1.1	
Pakistan	81	2	6	4	4	3.4	
Bangladesh	82	-----10-----		-----7-----		0.9	
Japan	1	-----61-----		-----33-----		5.5	
USSR	-----48-----	-----	-----	-----44-----		7.2	

/a It would have been preferable to compare the 15+ age group, but no Unesco data are available on the 15-24 age group.

/b Thailand and Korea had increased their percentages to 2.2 and 10.4, respectively, by the mid-1970s.

Sources: China, mission estimates; other countries, Unesco.

2.03 China's literacy campaigns have been successful, though the number of illiterates increased somewhat during the Cultural Revolution. The literacy rate among the population aged 15+ is estimated at about 66%, or an increase of over 46 percentage points since 1949. For comparison, the literacy rates of the three countries on the Indian subcontinent vary from 21% to 33%. The other developing countries listed in Table 2.1, however, have rates higher than that of China, which vary from 69% in Singapore to 87% in the Republic of Korea. Japan and the USSR have literacy rates of or above 98%. The attrition rate in China's primary schools is such that the literacy curve may have leveled off during the last decade (para. 3.10).

2.04 The labor force in China is still primarily employed in agriculture (Table 2.2). The percentage in industry remains comparatively low, despite the ongoing industrialization, which began in the early 1950s.

Table 2.2: MANPOWER AND POPULATION DATA, 1952 AND 1979

	No. (millions)		As % of labor force	
	1952	1979	1952	1979
Total population	570	970	-	-
<u>Labor Force</u>	207	406	100	100
Of which:				
Employed in agriculture	173	300	84	74
Employed in industry	12	53	6	13
Employed in the military/civil service	} 22	33	} 10	8
Other	}	20	}	5

Source: State Statistical Bureau.

2.05 The educational profile of the labor force aged 15-64 is, as expected, better than that of the population aged 25+. Based on government information, the total output of educational institutions between 1949 and 1979 constituted an estimated 90% of trained labor in 1979. A profile of the trained labor force for 1979 shows that two thirds (a reasonable proportion) have at least a primary education (Table 2.3).

2.06 The 0.5% of the labor force with higher education should be compared with percentages ranging from 0.7% to 10.4% in other developing countries in East Asia. An estimated 40% of the manpower with higher education pursued studies in science and engineering; this amounts to 0.2% of the total labor force, which is a low percentage. Since many of the manpower with technical secondary education are teachers and health personnel, the percentage with industrial or agricultural training must be below the 0.9% shown in the table - probably 0.4%, again a low percentage.

Table 2.3: TRAINED LABOR FORCE, 1979

Level of education	Educational output 1949-79		Labor force participation		Adjustment /a (mln.)	Attrition /b (mln.)	Trained labor force	
	Mln.	%	%	Mln.			Mln.	% of total labor force
Higher education	3.0	0.6	100	3.0	+0.3	-1.2	2.1	0.5
Technical sec. education	5.4	1.1	95	5.1	+0.5	-2.0	3.6	0.9
Sr. sec. education	46.0	9.1	85	39.1	+3.8	-15.9	27.0	6.7
Jr. sec. education	147.0	29.0	80	117.6	+12.2	-46.5	83.3	20.5
Primary education	305.0	60.2	70	213.5	+25.3	-85.5	153.3	37.8
<u>Total</u>	<u>506.4</u>	<u>100.0</u>	<u>-</u>	<u>378.3</u>	<u>+42.1</u>	<u>-151.1</u>	<u>269.3</u>	<u>/c 66.3</u>

/a Adjusted for the remaining 10% of the trained labor force.

/b Assuming an annual average attrition rate of 3%.

/c Out of a total labor force of 406 million.

Source: Ministry of Education.

The Stock of Scientific and Technical Manpower

2.07 There are an estimated 4.7 million Chinese scientific and technical manpower with higher and intermediate training, distributed by occupation and sector as shown in Table 2.4. The table, which is broadly consistent with data in paras. 2.05-2.06, shows a strikingly low percentage in agriculture and industry compared with the figures for health care and medical personnel.

Table 2.4: DISTRIBUTION OF SCIENTIFIC AND TECHNICAL
MANPOWER, BY OCCUPATION AND SECTOR, 1979

	No. (millions)	% of total
<u>A. By Occupation</u>		
Engineers and technicians	1.7	36
Agricultural technicians	0.3/a	6
Medical personnel	1.4	30
Scientific researchers	0.3	6
Teachers	1.0	22
<u>Total</u>	<u>4.7</u>	<u>100</u>
<u>B. By Sector</u>		
Manufacturing	1.20	26
Construction	0.38	8
Transportation	0.16	3
Agriculture and forestry	0.36	8
Culture, health and education	1.70	36
Research	0.29	6
Miscellaneous	0.61	13
<u>Total</u>	<u>4.7</u>	<u>100</u>

/a Other sources give a figure of 0.21 million.

Sources: State Commission of Science and Technology, and State Planning Commission.

The Industrial Work Force

2.08 Achieving the four modernizations will require a good stock of skilled manpower in Chinese manufacturing industries and other enterprises such as transportation, construction and mining. The existing stock is low, and a shortage of scientific and technical high- and middle-level manpower prevails. A survey of the occupational structure of industries in 26 developed and developing countries /1 shows that these countries have an average of 87 engineers, technicians, managers and administrators per 1,000 employees, while China has 37 per 1,000. /2 In coal mining the respective figures are 84 and 19. In a sample of Chinese manufacturing industries,

/1 M. Zymelman, Occupational Structures of Industries (The World Bank, July 1980).

/2 Other sources quote 28 per 1,000.

which in many respects were above the Chinese average, the figures varied from 40 to 90 technical staff per 1,000 employees, with the majority below the international average. A few data from industrialized countries, or countries with strong industrial aspirations, confirm the picture of an undersupply of high- and middle-level technical manpower in Chinese industry (Table 2.5). China's construction industry of 1979 can well be compared with Brazil's industry of 1970 in its stock of technical manpower; its stock is otherwise relatively small.

Table 2.5: SCIENTIFIC AND TECHNICAL MANPOWER IN SELECTED INDUSTRIES: CHINA AND COMPARATOR COUNTRIES /a
(%)

	China	Brazil	Mexico	Japan	USA
Construction	2.5	1.6	3.2	3.6	3.5
Chemical and machinery	4.5	5.2	9.3	11.7	21.1

/a Data for 1970; the current stock is larger than these figures indicate.

Sources: For China, State Planning Commission; for other countries, M. Zymelman, op. cit.

2.09 The percentage of high-level manpower (scientists and engineers with university education) is estimated from the data in Tables 2.3 and 2.4 at 0.5%, or 5 per 1,000 employees. This is a low percentage compared to the figures for Mexico, Brazil, Japan and the USA.

2.10 Shanghai, with its population of 11 million, has a long industrial tradition and is China's most heavily industrialized community. It will play a key role in China's modernization efforts. Good educational opportunities are offered through its 30 universities and higher science and technical institutions, and its 72 technical schools. Nevertheless, its enterprises, with a labor force of 4.2 million, have only 57 technical managerial staff per 1,000 employees, and only 12 of these have completed higher education in an industrially relevant subject. Data from the Municipal Planning Commission in Shanghai confirm the shortage of scientific and technical manpower (Table 2.6), revealing that only 16% of the required number could be supplied to the various industries.^{/1} The greatest shortage was in the computer and automatic control sector, where only 8% of the need could be met.

/1 No similar surveys are available from other industrialized communities, but a textile factory and an instrument factory in Chengdu, the capital of Sichuan in China's interior, stated that they were able to meet 29% and 27% of their needs, respectively.

Table 2.6: REQUIREMENT AND SUPPLY OF NEW SCIENTIFIC AND TECHNICAL
MANPOWER IN SHANGHAI, 1979

Field	Requirement	Supply	Supply as % of requirement
Automatic control	251	20	8.0
Electronic computers	176	15	8.5
Industrial & civil engineering	480	47	9.8
Hydraulic drive	97	10	10.3
Radio communication	115	12	10.4
Industrial automation (electronic)	250	30	12.0
Architecture	107	13	12.1
Program design	241	31	12.9
Radio technology	104	14	13.5
Boilers	162	23	14.2
Industrial automatic dials	123	20	16.3
Computing mathematics	90	15	16.7
Chemistry	585	104	17.8
Motors	168	34	20.2
Machining methods & equipment	111	24	21.6
Physics	552	124	22.5
Chemical engineering	89	21	23.6
Biology	319	80	25.1
<u>Total</u>	<u>4,020</u>	<u>637</u>	<u>16.0</u>

Source: Municipal Planning Commission, Shanghai.

2.11 The shortage of economists, social scientists and lawyers in China is even greater than that of personnel with training in engineering and the natural sciences.^{/1} Prior to 1957, higher education and senior secondary education were geared towards science and technology after the Soviet model. Economics, the other social sciences and law were never emphasized enough. Later on during the Cultural Revolution, the study of these subjects was completely abolished. It has now been reintroduced, but so far only 7% of all university students in China are enrolled in these departments. The general low efficiency in many factories, often primitive office procedures and the lack of economic thinking also indicate shortages of such personnel as business administrators, plant managers and financial analysts.

^{/1} No manpower survey has been conducted but, to quote a typical example, a textile factory asked for 15 accountants last year but was not able to hire any.

2.12 There is also a shortage of researchers in China. The research sector in China only employs about 300,000 people, not even one researcher per 1,000 employees. The Academy of Sciences reports having only one experienced researcher to every hundred of its technical staff, compared to the ratio of one researcher to 3-4 technical staff in advanced countries. The Cultural Revolution was in general a period of decline in research and development:^{/1} although some applied research was conducted, basic research was frowned upon. This trend is now being reversed. Serious efforts are being made to rehabilitate Chinese research in all sectors. There is also a need to develop postgraduate education to produce qualified researchers. A priority is to rehabilitate the Chinese Academy of Sciences, which needs to staff close to 100 scientific institutes, with many hundreds of researchers in each institute.

2.13 The quality of scientific and technical manpower suffers on two counts: the low qualifications and unsuitable age distribution of personnel. Those graduated during the Cultural Revolution are inadequately qualified. In 1979, the Shanghai Commission of Science and Technology conducted a survey of those who graduated from universities and technical schools between 1972 and 1976. Its findings show that only about 20% were qualified to the standard of the pre-Cultural Revolution university syllabi; 60% were qualified to the standard of technical secondary education; and the remaining 20% were not qualified by either of these standards.

2.14 Comparatively few technicians and professionals entered the labor force during and after the Cultural Revolution, and the average age of technicians or professionals in Chinese enterprises is therefore high. Technicians are often 20 years older than their colleagues in other countries; the average age of senior scientists in Chinese industry is 58 years. In higher education, the situation is even worse, with professors averaging 70 years in Shanghai and associate professors 55 years. This age structure in industry and research institutions and universities carries with it a high risk of retaining outdated technologies and university curricula, and conducting irrelevant research.

2.15 The Chinese authorities are also dissatisfied with the technical and cultural levels of the rest of the labor force in manufacturing industries and other enterprises. They stated that the illiteracy rate of 5% in factories is too high and is unsatisfactory, that 70% of the labor force have had less than 6-7 years of education,^{/2} and that most of the 20-30% with a junior secondary education (up to 70% in some industries) received an

^{/1} With the possible exception of the defense sector.

^{/2} Some sources state that two thirds have only 2-3 years of primary education, which appears inconsistent with other data.

inferior education during the Cultural Revolution./1 Few employees have received any preservice skill training and most have learnt their skills on the job. Workers have a poor command of science and technology and few are fully skilled./2 This affects the utilization of equipment, productivity and the quality of products. The Chinese industrial worker appears ambitious and prepared to work long hours, but a lack of training may reduce overall creativity and willingness to try and adopt innovations.

The Agricultural Work Force

2.16 The labor situation is even more serious in agriculture than in industry. No reliable information is available in China on the number of agricultural technicians and agronomists with university degrees. There is reportedly an average of one technical staff per commune, or a total of 50,000 persons. There are, according to the State Planning Commission, 360,000 technical and scientific staff working in agriculture, forestry or related jobs in government-owned or collectively owned enterprises (Table 2.4). This would indicate a ratio of one technical worker per 1,000 people in the agricultural labor force. The scarcity of agricultural technicians is supported by data from Sichuan, which has a population of 100 million, an agricultural labor force of 43 million and 20,000 agricultural technicians; this corresponds to a ratio of one technician per 2,000 agricultural workers. For international comparison, agriculture employs an average of 5 technical staff per 1,000 employees with Mexico employing 2 per 1,000 and the USA 16 per 1,000 in 1970./3

2.17 As in industry, the technical and cultural levels of the agricultural labor force are low compared with those in developed countries and other East Asian countries. According to a government source, "30% of the young and middle-aged people in the rural areas are illiterate or semi-illiterate." This percentage is in fact probably higher, as the national figure for illiterates, including the urban population, is estimated at 34% and one out of three students leaves primary school prematurely. Furthermore, very few farmers have received any formal vocational training in agriculture.

/1 The Chinese authorities state that the overall quality of education deteriorated so much during 1966-76 that "quite a number of the young workers and staff members are junior or senior secondary school graduates only in name."

/2 A survey in one province showed only 5.1% fully skilled workers in coal mining, 4.1% in the metallurgical industry, and 6.4% in the chemical industry, although the Chinese authorities estimate that 10-15%, 10% and 9%, respectively, would actually be needed.

/3 Source: M. Zymelman, op. cit.

2.18 It has increasingly been realized that primary education and literacy enhance farmers' effectiveness. The Government's intention to make primary education universal by 1990 will therefore have an important effect not only socially but also economically in rural areas. It will also widen the recruitment base to accelerate industrialization. Expansion of agricultural training is also vital in many rural areas.

Projected Manpower Needs

2.19 Successful implementation of the Chinese Government's development plan will depend on the ability of the education system to produce sufficient well-trained workers, technicians, scientists and engineers over the next decade. Tentative estimates of future needs for skilled workers, middle-level technicians, scientists and engineers for industry and agriculture (services excluded) are shown in Table 2.7./1 The output of the school and university system (discussed in Chapter 3) would need to be significantly expanded to meet the projected demand.

Table 2.7: PROJECTED DEMAND OF INDUSTRIAL AND AGRICULTURAL SKILLED MANPOWER, 1990

	<u>Stock</u>		Annual additional need /a	Current output /b per annum
	Exist. 1979	Required 1990		
Scientists, engineers	900,000	1,650,000	106,000	30,000
Middle-level technicians	1,600,000	2,900,000	190,000	50,000
Skilled workers	16,000,000	23,000,000	1,200,000	400,000

/a For economic growth and attrition.

/b Full-time schools only.

Source: Estimates based on data from State Commission on Science and Technology and State Planning Commission.

Supply Mechanism

2.20 There is little mobility in the Chinese labor market and the labor transfer process is cumbersome. Chinese workers seldom change jobs and often remain with their first employer, although they may be promoted within

/1 The current labor force may be underutilized in some economic activities, but it has not been possible to take better utilization of the existing labor force into account in this estimate.

the enterprise. The place of employment is often the place of birth and childhood. This stability, which is politically and economically but also culturally conditioned, has advantages, as is evident from a similar situation in Japan. However, it also has disadvantages, including a tendency to create pockets of unemployment or labor shortage.

2.21 The allocation and employment of new labor follow a complicated procedure. Manpower needs are determined on an annual basis, and this process is closely correlated with the planning and budgeting work (para. 4.09) and based on surveys. Enterprises that come under local government submit an estimate of the number of new employees (graduates from universities and other schools) they require by field for the next year to the State Planning Commission through local planning commissions; those that come under ministries submit their estimates to the State Planning Commission through their respective ministries. A meeting is held between the central and local planning commissions and the ministries that have requested graduates. In light of national and local priorities, decisions are made on graduate quotas for the central government and each local government. Universities and schools are then notified of the number of graduates by field to be supplied to specific enterprises and organizations. These institutions in turn assign students to particular enterprises and organizations, based as far as possible on students' preferences.

2.22 The transfer from one enterprise to another is also complex. If an industry needs unskilled or skilled workers, it applies to the provincial industrial bureau under which it belongs. If this bureau cannot transfer labor from any of its industries, it applies to the labor bureau, which looks at the whole labor market of the province to find the requested labor. If this bureau is also unsuccessful, it applies to the Central Labor Bureau in Beijing. If an industry needs middle-level technicians or professionals, it initiates a similar procedure, although the planning commissions (provincial and central levels) would deal with the request rather than the labor bureaus. For administrative staff and office personnel, the factory would apply via the provincial industrial bureau to the provincial bureau of personnel, and if necessary to the State Council's Bureau of Personnel. The employees' preferences are considered within the framework of the needs of the labor market.

2.23 These cumbersome methods of recruiting personnel may lead to the misallocation of skilled manpower. Allocation procedures compound problems caused by the shortages of skilled manpower and may partly explain why personnel managers and others responsible for staffing China's enterprises invariably state that they get only a fraction of the qualified staff they ask for. In fact, they much prefer to fill personnel vacancies through their own staff upgrading programs.

Summary

2.24 Information on the educational attainment and vocational composition of the Chinese labor force is scanty and sometimes contradictory. This is also true of the functioning of the labor market. However, the stock of high-level manpower in engineering, science, administration and management is small, given China's current level of development and its aspirations to modernize its economy as soon as possible. Shortages exist in industry and are even greater in agriculture. Serious shortages of middle-level technicians and skilled workers also exist in many sectors. China's literacy rate and general educational level are high by the standards of many developing countries, but the technical and scientific profile of its labor force is not conducive to rapid economic development. The professional knowledge in industry and agriculture is sometimes insufficient and outdated; workers often lack skill training. Labor mobility is low, and the methods of hiring new staff or transferring employees from one enterprise to another are cumbersome. The immobility of the labor force may partially explain pockets of labor surplus and unexpected shortages.

3. THE CURRENT EDUCATION SYSTEM

Structure and Dimensions

3.01 Structure. The education structure in China is conventional (Appendix A). After nursery and kindergarten Chinese children enter a five-year primary school.^{/1} Those who complete their primary education and do well in the entrance examinations enter a three-year general junior secondary school and later, also after examinations, a two-year general senior secondary school. The latter is now slowly being expanded to three years. Students who do not enter the senior secondary school may go into vocational schools ("skilled worker training schools"), which are often run by various enterprises; into technical schools,^{/2} which are mostly run by specialized ministries; or into primary teacher training institutes, which come under the Ministry of Education. Furthermore, to meet the needs of senior secondary school graduates applying for technical education, two-year courses have been started at the vocational and technical schools. An increasing number of senior secondary school graduates is also entering universities or other university-level education institutes directly, now that the requirement for two years' productive labor (current during the Cultural Revolution) has been dropped. Most of the courses at these institutes last four years, or longer in departments such as medicine. Many universities are now offering postgraduate education, which may last a further two to four years.

^{/1} It has now been decided to extend primary education to six years.

^{/2} These schools offer courses in agriculture, forestry, health and medicine, finance and economics, arts, physical culture, etc.

3.02 In addition to formal education and training, a large network of nonformal education exists for teenagers and adults who have not been able to receive formal education. Literacy courses or full primary education are offered in urban and rural areas, primarily by enterprises for their employees and by communes for their members. Enterprises may also offer full-time or spare-time preservice or in-service courses at the secondary and tertiary levels, using correspondence and radio/TV education in addition to traditional classroom instruction. Nonformal education is supervised by the education authorities, but the enterprises and communes have considerable freedom in the choice of courses and in the selection of course participants. The structure of the nonformal system is flexible and can easily be adjusted to new education and training needs. Nonformal education has played and continues to play a very important role in China's education.

3.03 Dimensions. China's education system is the largest in the world. In 1979, it enrolled 9 million preschool students, 168 million primary education students, 65 million secondary education students, and 2 million tertiary education students. The system's total enrollment of 244 million comprises about 40% of all students in the developing world.

3.04 The education pyramid /1 of China, including adult, spare-time students, is shown in Appendix B. The size of the relevant age groups (7-21 years) varies only slightly from year to year and is about 21 million. Enrollment in each grade of primary education is bigger than the corresponding age group, and a large number of under- and overage students are enrolled. The intake in primary education has been reasonably constant during the last few years, and the pyramid therefore indicates a fairly substantial dropout rate. The low enrollment in grade 3 of senior secondary education reflects the recent reintroduction of a third grade and the fact that few schools have so far extended their two-year courses. Most students still proceed from grade 2 of senior secondary school to the labor market or to postsecondary institutions. The pyramid shows a large output from senior secondary schools and a limited intake to higher education, a situation that has prevailed over the last few years (para. 3.26).

Primary Education

3.05 Enrollment. Primary education expanded rapidly after the establishment of the People's Republic in 1949. In 1979, China enrolled close to 147 million children in 920,000 formal schools, giving an appropriate average school size of 160 students (Appendix C.1). This quantitative development

/1 The pyramid is based on enrollment figures given in Appendix C. The distribution of girls and spare-time students by grade has been estimated from aggregate data.

compares very well with progress in most other developing countries. In fact, the net enrollment ratio /1 of 93% is close to those of advanced countries and 30 percentage points above the ratio for the rest of the developing world (Appendix D). In 1979, when the appropriate age group (7-11 years) comprised about 106 million, the gross enrollment ratio (including 21 million nonformal primary students) was a very high 158%.

3.06 A considerable proportion of the students enrolled in China's primary schools are over- or underage (Appendix E): the education pyramid and gross enrollment ratio for the formal school system (138%) indicate that this proportion is at least one third./2 The percentage of overage students in China's primary schools is higher than that in other comparable countries, where it averages 13% and 21%, respectively, in 57 countries belonging to the two lowest GNP/capita income groups./3 Some Chinese overage students are repeaters, but most are late school entrants. The high percentage of late entrants is astonishing in view of the Chinese Government's emphasis on mass participation in education, particularly since the Cultural Revolution. Also, gross enrollment ratios have been reported as being well over 100% during the last decade, which would imply that the accumulated educational needs of overage children had long since been met.

3.07 Girls comprise 45% of the students in China's primary schools, a similar percentage to the average for other LDCs (43%). While this appears to be a satisfactory participation rate for China's stage of development, it implies nevertheless that most of the 7% of the appropriate age group not attending school are girls.

3.08 Promotion. Grade promotion in primary schools was, but is no longer, automatic. No official information is available on repetition rates, but data from ten primary schools in urban and rural areas showed a repetition rate of less than 10%, with an average of 5%. These rates, if representative, compare favorably with the average rate of 10-20% in some neighboring Asian countries. The current educational policy, which emphasizes academic achievement and competition, is likely to increase

/1 The net ratio excludes, but the gross ratio includes, under- and overage students.

/2 A brief survey by Bank mission members of some primary schools in Beijing, Gansu and Jiangsu (which may not be representative) revealed that only 23% of the students in these schools were of the right age for their grades; 5% were underage and no less than 72% were one or more years older than the normal grade age. In one rural school, the age span was 8 years in some grades.

/3 Group I comprises 36 countries with a GNP/capita below \$265 and Group II 21 countries in the income bracket \$265-510/capita, both in 1975 prices. China will be compared with these two country groups throughout the report.

repetition rates with universal primary education. However, restricted promotion and high repetition do not necessarily increase standards but certainly increase costs.

3.09 Access. The Chinese constitution states that "The citizens have the right to education." Consequently, admission is granted upon request (except to key primary schools, where potential students are interviewed and pre-tested) and is limited only by the availability of facilities. Ethnic minorities are almost as well represented in primary education as the Han majority (14% vs. 15% measured as a percentage of the total population). The high enrollment ratio shows that primary schools are easily accessible, even in rural areas, where about 85% of China's population live. The average commune has 15 primary schools, generally located within walking distance even for the youngest children. Access to primary schools is difficult only in remote areas of northern and western China, which are sparsely populated and partially inhabited by nomads. The Government was unsuccessful in its attempts to meet the educational needs of the nomads with mobile "tent" schools, and a boarding school system is now being introduced. The nomads are increasingly being settled, which will further facilitate the education of their children.

3.10 Internal Efficiency. In 1979, 64% of the students who began their education in the mid-1970s completed primary schooling. The Government regards this as an unsatisfactory retention rate. However, the completion rate in China is about 20 percentage points higher than in the rest of the developing world. There is an urban-rural and sex disparity in retention rates. Rural girls are most often taken out of school prematurely, for economic rather than academic reasons: there is an income foregone, and the girls are needed to look after the younger family members or to tend domestic animals. Peasants and cattle breeders in remote areas perceive education as being of little use to their daughters. Chinese educators state that five years of education are needed to achieve reasonable literacy in the Chinese language, defined as the recognition and ability to write some 3,000 characters. This implies that the 36% of primary school children (10 million in 1979) who drop out of school return to their villages or to nomadic life as illiterates or semi-literates. The Chinese Government has decided that measures must be taken to increase the holding power of rural primary schools and reduce the dropout rate.

3.11 Progression. About 83% of the urban and 79% of the rural primary school graduates proceed to junior secondary education. These are high percentages by international standards; they approach those of advanced countries and are 13 percentage points above the median for LDCs.

3.12 Curriculum. A common primary school curriculum has been developed in China, but local authorities may adjust the basic curriculum somewhat to meet their specific needs. Chinese and mathematics account for as much as two thirds of the scheduled hours. The curriculum has been weak in the natural

and social sciences, but these subjects now occupy 8% of the school time, with the remaining hours devoted to physical education, music and art. Foreign languages (primarily English) may be offered in grades 4 and 5, but the shortage of teachers able to teach a foreign language (a situation that was exacerbated by the Cultural Revolution) makes it unlikely that much foreign language instruction is given, except in key schools in urban areas.

3.13 The scheduled class week of six work days comprises 24-27 periods lasting 45 minutes each for each grade. This is above the average in many advanced countries, where the schedule is often light during the first school years. There are, in addition, 7-8 hours per week in each grade of extra-curricular activities, including productive labor, private study, Young Pioneer activities and outdoor sports. Productive labor, which has been de-emphasized during the last few years, is still a compulsory school activity and involves students in maintaining school facilities, working in nearby factories or cultivating one of the school's gardens.

3.14 The primary school curriculum seems to give students sufficient opportunity to reach a good level of literacy and numeracy. A shortage of teaching materials reduces the value of some other subjects (para. 3.22).

3.15 Chinese educators feel that the school week is too long and that primary school children are overburdened. However, research has shown that learning is (as expected) positively correlated to the time the student is exposed to a specific subject. Furthermore, the school is a more important learning institution in a developing (and primarily) rural society than in a developed urban society, where out-of-school learning stimuli such as books, newspapers and TV are abundant. The Chinese should carefully consider these factors before reducing the curricula for either primary or secondary education, towards which a similar attitude exists.

3.16 Teachers. Of the 5.38 million teachers /1 in China's primary schools in 1979, 1.95 million were civil servants employed and paid by the public authorities and 3.43 million were minban teachers employed and paid by local communities or enterprises. Since 1949, 2.37 million teachers (or 44% of the current total) have graduated from primary teacher training colleges in China. This implies that the remaining 3.01 million teachers have had no preservice pedagogical training (except for the few teachers trained during the prewar period). In fact, the Government has reported that only 47% of the primary teaching staff are qualified. The unqualified teaching staff,

/1 There are in addition 0.5 million teachers serving as school principals or in other administrative posts.

mostly minban teachers, generally have a junior secondary school certificate and have perhaps had a few years of senior secondary education. This is not a sufficient base for efficient teaching in primary education, where good pedagogical training has been found to be essential./1

3.17 The student/teacher ratio in China's primary schools is 27:1./2 This is low compared with the average ratio in other LDCs (38:1 to 34:1) and is closer to the mean ratio of 23:1 in a number of advanced countries. The uneconomical student/teacher ratio is caused by the staff's low weekly teaching load, which is only partially offset by large class sizes. The number of scheduled class contact periods per week (commonly 12-20 in the schools visited by the Bank mission, with 19-20 being a national average) is 5-10 periods/week less than in many other countries. The average-sized class of 34 students is bigger than classes in advanced countries but is not particularly large compared to classes in other LDCs. A class of 34 students does not detract from the quality of teaching, since within a reasonable range (say, 25 to 45 students) student performance is unrelated to class size. A rise in the scheduled work load to 25-27 periods/week would reduce the demand for teachers by some 1.2 million teachers and increase the percentage of qualified teachers by some 13% (to 60%)./3 This rise would probably much improve the quality of teaching, despite a shortened time for class preparation.

3.18 China often applies a subject-teacher method of instruction in primary education. The Government justifies this by the high percentage of unqualified teachers for whom it is easier to master one or two subjects rather than the eight in the curriculum. Chinese teachers also appear to specialize by grade and teach in only one or two of the five primary grades. While it may be acceptable to use specialized teachers for subjects such as music or physical education, many countries prefer to apply the class-teacher concept in primary education. If one teacher for all subjects follows primary school pupils through three grades or more, the children relate to

/1 The minban teachers do, however, generally come from the village where they teach, which allows them to identify with the children and their educational needs.

/2 The ratio would be 25:1 if principals were included as they are in many other countries, where primary school principals are both teachers and managers.

/3 Using full employment policies as a possible justification for a low student/teacher ratio is not considered in the context of this report.

only one person in the school, the class teacher, and attain their optimum emotional and intellectual development. This relationship is seen as more important than the increase in subject knowledge that a subject-teacher system might offer./1

3.19 The subject-teacher method increases the demand for teachers and the minimum size at which a school can operate economically. It makes multigrade teaching and biannual student intakes difficult, though these two measures make schools with low enrollment viable and allow access to be increased even in sparsely populated areas. The Bank mission observed multigrade teaching in one primary school, but in another, 30 students in 4 classes were taught by 7 subject teachers, though 2 teachers could have handled the work load by taking one multigrade class each.

3.20 Facilities. Many primary schools, even those in Beijing and Shanghai, have poor facilities. Lighting and heating are often insufficient, and rural schools often lack windowpanes (glass is in short supply). Lighting deficiencies are particularly serious in some regions of China where schools are housed in caves dug out of the hills and mountains. These schools are also potentially dangerous because of the risk of sudden collapse. Surveys have shown that 35% of primary schools in some prefectures lack furniture. Benches and desks are made out of dried clay in areas where wood is scarce and funds to purchase furniture from other areas are lacking. According to a state inspector in Gansu, up to 40% of the students in such a school have suffered from diseases caused by the clay benches and the unfavorable climate in the classroom. In China, the classroom environment is not always conducive to efficient learning.

3.21 The classrooms are supplied with a few posters, one or two wall maps, and a blackboard. Other teaching equipment is rare. The supply of textbooks is ample, however. All students in the schools visited by the Bank mission had textbooks, which they buy for a sum equal to \$0.25-0.50 per piece./2 Even remote schools located four days' travel from the book distribution centers are provided with books (the political cadres of the communes arrange for pick up of the books). Such an abundant supply of textbooks is unusual in most LDCs and, as a decisive factor in determining learning rates, should have a positive effect on learning. The

/1 Some researchers claim this to be conventional wisdom without sufficient scientific proof.

/2 This may seem a low, and possibly subsidized, price, but it nevertheless amounts to several percent of a peasant's monthly cash salary.

textbooks are paperbacks with rough paper qualities and few illustrations compared with US or European school books. Nevertheless, they appear adequate and many are recently published.

3.22 Learning the Chinese script, which occupies 40% of the scheduled primary school week, requires an unusual amount of rote learning. Teaching, which often amounts to a teacher directing a class that is reciting in unison Chinese symbols on the blackboard, consequently appears teacher oriented, traditional, and to be hampered by a lack of other instructional materials. But teachers appear ambitious and eager to teach; students are alert and eager to learn, and disciplinary problems are almost nonexistent. Classroom visits and a review of textbooks show that students are probably further advanced in mathematics than school children of the same age in many other countries. The lack of teaching equipment and materials must, however, reduce the quality of education in the natural and social sciences.

3.23 Summary. The quantitative development of China's primary education since 1949 compares very well with progress in other developing countries. Internal efficiency is high, and repetition and dropout rates are low. The progression rate from primary to secondary education is also high. Students and teachers are dedicated. Student achievement in mathematics, a particularly important subject, is high. There is, furthermore, a good supply of textbooks, which contribute more to learning than other media.

3.24 But the system also has flaws. The supply of teachers from teacher training colleges has not been able to match the expansion of the system. There is a high percentage of unqualified teachers and this is reflected in teaching methods. The retention rate of the system could be improved and the enrollment of girls bettered. There is a shortage of appropriate school furniture and learning equipment, particularly in rural schools, and a poor physical environment often reduces the learning rate. The utilization of existing teaching staff is low.

Secondary Education

3.25 The quantitative development of China's secondary education has been even more impressive than that of primary education. General secondary schools (junior and senior) enrolled 1.04 million students in 4,000 schools in 1949, giving a gross enrollment ratio of less than 2%. In 1979, the corresponding figures were 59.05 million students in 144,000 schools, with a gross enrollment ratio of 46%. The current ratio increases to 51% if the 6 million students enrolled in technical and vocational schools and in nonformal education institutions at the secondary level are included. These enrollment ratios compare favorably with a 26% secondary school enrollment ratio (in 1975) for 92 other developing countries in World Bank statistics

(Appendix D). The Chinese enrollment ratio is, nevertheless, below those of neighboring East Asian countries, which are around or above 60%, or those of the OECD countries, which are around 80%.

3.26 The high enrollment in secondary schools is biased towards general education. Less than 5% of the schools are vocational/technical. Secondary schools thus prepare students for higher academic education rather than for the labor market, even though only about 37% of junior secondary school graduates (from grade 8) proceed to senior secondary schools,^{/1} and a maximum of 10% of senior secondary school graduates (from grade 10) proceed to universities and/or other postsecondary formal or nonformal institutions. The remaining graduates (63% and 90%, respectively) seek jobs in the labor market without much preparation, as there is no vocational training in the curriculum of the junior secondary or the general senior secondary schools (the few weeks per year of productive labor cannot be regarded as job preparation).

3.27 There was an almost complete dismantling of 62,000 ^{/2} vocational and technical secondary schools during the Cultural Revolution (para. 1.11). Although productive labor was particularly emphasized during the Cultural Revolution, this could not substitute for the lack of systematic and comprehensive vocational and technical education. The system, which has been restored since 1976, now operates 6,000 technical/vocational schools,^{/3} and the enrollment is still far below its 1965 level.

3.28 An imbalanced secondary education is not unusual in developing countries.^{/4} The situation of other LDCs is nevertheless better than China's. In 1975, 10.9% of their combined total of secondary school students (junior and senior) were enrolled in technical or vocational education, whereas China's 1979 figure was only 2.4%. The percentage of technical/vocational students in Europe was even higher (27.1%) and in the USSR it was as high as 42.1%. China's imbalanced secondary education, with its few vocational trainees, is a serious constraint to achieving the four modernizations.

^{/1} Over 90% of these students (about 7.0 million) proceed to general academic senior secondary schools and less than 10% (0.6 million) to technical/vocational schools or agricultural senior secondary schools.

^{/2} This figure appears too high given the aggregate enrollment.

^{/3} Including students in primary teacher training.

^{/4} Much of the World Bank's education financing during the last 15 years has been used to remedy the underenrollment in vocational secondary education.

3.29 Secondary Teachers. The academic secondary school system suffers from a serious teacher shortage. In junior secondary education, only 11% of the teachers have a college degree.^{/1} In general senior secondary schools, 51% of the teachers are qualified (90% would be a more appropriate proportion). The situation is better in technical/vocational and normal schools, where 90% and 75%, respectively, of the teachers are qualified. In the technical/vocational schools run by enterprises, teachers have had good practical experience, an advantage rarely found in other LDCs.

3.30 The utilization of teachers is also low in secondary schools. In the academic schools, the student/teacher ratio is a low 19:1, compared to 22:1 or 23:1 in other LDCs. In technical/vocational schools, the ratio is 10:1 (15:1 would be a more appropriate ratio). In the normal schools, it should be possible to raise the ratio from 14:1 to 20:1. The major reason for the low ratios is, again, low teaching loads rather than small classes. In many schools, only 12-13 class periods are scheduled per week for the teachers (20-25 would be reasonable for this educational level).

3.31 A policy of one subject per teacher is applied. In many other countries, secondary school staff teach a group of subjects (mathematics, physics and chemistry or biology and geography, etc.), but in China they generally teach one subject only. This increases the demand for teachers, school size and the risk of teachers being underemployed. It also makes the necessary coordination between school subjects such as mathematics and physics more difficult. It works against the establishment of schools in rural areas and increases the need for boarding schools.

3.32 Junior Secondary Education. Junior secondary education (grades 6-8) is almost universal and has enrolled 46-50 million students during the past few years (Appendix C.1). It has a gross enrollment ratio of 75%. Girls account for 41% of enrollments, which is 5% higher than in other LDCs.

3.33 Access to junior secondary education is good, as the high enrollment ratio indicates. Of the 144,000 general secondary schools in China, 104,000 offer junior secondary education only, while most of the others are vertically integrated, offering both junior and senior secondary education. Ethnic minorities are, however, less well represented than the Han majority, with the enrollment of Hans almost 40% higher measured as a percentage of the total population, or even higher measured as a percentage of the relevant age groups (as minority groups do not participate in the population program and have larger families). Many ethnic minorities live in sparsely populated

^{/1} If a qualification criterion other than holding a college degree is used, about 30% would be considered qualified.

areas or in areas with poor communications; boarding facilities for secondary schools are consequently being established in many provinces. Secondary schools for minorities also enjoy government subsidies to reduce the private cost of education and facilitate access for underprivileged groups. These measures should reduce inequities in access.

3.34 The internal efficiency of junior secondary schools is even higher than that of primary schools. Enrollment statistics indicate a 5-6% dropout between grades and an 85% graduation rate. Repetition rates also appear to be low (0-10%). Wastage rates in secondary education amount to 28-46% in other LDCs at the same income level.

3.35 The junior secondary school curriculum is common to all students in China.^{/1} As at the primary level, most time (38%) is devoted to Chinese and mathematics; 16% is devoted to a foreign language (usually English), while the remaining 46% is shared among 9 other subjects. In addition to the 30-31 scheduled class periods per week, students spend time on private study, productive labor, sports and other extracurricular activities. Teacher shortages, which are common, may make the teaching of physics and chemistry difficult, and these subjects may therefore be replaced with additional mathematics, English or a basic agricultural course. Furthermore, science teaching is difficult because of a general shortage of laboratories and equipment.^{/2} A Chinese study states that students can conduct experiments in only 10% of the secondary schools, and teacher demonstrations are possible only in 25%. The social sciences and the experimental aspects of the natural sciences occupy a weak position in the junior secondary curriculum.

3.36 Because of the shortage of secondary school buildings, many schools use a double shift system. This increases administrative work for school staff, but the double shift system is not necessarily detrimental to learning. The quality of buildings and furniture is, as expected, higher than in primary education, but equipment remains substandard. Lighting was poor; a survey in Shanghai has shown that 40% of the students suffer from myopia and poor light makes reading even harder for the shortsighted.

^{/1} Except in the key schools, which may differ by a few hours per week.

^{/2} The mission observed no junior secondary schools and only a few senior secondary schools with laboratories. No science experiments or demonstrations took place in the schools visited, despite the availability of equipment in some schools.

3.37 General Senior Secondary Education. General senior secondary education covers grades 9-10, but is now being expanded to include an eleventh grade. It enrolls 12.9 million students, or 29% of the 15-16 age group. The 40,000 secondary schools with senior grades are located in towns. Many have boarding facilities to improve the access for students from rural areas. About 39% of those enrolled were girls. Internal efficiency at this level of education is good, as measured by dropout rates and repetition.

3.38 The general senior secondary school curriculum offers essentially one study option.^{/1} The program is strong in the natural sciences and mathematics, which occupy about half of the scheduled time, with 30% devoted to Chinese and a foreign language, and the remaining 18% shared among three other subjects. Laboratory experiments can, however, be conducted in few senior secondary schools, and studies focus on mathematics and theory. Chinese senior secondary school students appear well advanced in these subjects; secondary students in grade 10 deal with mathematical problems that in many other countries are taught in higher grades and are only studied by selected students. However, a study ^{/2} of Chinese secondary school textbooks and university entrance examinations showed that parts of the syllabi in chemistry and mathematics are outdated, while some modern concepts are absent from the courses. The difficulty of the tests was nevertheless reasonable by international standards.

3.39 After a period of free intake, no examinations, few tests and much emphasis on working life, Chinese senior secondary schools are now moving in the opposite direction. Probably every student entering the first grade of senior secondary education aims at university studies, although only a few are accepted after the entrance examinations. Tests have again become an important part of school life, and much of the teaching is geared towards tests and university examinations. Students are given mid-term as well as final examinations each semester, and report cards are issued regularly. The secondary curriculum needs updating, but its bias towards mathematics provides a good foundation for higher studies in science or engineering. It prepares students less well for pursuing economics and social studies, and not at all for direct entry into the labor market.

^{/1} Minor changes in the curriculum, amounting to a few hours per week, can be made by local authorities. Key schools may also develop their own curriculum.

^{/2} Executed for the Bank by the Institute of International Education at the University of Stockholm.

3.40 Nonscheduled activities in the curriculum continue to include productive labor, which at this level comprises four weeks per year in industry and agriculture./1 It often provides the school with an income, which the school's management can use to procure equipment, subsidize boarding costs or in other ways.

3.41 Technical/Vocational Education. The formal technical and vocational senior secondary and postsecondary system enrolled over 1.3 million students in 1979, with the majority of students at the secondary level. Training is given at about 2,000 schools administered by various specialized ministries (industry, agriculture, health, etc.), and 3,000 administered by enterprises. Enrollment by trade and type of institution is shown in Appendix C.2.

3.42 The low aggregate national enrollment in technical and vocational education has been emphasized (para. 3.26). It is particularly discouraging in agriculture. There were only 110,000 students in technical agricultural schools and 226,000 in senior secondary schools with agricultural programs in 1979 (or about 0.6% of the relevant age group) in a society where agriculture occupies 75% of the labor force. A prefecture in Hubei, with a population of 2.6 million of which well over 90% are rural and depend on agriculture for their living, has 2,400 primary schools with 450,000 students, 553 general secondary and primary teacher training schools with 164,000 students, but only one agricultural school with 335 students and one farm machinery school with 200 students./2 Of the 40,000 senior secondary and postsecondary level students in the prefecture, only 1% study agriculture and farming. The low enrollment in the agricultural school is, in fact, higher than the number who wanted to enter it. Secondary school graduates rank their choice for further education when they apply to the school. Only 25% of the 335 students in the Hubei agricultural school had agriculture as their first choice for further training at the time of the school examinations; the others ranked it behind industrial, trade and medical training, despite the shortage of agronomists and abundant employment opportunities for trained agriculturists in the prefecture. The target is to provide the prefecture with 1,200 university graduates in agriculture and 5,000 agricultural technicians (the current stock is 150 graduates and 400 technicians).

/1 The school may have its own workshop or farmland.

/2 There are, in addition, schools in forestry, trade and nursing, which together have 1,560 students.

3.43 Similar problems exist in Xinjiang. Only 10 out of 360 agricultural schools have reopened after the disruptions of the Cultural Revolution. One agricultural training institution has serious enrollment problems; of its 1,200 students, only 50% had actually applied to the college (the rest had been placed there and gave agricultural education low priority). Entrance procedures favor urban students and thus exacerbate the situation. To enroll rural students alone would only partially solve the problem: 60% of the students in the Xinjiang college already came from rural backgrounds, but very few graduates return to the communes to participate in and direct farming activities (most accept office positions).

3.44 The difficulty of providing agriculture with skilled manpower is not uniquely Chinese. It is a common phenomenon in LDCs. But the continued existence of the problem shows that not even China, despite decades of efforts, has been able to solve this difficulty. A change in the salary structure, so that agronomists are paid higher salaries than academicians and technicians in trade and industry, is claimed to have solved this problem in Cuba and may be the answer in China.

3.45 The output from agricultural schools in China has been insufficient. The output from government-run industrial and trade schools has also fallen short of the country's needs; in 1979 they graduated only 37,000 students for activities that employ 53 million people and for a society short of middle-level technicians (para. 2.19). Enterprises therefore run their own vocational schools to meet some of their most urgent needs; these schools enrolled 640,000 full-time students last year. But these efforts are insufficient, and more training is needed in industry and trade.

3.46 The curricula of most vocational/technical schools were originally intended to follow junior secondary education with entrance after grade 8. The limited intake to the universities of senior secondary school graduates has forced an increasing percentage of these graduates to apply to the technical/vocational schools for skill training. The technical/vocational schools have consequently started courses to follow senior secondary education, or they have accepted senior secondary school graduates in their regular courses, despite the courses' lower admission level.

3.47 The few government schools that have reopened since 1976 suffer from a shortage of equipment, as much of their equipment was sold or demolished during the Cultural Revolution, and a lack of funds has prevented them from being re-equipped. Some technical/vocational schools have not regained access to their workshops and have difficulty in executing the learning program as required. Many of the schools used boarding facilities to widen their catchment areas, but those that have not regained access to their dormitories have only a fraction of their previous enrollment. The training conducted in

schools run by enterprises was less disturbed by the Cultural Revolution. Practical activities can be carried out; they are often conducted on the shop floor and form part of the production process. Laboratory space is, however, often insufficient in the industry schools.

3.48 China's vocational and technical education system is in a state of flux. A coherent policy on administration, educational level, curricula and staffing has not yet been developed in the aftermath of the Cultural Revolution. A most important task is to develop a system that fully exploits the advantages of vocational/technical schools managed by enterprises. A socialist society has an opportunity, denied to private enterprise systems, to closely coordinate training between enterprises and government agencies, thereby obtaining the maximum efficiency and fast response to changing manpower needs.

3.49 Preservice primary teacher training is conducted in three-year courses at the senior secondary level and in two-year courses at the postsecondary level /1 in 1,053 normal schools. Enrollment totaled 484,000 in 1979, and annual output has averaged 110,000 over the last few years.

3.50 In-service training and upgrading of existing primary teachers, whether formally qualified or not, takes place at about 2,000 training institutions, which are separate from the normal schools. The Chinese in-service teacher training system is well developed by international standards. It uses distance education, summer courses, etc., and the participation rate is high (one teacher out of five).

3.51 The curricula of the normal schools are geared to primary school subjects. They are weak in the sciences and their content appears partially outdated./2

3.52 Low teacher salaries are said to deter students from normal schools. Students who seek further education rate teaching as a low priority vocation. Normal schools are thus unlikely to enroll the top school graduates. Their students may therefore tend to perform less well, both in the normal schools and as primary teachers.

/1 The latter are for minban teachers and senior secondary school graduates.

/2 At an in-service institution visited by the mission, the staff appeared to be abreast of recent developments in education, although they lacked many of what are considered necessary instructional materials in teacher training. However, at a preservice institution in the interior, the staff appeared more interested in their specific subject area than in pedagogy and psychology. The institution had adequate physical facilities but lacked almost all equipment for subject teaching and professional instruction.

3.53 Summary. The quantitative development of China's junior secondary and general senior secondary education has been very impressive. Internal efficiency (as reflected in retention rates) is high. The emphasis of the curricula on mathematics and sciences should help in achieving the four modernizations, but the curricula need to be updated and other areas of study should also be emphasized. The schools need to be better provided with laboratories and equipment. Academic secondary schools suffer from a serious shortage of qualified teachers. However, teachers at all secondary schools are underemployed.

3.54 In vocational and technical education, low enrollment has created an imbalance in secondary education and a shortage of skilled middle-level manpower. Particularly discouraging is the low interest in agricultural education and the low prestige of primary teaching as a vocation. There is an acute shortage of equipment and facilities in government-run vocational/technical schools, but this is less true of schools run by enterprises. No coherent policy has yet been formulated for vocational/technical training.

Higher Education

3.55 China has 633 universities and other institutions of higher learning (Table 3.1). The Ministry of Education plays a central role in the administration of higher education and in the development of its policies and principles, but it shares responsibility for research with the Chinese Academy of Sciences. The Ministry manages directly 35 comprehensive universities. Other ministries manage higher education institutions in their sphere of interest. Provinces, the three major municipalities and the autonomous regions also run universities under the supervision of the Ministry of Education.

Table 3.1: HIGHER EDUCATION INSTITUTIONS, BY
ADMINISTRATIVE RESPONSIBILITY

Ministry	<u>Number of institutions</u>		Total
	Central	Provincial	
Education	35	392	427
Machine Building	29		29
Agriculture, Forestry, etc.	26		26
Railways, Communications, etc.	19		19
Metallurgical Industry, etc.	22		22
Water Conservancy, Power	7		7
Public Health	16		16
Light Industry, Textile Ind.	13		13
Construction	9		9
Coal, Oil	18		18
Finance, Commerce	16		16
Culture, Sports	15		15
Others	16		16
<u>Total</u>	<u>241</u>	<u>392</u>	<u>633</u>

3.56 The institutional structure of higher education has changed little since the 1950s. Most of the institutions, shown by type in Table 3.2, have highly specialized curricula according to the Soviet model. Table 3.2 also shows the distribution of the 97 key institutions. The table reveals the heavy emphasis on engineering and sciences, particularly in the key institutions; this bias has been achieved at the expense of the social sciences and law.

Table 3.2: INSTITUTIONS OF HIGHER EDUCATION, BY TYPE, 1979

Type	Total institutions	Key institutions
Engineering	191	54
Normal (teacher training)	161	2
Medical	107	6
Agricultural	52	9
Comprehensive	33	17
Finance	22	1
Fine arts	22	1
Physical education	11	1
Language	10	2
Forestry	9	1
Institutions for minorities	9	1
Law	6	2
<u>Total</u>	<u>633</u>	<u>97</u>

3.57 Enrollment. In 1979, higher education enrollment was 1,020,000 students, 24% of whom were women; this is lower than the proportion of women in tertiary institutions in the rest of the developing world (33% in 1975). In 1979, 85,000 students graduated from undergraduate programs (Table 3.3). The low level of graduation relative to current enrollment reflects the low intake in the mid-1970s and the extension of higher education by one year from three to four years. With the current intake of approximately 280,000 students p.a., the annual output should increase to 250,000. The key institutions play a crucial role in tertiary education: they enroll 45% and 60% of students in science and engineering, respectively, and graduate 56% and 70%, respectively, of all scientists and engineers.

Table 3.3: HIGHER EDUCATION ENROLLMENT AND GRADUATES, BY FIELD, 1979

	Enrollment ----- ('000)	Graduates -----
Engineering	346	21
Teacher training (for secondary schools)	311	24
Medicine	127	14
Science	70	6
Agriculture/forestry	69	11
Liberal arts	63	6
Finance/economics	22	2
Physical culture	9	1
Politics and law	3	-
<u>Total</u>	<u>1,020</u>	<u>85</u>

3.58 Graduate education in China began in the mid-1950s. Approximately 16,000 graduate students were studying in China, and another 3,000 finished their courses in the USSR, before the Cultural Revolution. Graduate schools only reopened in 1978; around 15,500 graduate students were attached to universities and to research institutions such as the Chinese Academy of Sciences and the Chinese Academy of Social Sciences (70% are in key institutions). Graduate education is reserved for students with exceptional intellectual ability. It is still at a formative stage and the curriculum pattern is still not fully defined.

3.59 The proportion of Chinese students studying agriculture is higher in universities and colleges than in senior secondary education (6% vs. 2.3%), but is nevertheless low. It corresponds to a future annual output of about 15,000 graduates. It would take decades for China to achieve a goal of one university-trained agronomist per 1,000 agricultural laborers with such a low annual graduation rate (c.f. para. 2.16).

3.60 The low enrollment (less than 3%) in finance, economics and law is also apparent. Training in finance, economics, business, trade, law and administration was almost nonexistent during the last few decades. The shortage of managers with good training in these fields is even more critical than the shortage of engineers, scientists and agronomists. Higher education enrollments could possibly be tripled without a risk of unemployment among graduates in these fields.

3.61 The overall enrollment ratio in China's higher education is low by international standards. For formal university institutions, the enrollment ratio is 1.2% (or 2.8%, representing 2.4 million students, if nonformal and other postsecondary institutions are included), compared to 4.4% in 1975 in the rest of the developing world, and a current 23% in advanced countries. The graph in Appendix D shows that China's higher education enrollment ratio dropped drastically below the level in the rest of the developing world during the Cultural Revolution and has not yet been able to catch up. China has only 10.5 university students per 10,000 population, while developed countries have 200 and even 500 (USA) per 10,000, and a developing country like India has 60. There is a striking contrast between China's quantitative performance in primary and secondary education and its performance in higher education.

3.62 Access. The key universities recruit their students nationwide. Many other universities also recruit from outside their province. Nevertheless, higher education institutions need to be distributed throughout the country to increase access to education and research. All provinces have higher education institutions (Appendix C.3), although the number of students enrolled per 10,000 of the population in the province where the institution is located varies from a low of 5 in Henan to a high of 86 in Beijing (in Shanghai it was 61). The student/population ratio is also small in the autonomous regions.

3.63 Chinese universities have until recently provided boarding for all students regardless of their residence, even though a shortage of dormitory places has hindered the expansion of enrollments in some institutions. Some day students have now been accepted, but the percentage is low and restricted by lack of transportation in many university towns. Acceptance of more day students and removing the boarding option for students who live within commuting distance (one hour or less travel time in each direction), together with better public transportation, would increase access to higher education for students from rural areas and decrease a high student unit cost.

3.64 The policies introduced during the Cultural Revolution regarding the intake, promotion and graduation of university students have all been changed. Entrance examinations were reinstated in 1977, and good students can now enter universities directly from senior secondary schools (para. 3.01). Forty and 70% of tertiary-level students were admitted directly in 1978 and 1979 after passing entrance examinations, and the percentage was even higher in 1980. Entrance examinations are unified and students may sit for either arts or science papers. The Ministry of Education allots quotas of university vacancies for each province and fixes the number of places in each university. Schools decide on the applicants to be admitted but need approval from the provincial, municipal or regional authorities (c.f. para. 2.21 on the allocation of graduates). Students may indicate their preference for two or three schools and subjects. Preferential treatment is given to students from minority groups and to overseas Chinese. Admissions have been highly selective and competitive: of 7 million senior secondary school graduates,

4-5% are being admitted to institutions of higher learning, based on their examination results, physical condition, and political inclination (paras. 3.04 and 3.26).

3.65 Comprehensive national data on the socioeconomic background of Chinese students in tertiary education are not available. But in Gansu, a sparsely populated (19 million people) and comparatively poor province in China's interior, the situation is as follows:

Percentage of the population who are peasants	86%
Percentage of students with peasant background in	
junior secondary education	84%
senior secondary education	66%
higher education	53%

The percentage of students with a peasant background diminishes at successively higher levels of education, but is nevertheless high. In a senior secondary school in Hubei, 50% of the students were said to have illiterate parents; this would support the Gansu figures. If the access of peasants to higher education is as high in the rest of China as it is in Gansu, China's education system would be one of the most equitable among developing countries.

3.66 Curricula. The length of courses at both colleges and universities, which was shortened to three years in the early 1970s, has been restored to four years and is being further increased to five or six years for some study programs (para. 3.01).^{/1} The emphasis is again on basic and theoretical subjects, and these now make up two thirds of university curricula. Subjects abolished during the Cultural Revolution have now been restored. The Ministry of Education is unifying curricula and teaching plans for institutions of higher learning. Although manual labor is no longer part of the curriculum, college students are advised to spend four weeks a year in productive work related to their studies.

3.67 Until 1980 graduates received a certificate of completion. The few students taking some form of graduate education received no degrees or certificates. In February 1980, new regulations on the award of academic degrees were adopted by a standing committee of the Fifth National People's Congress. Patterned after the system in the USA, bachelor's, master's, and doctoral degrees will be awarded beginning in 1981.

^{/1} Some colleges have retained shorter courses.

3.68 Despite recent changes, problems with the curricula remain. A Ministry of Education official stated that:

"Another factor contributing to the shortage (of qualified professionals) is the out-of-date structure of the disciplines, that is the number of old disciplines and that of new ones are out of proportion; many scientists and technicians are engaged in traditional disciplines but very few in newly emerged and frontier disciplines, even none in some."

The recently adopted undergraduate curricula still reflect the science of the 1960s rather than that of the 1980s. Undergraduate curricula are inflexible; majors follow identical courses with few elective subjects.

3.69 The balance of subjects is a matter for concern. Technological specialization has produced an "applied method" approach to science and engineering courses instead of the educationally more desirable "basic problem" approach. In basic life sciences, immunology and genetics are not included. In physics, laboratory experiments deal largely with optics, calorimetry and basic electricity. There is a heavy concentration on physical chemistry at the expense of organic and inorganic chemistry. These imbalances result not only from deficiencies in the syllabi but also the shortage of laboratory equipment. A survey of 165 laboratories in 13 universities shows that only one third can carry out 90% or more of the required experiments; even some key universities can only carry out half or less of the experiments required in physics. Third year chemistry laboratories lack interchangeable ground glassware; spectrophotometers are not common; and only in the project portion of fourth year studies is equipment used that is similar to that seen in American and European universities. Much of this equipment was bought for research. The research worker has no routine instrumental services (mass spectrometry, elemental analysis, etc.) but must rely on his own laboratory equipment./1

3.70 In engineering, the existence of a factory within the university allows students to make complicated and sophisticated machinery, for instance making lathes used in foundry work, gear cutting, milling, planing and drilling, or making small machine tools. However, there is sometimes more concern about the commercial profitability of these activities than about their usefulness in teaching engineering or management principles. Equipment for testing material properties, hydraulics and mechanics is generally outdated. In some engineering specialties, the equipment is impressive (e.g.

/1 This is also true of universities in many other LDCs.

wave tanks and cavitation chambers) but the associated technology is not taught (e.g. the ability to alter amplitude and frequency of wave patterns in a wave tank). In electronic engineering, the absence of the latest semi-conductor technology is evident, though large investment in silicon-based products has begun, and some universities are attempting to import the know-how they need to teach modern circuitry techniques. Fundamental research is not in evidence, except in specialized departments where design or analytical measurements are conducted. In all sectors of research and teaching, the acquisition of new, accurate and sensitive equipment is a priority.

3.71 There is a need to provide Chinese universities with modern computers and trained computer scientists. Very little research can be conducted nowadays in natural and social sciences or in engineering without access to computers. Universities require two types of computers: one for student training and another for research. The first type is used to develop experimental hardware and software for classroom teaching and for research in computer technology. The second is required for research by all university departments in physics, economics, chemistry, engineering, etc., and for university administrative work. In the first case, use of the computer is an end in itself; in the second case, the computer is a tool for research and administrative work. In developed countries, universities usually possess separate computers for the two tasks. Some, but certainly not all, higher education institutions in China have computers, most of which were made in China. They are, however, old, small, and slow. There is also a shortage of software.

3.72 Staff. There were 237,000 teaching staff in China's higher education institutions in 1979. The student/staff ratio is 4.3:1 (Table 3.4). This is low by international standards (10:1 or higher) and reflects an inefficient use of staff. In the key institutions, which employ about 50% of all staff, overemployment is even more serious, with a student/staff ratio of 3:1. The number of full professors is, nevertheless, low, as the staff of higher education institutions consisted of 5% professors, 62% lecturers and instructors, and 33% assistants in 1979. The assistants comprise a large part of the staff hired during the Cultural Revolution. Some are inadequately qualified and were originally hired to assist students in productive labor and practical work rather than in academic studies. Other assistants primarily grade papers and tutor undergraduate students. Teaching is a main responsibility of the lecturers. Associate professors are engaged in research and have fewer teaching duties (primarily with graduate students). The most senior faculty members and the full professors are not always active in teaching or research. The teaching load is generally low, which further increases the demand for staff and the per student cost, and reduces the

student/staff ratio. The large number of employees in university workshops/industries is also a concern./1

Table 3.4: TEACHING STAFF AND STUDENT/TEACHER RATIO, 1979

Type of institution	Professors/ <u>a</u> and associate professors	Lecturers and instructors	Assistants	Total	Enrollment ('000)	Student/teacher ratio
Key	6,030	47,250	32,070	83,350	265.6	3.1
Other	5,590	98,860	46,840	151,290	754.4	5.0
<u>Total</u>	<u>11,620</u>	<u>146,110</u>	<u>78,910</u>	<u>236,640</u>	<u>1,020.0</u>	<u>4.3</u>

/a Academic titles have been reinstated since the Cultural Revolution and can also be given to graduates.

3.73 The levels, qualifications and experience of staff in 20 key universities have been reviewed in some detail (Appendix G). Of a total staff of 29,600, 3.2% were full professors, 8.8% associate professors, 56.1% lecturers, 23.4% assistants, and 8.6% had other assignments. This staff distribution is close to the national average. Of the university staff, only 7.8% had completed six years or more of academic studies (postgraduate work), and 15.7% had three or less years of higher education. Thus the percentage of staff with postgraduate level research is low and the percentage of staff who have not completed undergraduate studies is high. The age structure of the staff was also a disadvantage: 6.5% had worked more than 30 years; 60.7%, 16-30 years; 19.2%, 6-15 years; and 13.6%, 1-5 years. About two thirds of the staff are likely to be over 40 years of age and only one third under 40 (the latter is considered the most productive age group for research). These findings are consistent with the Shanghai study (para. 2.14).

3.74 There is no compulsory retirement age for university professors in China. The age distribution of staff reflects the fact that few researchers

/1 A degree of self-reliance is useful, particularly for maintaining equipment, but the large workshops increase the payroll considerably and their cost effectiveness, particularly in manufacturing new equipment, appears low, despite efforts to make them commercially viable.

were trained during the Cultural Revolution, which has forced the Government to rely on staff trained pre-1966. Staff were almost without access to information on developments in research and education outside China for a decade; many university staff will find it difficult to compensate for this loss. Another staffing issue characteristic of the whole labor market, but which has a special significance in education, is low staff mobility (para. 2.20). Many university staff have spent their entire academic life in the same institution. Staff are often very well read but lack the direct interaction that is so useful for research and education, and which can only develop through staff and student exchange programs. Staff and student exchange programs are being increasingly organized with the USA and other countries; these programs should be further developed, as should those that allow intranational exchanges.

3.75 Facilities. Most Chinese universities have sufficient classrooms and laboratories to accommodate the current student body, since enrollment has only recently returned to its pre-1966 level. Many could even increase enrollment by accepting more day students (para. 3.63). The use of physical facilities is uneven. Some universities use laboratories and classrooms to their full potential, while others follow the uneconomic tradition of having classes in the morning and laboratory work in the afternoon, so that some facilities are used at less than 50% of their potential. Libraries appear adequately stocked with undergraduate books, but less well stocked with literature for postgraduate research; their opening hours need to be extended. Students' lack of ability in foreign languages restrains them from reading foreign textbooks or following research in foreign scientific journals (some books and papers are being translated into Chinese). There is little provision for interlibrary loans. The absence of campus master planning, a heavy compartmentalization and inappropriate scheduling have prevented full use of laboratories, classrooms, libraries and other facilities in some universities. An increase in enrollment in the 1980s would create a need for more facilities. A comprehensive review of existing physical facilities, and of their potential use, should be incorporated in campus master planning for the universities and be undertaken prior to the allocation of funds for new construction.

3.76 Management. Problems of output quality and high unit cost are often exacerbated by inadequate management of university education and research. This problem is linked to inadequacies in management information (including the collection, treatment and use of statistics), planning, accounting, and monitoring and evaluation. There is no system for the assembly, analysis and distribution of comparative education indicators for universities. The accounting system does not identify the purposes of budget and expenditure: it is based on a control budget, which allocates funds for line items (salaries, utilities, equipment); it identifies goods to be purchased, but not their purpose (e.g. physics, chemistry, computing, student housing). A program budget is needed to complement the control budget.

3.77 The size of China and the divided responsibility for its 633 higher education institutions make comprehensive monitoring and evaluation of the system's performance difficult, though some aspects are, in fact, well monitored and evaluated. The intake of students, which is based on a quota system and on entrance examinations, is carefully controlled and assessed by the authorities. This is also true of the final examinations and the placement of graduates in the labor market. Dropouts and repetition are rare and do not need to be monitored, but more attention should be paid to educational content, teaching methods and the cost effectiveness of higher education (by monitoring and evaluating curricula, student achievement, and the relevance of the knowledge and skills gained at the universities to employment). There is also a need to monitor costs.

3.78 Summary. Higher education suffered more than other subsectors of education during the Cultural Revolution. Universities and graduate schools were closed for at least four years, the teachers dispersed, equipment sold or destroyed, and university library books burnt. When the institutions eventually reopened, enrollments were much below the pre-1966 level, and the quality of teaching was lower. Higher education is now seen as an integral part of China's efforts to achieve rapid economic growth and as a major producer of the skills needed for the four modernizations. But China's universities have fallen far behind the higher education and research institutions of the West and Japan: their staffs often belong to an older generation, and after 10 years of forced isolation, they are out of touch with much current research and technology. Their research and teaching equipment is often outdated and lacks the accuracy required today. The shortage of computers is also serious, since today's research and technology in natural and social sciences and in engineering require computerized data processing.

3.79 A concerted effort will be required if the higher education system is to support China's economic and technical development. More students need to be enrolled, curricula updated, teaching and research equipment procured, and the staff profile improved. Student and teacher exchange programs must be further expanded. Costs are high, and staffing and boarding policies should be changed to increase cost effectiveness. Measures should also be taken to improve management.

Nonformal Education

3.80 Education is considered a life-long process in China. Preschool and adult education have consequently been given much attention since 1949. Institutions providing care and basic training for children below school age have been strengthened; new educational opportunities have been provided for many out-of-school teenagers; and more education has been offered to adult peasants and industrial workers. Nurseries and kindergartens have become

increasingly necessary as adults have the opportunity to work outside the home. Nonformal literacy and primary and junior secondary courses are increasingly offered to teenagers who have dropped out of school prematurely. Most adult Chinese live far from senior secondary and technical schools, and few can take regular university courses, but nonformal secondary and postsecondary education institutions are expanding. The education and training opportunities that Chinese industries offer (through spare-time or full-time, off-the-job courses) are impressive; similar courses can only be found in developed societies. Particularly impressive is the way in which TV instruction is being integrated with classroom teaching. Nonformal education at the primary, secondary and tertiary levels adds 15%, 8% and 59%, respectively, to education enrollments.

3.81 Preschool Education. Kindergartens are available for Chinese children aged three to six. They are run by education or other civilian government authorities, by army units, by factories or by agricultural production units. They can also be organized by neighborhood communities, communes or production brigades.

3.82 Kindergartens are available from 4 to 8-10 hours per day. Some provide boarding facilities, so that children return to their families only during weekends, while others are temporary, being set up, for instance, during the harvest. At present, there are 166,000 kindergartens in China with 8.79 million children (about 11% of the age group). With 314,000 classes and 533,000 teachers, the children/teacher ratio is 16:1 and the class size 28 children. The latter two figures, which are higher than those in developed countries, show a better staff utilization than at other educational levels.

3.83 The curricula in kindergartens are laid down by the Ministry of Education and include physical education, mother tongue (verbal skills, conversation and storytelling, but not reading) and general knowledge (social and natural environment, plus political education). The objectives of training are to impress upon the children at an early age the virtues of cooperation, service to the people and respect for authority. The children should also receive some knowledge and preparation for their future studies in primary school.

3.84 Fees are charged to meet the cost of meals and medical care. For example, in a Beijing cotton mill kindergarten, the monthly charge for board and child care is \$9 equivalent, which is approximately one fourth of the average monthly wage in the mill. Kindergarten activities are largely determined by the wealth of the community and the teachers' qualifications. There is thus a considerable disparity between urban and rural areas.

3.85 Primary Education. There are 21.2 million teenagers and adults receiving spare-time primary education, of whom 16.4 million are in literacy courses. They are taught by 120,000 full-time teachers and 1.0 million part-time teachers.

3.86 The yearly cohorts in the primary education age group comprise about 20 million children, a third of whom drop out of primary school prematurely. The authorities are eager to offer these dropouts further educational opportunities. The provincial bureaus of education and the county education offices have units that deal with teenage and adult education in general, and with literacy training in particular. Evening and afternoon primary schools and literacy courses are established by factories, communes and brigades in many parts of China with government support.

3.87 The percentage of illiterates is higher in rural areas and may even have increased in some remote areas. Rural communes and brigades are trying to cope with this problem by hiring minban teachers and other adults as instructors in spare-time literacy courses. However, the efficient organization and delivery of literacy training in rural areas is difficult and the costs of eradicating the remaining pockets of illiteracy will be high.

3.88 Secondary Education. Adults can attend general as well as technical or vocational spare-time secondary schools. In addition, many adults study in technical schools on a full-time, off-the-job basis, with pay from their employers. In 1979, 4.73 million adults were attending secondary schools with 26,000 full-time and 135,000 part-time teachers. Curricula are the same as in regular schools, but the work is covered over a longer period. Specialized courses are also offered. Most of the secondary-level courses are managed by enterprises and are financed out of the enterprises' profits. Many courses provide in-service upgrading to the enterprises' staff. Some enterprises also offer preservice technical and vocational education for junior or senior secondary graduates who have not taken jobs and cannot proceed in the formal school system. These students are offered employment in the enterprises after successfully completing the course, and often receive a living allowance while studying.

3.89 Higher Education. The development of nonformal education at the tertiary level is perhaps China's most impressive educational achievement. The output from traditional universities and colleges has so far been limited. The shortage of skilled manpower in industry and other sectors has partly been met by significant upgrading of workers and other employees through worker colleges and universities. These institutions, which have developed rapidly since 1975 (as shown below), now play an important role in training technical personnel for work in plants, mines and other enterprises. A large number of enterprises take part in these activities. Some 20,000 full-time teachers and 33,000 part-time staff teach in about 3,400 locations (e.g. TV and correspondence universities and night schools).

<u>Year</u>	<u>Enrollment</u>
1975	90,000
1976	460,000
1977	780,000
1979	860,000

3.90 Five types of nonformal higher education training exist: (a) night schools; (b) correspondence courses (often run by regular universities); (c) spare-time universities (run by cities, towns and prefectures); (d) universities and colleges (run by factories or provincial bureaus of education); and (e) the Chinese TV universities. The former three types of training enrolled 502,000 students in 1979, and the latter two types 78,000 and 280,000,^{/1} respectively. The major burden of financing tertiary level adult education rests with the enterprises. The courses use the enterprises' facilities and the teachers are regular employees of the enterprises who receive the same benefits and bonuses as other staff.

3.91 The number of employees being trained varies among enterprises, but the types of training and its structure differ only slightly, as can be illustrated from data gathered by the mission during visits to 10 enterprises with 1,000 to 100,000 employees. At a steel plant in Wuhan (Hubei), the staff of 101,000 had a good educational profile:

University level	5%
Technical, vocational or senior secondary school	30%
Junior secondary school	35%
Primary school	25%
Illiterates	5%

The plant runs an in-service, full-time workers' college, whose courses last 2 years for 300 students in engineering and electricity. The students have at least 2 years' work experience, average 28 years of age, and were recruited from among the 30% of the labor force with a secondary-level education. They study in specially built classrooms and laboratories. The teachers are employed full-time. The plant also runs a TV college,^{/2} which enrolls 640 full-time, in-service students (who are also about 28 years old) and 60 full-time, preservice students (who are about 18 years old). The latter have tried, but failed, to enter regular universities. The TV college offers an

^{/1} 120,000 of whom are full-time students.

^{/2} The factory possesses 54 TV sets.

engineering course in disciplines for which no qualified instructors can be found locally. It has its own facilities in the plant but no laboratories, so laboratory work is conducted in downtown institutions. The college has 30 full-time staff who can, however, only coach the students because they are young and not qualified for regular teaching. The plant runs a spare-time vocational school (one evening per week) with 700 participants studying subjects that are relevant to steel production. A full-time, one-year language course in English has 90 students. These activities are all financed by the factory at a cost of \$400,000 equivalent per year. This corresponds to a reasonable full-time equivalent unit cost of \$310, exclusive of salaries or allowances to students.

3.92 In addition, the plant runs three schools at the senior secondary level to train middle-level technicians and skilled workers; these preservice schools come under the supervision of the provincial bureau of labor. Twelve general secondary and 11 primary schools, with an enrollment of 23,000 students, are also administered and financed by the steel plant.

3.93 At another factory, a radio plant in Shanghai, the educational profile of its 2,000 staff was as follows:

Senior secondary or higher education	10%
Junior secondary education or equivalent (skilled workers)	70%
Primary education	20%
Illiterates	-

This plant has 700 staff pursuing spare-time education (24 through TV university, 30 through other university education, and the rest through various types of secondary education) and 160 junior secondary graduates taking a two-year preservice course. Teaching arrangements and facilities are similar to those of the steel plant.

3.94 Distance Education. The Chinese TV university deserves special mention. "Distance teaching" (using radio, TV and correspondence courses) can reduce costs, sometimes dramatically; broaden access to education; and, in well-run projects, do this with little or no sacrifice in quality./1 Teaching is usually organized in one of two ways. Either students are organized into classes that meet frequently (usually daily) and receive the bulk of their instruction from radio or television rather than a teacher; or (as in the British Open University) students study almost entirely on their

/1 Alternative Routes to Formal Education, Distance Teaching for School Equivalency; Ferrata, World Bank Johns Hopkins University Press.

own, with greater emphasis on textbook learning and correspondence than on radio and television. The Chinese TV university /1 follows the former approach, though greater provision may be made in the future for private study.

3.95 The TV university is the joint creation of the Ministry of Education and the central broadcasting authorities. Each province except Xizang has its own television university, but the Central Broadcasting and TV University in Beijing plays the leading role. The central TV university is responsible for preparing television programs, selecting textbooks, and preparing workbooks and printed guides for the courses. Its TV programs are distributed by the Beijing broadcasting authorities to the provincial TV universities, which have substantial flexibility in organizing classes, integrating the programs with other higher level education activities in the province, or adding courses to the basic program (for instance, in Shanghai, substantial material is added, including courses in medicine).

3.96 The central and provincial TV universities are also responsible for providing individual classes with television receivers and paying charges incurred for the use of library facilities at local schools and universities. The local organizer of the class, usually an enterprise, is responsible for making space available, paying utility charges, and paying the fees of local tutors and lecturers who provide personal instruction. The student must pay the cost of books (approximately \$10 equivalent per year).

3.97 The Chinese TV university offers equivalency for a two-year college curriculum. There are plans to provide equivalency for the full university course in selected subjects within four or five years and perhaps also to offer senior secondary school equivalency by radio in rural areas. At present, though, the TV university requires three years' enrollment of its (full-time) students to complete the two-year equivalency program.

3.98 The curriculum of the TV university is highly technical, offering courses in physics, chemistry, mathematics and computer science and, at a somewhat lower level, engineering. English broadcasts apparently have a very wide (unenrolled) audience, which is indicated by the more than 2 million copies of the English TV university textbook sold in bookstores.

/1 It should be emphasized that television and other media are also used in other types of courses, such as in-service teacher training (e.g. for foreign language teaching), which benefited 1 million secondary teachers and 1.3 million primary teachers in 1979.

3.99 Students may enroll in the TV university for full-time or part-time study. A full-time student is released from his job for three years to complete the program; part-time and spare-time students are released from their work for a few hours a day to follow particular courses. Television classes are offered during the day, usually at the enterprise or agency where the student works.

3.100 Students enter the TV university by passing either of two examinations. The first examination is, in fact, the examination for admission to regular universities. In its second year of operation, the TV university also began enrolling some students who were not selected for admission to regular universities but who had still done reasonably well on the entrance examination. The second examination is set by the TV university itself and its standards are deliberately lower. The second examination is for workers or other staff who wish, with the concurrence and support of their employer, to continue their studies. To bring these students up to the standard required for completing the TV university curriculum, some enterprises organize special courses to prepare students for entering the TV university, or the TV university itself provides assistant teachers and additional help for poorly prepared students. Nonetheless, 7-10% of the students are unable to follow the TV university programs and drop out of the courses. However, the other 90% have made satisfactory progress, and about half of these are doing exceptionally well.

3.101 Summary. The Chinese nonformal education system is very well established and efficient. It is closely related to the training and educational needs of the course participants and the employing enterprises. The system is flexible; an enterprise can easily introduce new courses or amend old ones, as dictated by technical developments. Preservice and in-service training that involves full-time or spare-time study can be set up at reasonable costs and without unnecessary constraints. It has been fairly easy to provide teaching facilities in the enterprises and to hire full-time teachers or use the enterprises' engineers as part-time instructors. The TV university has provided useful inputs when local resources have been in short supply, and it has been well integrated with local activities. The Chinese nonformal education system is probably the best and most comprehensive in the developing world, and it should continue to be a very important factor in China's human resources development. It should be used to meet many urgent manpower needs in industry, agriculture, education and other sectors of Chinese society.

4. MANAGEMENT AND COSTS

Administration and Management

4.01 Administration. In a country of China's size, the management of education is a formidable task, even more so because of the difficulty in reconciling educational objectives and financing methods. The Government wants to provide educational opportunities to every citizen regardless of family origin and place of birth. It wants, furthermore, to reduce inter- and intraprovincial disparities in the quality of education and endorses a standardized system with unified curricula, textbooks and teacher qualifications. Fiscal constraints at the central government level and the need to improve the efficiency of education management point, however, towards administrative decentralization and towards increased local autonomy in educational and financial matters, with a closer link between schools and grant awarding authorities. But such fiscal and educational decentralization could easily increase disparities between schools and between localities (as has happened in other countries with a high degree of local autonomy).

4.02 Most of China's over 90 ministries and commissions at the cabinet level and bureaus are involved in education activities. Pre-eminent among them is the Ministry of Education, which is responsible for primary and general secondary schools and primary teacher training institutions, as well as many technical schools and universities, and for overall education policy formulation and the general direction of education. Other ministries involved in education include the Ministry of Health, which runs medical colleges and schools for nurses and paramedics, and the Ministry of Agriculture, which runs agricultural universities and schools. Some agencies administer considerable in-service training programs for their employees, as well as universities and other teaching institutions. Factories under the various ministries of machine building often have their own vocational and technical schools. Some enterprises even run primary and general secondary schools. In vocational training, an important role is played by the Labor Bureau, which cooperates closely with industry on such matters as course arrangements.

4.03 The organization of the Ministry of Education is shown in Appendix H. The ministry comprises two offices, nine major departments, eight separate bureaus, and units dealing with the TV university, publishing and research. The organogram shows a mixture of line, regional and functional responsibilities. There are thus departments or bureaus in charge of specific levels of education; others are in charge of the education of minorities or of planning and basic construction, regardless of the level of

education. This type of organization, which requires a considerable amount of time-consuming cooperation between departments and bureaus to assure full coverage of education affairs without unnecessary duplication, can easily become bureaucratic. The ministry appears, however, not to be overstaffed and reportedly employs only some 500 professional staff. The Ministry of Education is, as mentioned, directly responsible for the administration of 35 universities, while the responsibility for other institutions is vested further down the administrative hierarchy (Appendix I). The provincial and local school administration is also quite complex with overlapping responsibilities, as described in the following.

4.04 Each of China's provinces has a bureau of education,^{/1} as do the five autonomous regions and the three directly administered municipalities (Beijing, Shanghai and Tianjin). These bureaus have offices for primary, secondary and higher education, for adult education, and for planning and finance, personnel, productive labor, audiovisual media and student affairs. They may employ 100-150 staff. The provinces have their own tax revenues, outside the consolidated budget, some of which are used for local capital construction in education. The provincial education bureaus supervise schools in their provinces and also administer senior secondary schools, specialized education institutions, key schools and often some higher education institutions, etc.

4.05 Each prefecture within a province has an office of education which, with a complement of 25-35 staff, runs units for education, planning and finance, and personnel. The prefectures had, in the past, no income of their own, but provincial bureaus will now provide funds from local revenues to cover recurrent education costs in the prefecture. Some spare-time education, primary teacher training and key secondary schools, as well as other institutions, are run by the prefectures.

4.06 The prefectures are divided into about 2,000 counties, each of which has a county education office with responsibility for primary schools, junior secondary schools and spare-time institutions. The county offices play an important role in executing policies and directives from higher authorities in education planning and in school staffing. Each office's staff may number 10-15 people, with units for personnel, accounting and education. The counties have some income from local taxes, a minor part of which is allocated to education.

4.07 Within the counties are the communes (numbering 50,000) and within the communes, the brigades. The communes no longer have any responsibility for education but provide some office staff (accountants) to the schools.^{/2}

^{/1} Some provinces also have a separate bureau in charge of higher education.

^{/2} A few communes run vocational schools.

The same is true for the brigades, although they have provided funds for school construction and paid the minban teachers (often over 60% of the teachers in rural primary schools) in kind.

4.08 Management. Educational policy is formulated by the Central Committee of the Party in cooperation with the State Council. The Ministry of Education prepares long-term and annual plans, and coordinates education in China by developing curricula and textbooks and approving requests for recurrent budget. The planning and budget work varies according to the level of education, as well as the role of the ministry and the provincial bureaus of education in managing specific institutions. Some major aspects of education planning /1 and budget work are now being decentralized and simplified, but were previously conducted in the comprehensive manner described below (the extent and scope of the changes are not yet known).

4.09 All levels of the bureaucracy are involved in the planning and budget process, which until now has lasted about a year. In early fall, the provincial education bureaus would draft education development plans and budgets for their province and thereafter send its proposals to the provincial planning commission for review. The planning commission would consult with prefecture and county officials to balance proposed enrollment increases against proposed construction of new school facilities, etc. The provincial plans would be sent to the central government in Beijing, where the provincial planning commissions would meet in November to discuss the plans and budgets with the State Planning Commission. After approval by the State Planning Commission (generally in December), the approved provincial plans would be sent back to the provinces where the provincial planners, county planners, directors of provincial financial bureaus, etc., would meet in January of the following year to discuss capital construction projects, enrollment quotas, staffing and staff development, and to reassess the budget. These provincial meetings would generally last up to three weeks, with final decisions taken at the end of January on the plans and budget for the fiscal year starting the following July. The decisions would then be communicated to all concerned, so that the counties could execute the plans. At this time the local schools would submit their staff applications based on the enrollment decisions, and the county education offices would help schools, if necessary, to find staff and initiate construction and equipment procurement. These activities should all have been completed by the start of the school year (September). Other parts of the education planning and budget work (e.g. the collection and treatment of education statistics) have followed the same procedure.

/1 For the procedures used to meet manpower needs, see paras. 2.20-2.22.

4.10 The procedure described differs much from that in most other Bank member countries; it is highly participatory and comprehensive but also cumbersome, time-consuming and expensive. The planning and budget work is apparently done manually, with little use of computers.

Costs and Financing

4.11 The financial responsibility for education and training in China is divided among the central ministries, provinces, municipalities, counties, communes, brigades and enterprises. In addition, parents and adult students contribute directly to education financing by paying fees and by buying materials and books. The Ministry of Education has a capital construction budget and local authorities at various levels also contribute to the investment budget by providing funds for buildings and equipment. Of particular importance is the construction of schools by the brigades under self-help schemes. Brigades and enterprises also contribute to recurrent costs by paying the wages of minban teachers and vocational school instructors. Some recurrent costs for schools at all levels have until now been paid by the central government; the amount of this support was fixed on a per capita basis for each school, and local authorities had to finance any new programs that would increase costs. Finally, the income earned as a result of the students' productive labor need not be submitted to the Government, but is being used to cover some local expenses by the individual schools.

4.12 The central government's contribution to education in 1979 is estimated at 64% of the total, the contribution by local governments, brigades and enterprises, etc., at 28%, and that by the families at 8% (Table 4.1).^{/1} The family contribution to education, formal as well as nonformal, particularly in primary and secondary schools, is somewhat higher than expected in a socialist society, as is the contribution from local communities and enterprises. In this way, the degree of industrialization and urbanization of a locality or the profitability of agriculture of a rural commune plays an important role in determining the availability and quality of educational opportunities. Differences in education (beyond what is implied by the key school concept) are thus urban-rural, and within rural areas are related to the levels of agricultural prosperity; they could be substantial. There are transfers of funds in education between localities but

^{/1} The recording of financial data is not well developed at the lower management levels of the Chinese school system. There is often some confusion between capital and recurrent costs, among transfers, expenditures and incomes, and between salaries and other expenditures. The following is therefore based on several assumptions about the values of payment in kind, the amount of capital construction financed by the local communities, and the best way to reconcile apparently inconsistent data.

they are comparatively modest: about 12% of the Ministry of Education's recurrent budget in 1979 comprised subsidies. The Government is now transferring more financial responsibility to each locality. The Government should increase subsidies if educational inequities are not to increase as a result of decentralization.

Table 4.1: EXPENDITURES IN FORMAL AND NONFORMAL EDUCATION
OF ALL TYPES, BY SOURCE, 1979
(Y billion)

	Total expenditure	Ministry of Education	Expenditures by provinces, counties, brigades, enterprises, etc.	Private expenditure (fees, books, etc.)
Primary education	4.4	2.5	1.2	0.7
Secondary education	4.7	3.4	1.1	0.2
Tertiary education	4.0	2.5	1.4	<0.1
<u>Total</u>	<u>13.1</u>	<u>8.4</u>	<u>3.7</u>	<u>1.0</u>
Of which:				
Capital expenditure	1.4	0.7	0.7	-
Recurrent expenditure	11.7	7.7	3.0	1.3

Sources: Ministry of Education, and data from local authorities, enterprises and universities, colleges and schools.

4.13 Primary Education. The cost of primary education, which has been shared as detailed in Table 4.1, has involved brigades and industries in building primary schools as self-help schemes or out of their profits, and provincial and county authorities in contributing funds (e.g. for furniture and equipment). Recurrent costs have been shared between the central government and the brigades, but costs for some city schools have been financed completely by the authorities or enterprises. The minban teachers have been paid by the brigades in the same way as other brigade members. Similarly, the teachers in schools run by the enterprises have been paid according to the norms of those industries and have received the same bonuses and benefits as other workers. The rate of pay varies from place to place but is generally low. Although the Government is transferring increased

responsibility for financing education to the provinces and the local authorities, the autonomous regions with their ethnic minorities will continue to receive help from the central government to develop their education systems, which require extra funds to improve access and quality. But there is, nevertheless, a risk that decentralization will increase communal and urban-rural disparities in primary education (para. 4.12).

4.14 The allocation of funds to primary education is modest despite the contributions from many sources. The allocation per student was only about \$20 in 1979, compared with 1975 figures of \$26 and \$57, respectively, in the two low-income country groups (para. 3.06). A main reason for this is the low teacher salaries, which only comprise about 140% of the GNP/capita and aggregated only 60% of the recurrent costs of primary education (these figures are several hundred percent and 85-90%, respectively, in many other LDCs). The low and often insufficient allocation of funds for school construction, maintenance and equipment is also a major factor.

4.15 Secondary Education. Chinese expenditure by student and year in secondary education is also low by international standards. The low level of funding is reflected in unit costs, which amount to only about \$50 equivalent per student per year in China, compared to \$70 and \$219 in the two comparator country groups. As in primary education, the low cost is partially explained by teachers' salaries, which are only slightly higher than those of primary teachers. Consequently, salaries constitute only about 50% of the recurrent cost of secondary education, compared to 70-85% in most other countries. The cost of boarding facilities constitutes a part of the nonsalary portion of recurrent costs. A minor (and inadequate) part of the budget is used to provide educational materials and for maintenance. China should be able to increase its budget for secondary education (in the central government or in the localities) to permit a further upgrading of secondary teachers, improvement of equipment in academic secondary schools, and faster rehabilitation, expansion and improvement of vocational/technical education.

4.16 Higher Education. The unit cost (recurrent and capital) in higher education was about \$1,150 in 1979 or about \$870 in 1975 prices. The unit cost averaged \$534 and \$675, respectively, in 1975 in the comparator country groups. The reasons for the high unit cost in China have been enumerated: a generous student boarding policy, somewhat inefficient use of physical facilities and a low student/teacher ratio. It should be possible to reduce unit costs without jeopardizing attempts to raise the quality of higher education.

4.17 Only sketchy information is available on the cost per student of the TV university, but officials of the central TV university estimated costs at about \$200 equivalent per student per year. To this must be added the local costs of developing curricula, tutors, and textbooks, as well as imputing some value to an increasingly scarce resource, broadcasting time. In total, costs probably amount to less than \$300 per student per year, or

\$500 per full-time equivalent student per year, which compares well with the unit cost in regular universities.

4.18 Total Expenditure. The total public expenditure on education in China as a percentage of the GNP is estimated at 3.1%. This implies that China spends less on education than the median percentage (3.9%) of 82 developing countries for which the Bank has information. In developed countries, the percentage is even higher at 5.7%. Central government expenditure on education as a percentage of its total expenditure is also low: 6.6% vs. 15.1% in other LDCs and 15.6% in developed countries. The two latter percentages may include minor expenditures by local governments in some countries but the difference is, nevertheless, substantial. It shows that China has already shifted much of the cost of education to local authorities and to a minor extent to the families (books and fees).^{/1}

4.19 The comparatively low level of education spending is illustrated by the unit costs of education. Public expenditure on education per student in 1975 averaged \$40 and \$109, respectively, in the two comparator country groups (para. 3.06). In China, the corresponding figure in 1979 has been estimated at \$37 equivalent, which corresponds to \$28 in 1975 prices.

4.20 The estimated unit costs of primary and secondary education in China (as a percentage of GNP/capita) are also low compared with those in other countries, while those in higher education are high (Table 4.2). An international comparison of relative expenditure by level confirms previous findings (Table 4.3).

Table 4.2: UNIT COSTS OF EDUCATION AT DIFFERENT LEVELS,
AS A PERCENTAGE OF GNP/CAPITA

	China	Other LDCs	Advanced countries
	------(%)-----		
Primary education	8	15	16
Secondary education	19	52	21
Tertiary education	442	362	55

Sources: Unesco, World Bank Education Policy Paper and the Ministry of Education.

^{/1} Needy students receive scholarships and are relieved from paying fees.

Table 4.3: PERCENTAGE DISTRIBUTION OF EDUCATIONAL EXPENDITURES, BY LEVEL OF EDUCATION

	China/a	Other LDCs/b	OECD countries/b
	------(%)-----		
Primary education	34	45	37
Secondary education	36	32	39
Tertiary education	30	23	24

/a Data for 1979.

/b Data for 1975.

Sources: Unesco, World Bank Education Policy Paper and the Ministry of Education.

4.21 Chinese spending on primary and secondary education is inadequate given the high percentage of unqualified teachers, often poor physical facilities and lack of teaching materials. Achievement and efficiency could be improved with minor, affordable budget increases. In higher education, expenditure, however it is measured, is higher in China than in other LDCs, even though the quantitative development of higher education has been less satisfactory in China than in other developing countries. Part of the necessary expansion in higher and vocational/technical education and qualitative improvements at all levels could be financed through more economic use of staff and facilities.

4.22 Education financing in China is thus insufficient to achieve the needed qualitative improvements. Spending has, however, increased during the last few years, as shown below (and Table 4.4).

	Annual growth of recurrent expenditure (%)
Primary education	+ 7.5
Secondary education	+ 11.8
Tertiary education	+ 27.0
Other	+ 3.4
<u>Total</u>	+ <u>13.2</u>

A breakdown of Ministry of Education expenditures for 1979 is given in Appendix J. Appendix K contains Chinese education indicators and additional information on costs.

Table 4.4: GROWTH OF RECURRENT EXPENDITURE, BY TYPE, 1977-80

	1977	1978	1979	1980
	----- (Y billion) -----			
Higher education	0.78	1.14	1.61	n.a.
Primary teacher training	0.15	0.20	0.24	n.a.
Secondary schools	1.74	2.17	2.40	n.a.
Primary schools	1.57	1.77	1.95	n.a.
Special allowance	0.73	0.81	0.84	n.a.
Teacher upgrading	-	-	0.07	n.a.
Nonformal education	0.07	0.07	0.08	n.a.
Miscellaneous	0.26	0.40	0.51	n.a.
<u>Total</u>	<u>5.30</u>	<u>6.56</u>	<u>7.70</u>	<u>8.80</u>

4.23 Summary. China has spent less on education than is indicated by the impressive quantitative developments in primary and secondary education. A major reason for the low costs is low staff salaries, but a contributing factor is some underspending on education materials and buildings. Local communities, enterprises and, to some extent, parents carry a larger part of the costs in primary and secondary education than is usual in socialist economies. Their ability to carry these costs varies, and differences between localities in educational quality therefore exist in primary and secondary education. Measures should be taken to reduce the unit cost of higher education, which is expensive and absorbs a larger proportion of the total education budget in China than in many other developing countries. Achievement and efficiency could be improved at all levels of the education system with minor, affordable budget increases and better staff utilization.

5. ISSUESStrengths and Weaknesses of the Education System

5.01 The development of human resources in China since 1949 has in many respects been commendable. The Government took over a country that had some 70 million people with primary education, 4 million with secondary education, 185,000 with higher education and only a 20% literacy rate. In 1980, the corresponding figures are 305 million with primary education, 51 million with secondary education and 3 million with higher education. The literacy rate is 66%. These increases are the result of a tremendous expansion of enrollment (Table 1.1), with primary education expanding almost sevenfold, secondary education 50-fold and higher education 18-fold in 30 years. Literacy campaigns have also been successful. The graph in Appendix D forcefully illustrates China's achievements, particularly for primary and secondary education, during 1949-80.

5.02 The formal education system has been central to these achievements, but nonformal education has also played a very important role. Adult education in industry, often executed with the help of educational TV and radio, is particularly important.

5.03 Chinese students are alert, well motivated, hard working and disciplined. The teachers are dedicated and eager for their students to do well, which is reflected in low repetition and dropout rates. The curricula emphasize the Chinese language and mathematics at all levels, and students are supplied with appropriate textbooks.

5.04 Since the USSR withdrew its aid to China in the late 1950s, China has carried out its education program with little foreign assistance.^{/1} Self-help schemes have been important and more successful than in many other developing societies. Parents have shown an interest in the education of their children by contributions in kind and in cash to the schools, and by paying for textbooks. China has been able to carry out its education programs at a low cost. Its education expenditures are, in fact, too low in relative or absolute terms (paras. 4.18-4.21).

5.05 There are, however, also problems with China's education system. The closing of schools and universities during the Cultural Revolution reduced the capacity of the education system; deprived China of much needed skilled manpower in administration, industry, agriculture and science; and

^{/1} Foreign aid has primarily comprised fellowships and student exchange programs.

lowered the overall level of knowledge and skills of a whole generation of school and university graduates. The universities suffered both quantitatively and qualitatively during the Cultural Revolution, and secondary vocational and technical schools almost died out.

5.06 In primary and general secondary education, expansion took place largely at the expense of quality. There are too many unqualified teachers and too many schools without appropriate facilities and equipment. There are many advantages to self-help schemes, which can provide schools and teachers in rural areas. But these schemes also contribute to differences between localities in school quality; these differences may increase as the education system becomes more decentralized.

5.07 All levels of education in China are characterized by low staff utilization and therefore low cost effectiveness, despite low personnel costs. This is a particularly serious problem in higher education, where unit costs are high by international standards. The system is otherwise underfinanced, and China could well spend more on facilities and equipment without devoting a larger share of its GNP to education than comparable countries.

High-Level Manpower Needs

5.08 A shortage of university-trained staff and difficulty in getting needed technical staff are apparent (paras. 2.08-2.09). These shortages largely explain the comprehensive in-service training programs undertaken by many enterprises. Industry also suffers from a lack of staff familiar with modern management, administration, and cost analysis techniques.

5.09 Current university enrollments are low by any standard. To supply sufficient professional manpower (in industry, transportation, agriculture, administration, etc.) should be a major aim of higher education, but both formal and nonformal programs are needed to meet long-term and short-term manpower needs. The universities should be expanded and improved at both the undergraduate and postgraduate levels. Engineering, natural sciences, computer sciences and the social sciences (including economics and business administration) need to be covered. The impact of this expansion would, however, not be felt in the labor market until the latter part of the decade.

5.10 Short-term programs that have a faster impact on the labor market are also needed. These programs should focus on modern management and technology. They would aim to upgrade existing staff in factories, administration and agricultural communes by expanding and improving nonformal adult education programs (using TV universities, worker colleges, etc.). Enterprises and communes should have a major responsibility for executing the programs, but with support from appropriate ministries and labor bureaus.

These in-service programs could be initiated after a fairly short preparation period, given the existing infrastructure of adult education in China. Management training and staff upgrading are also needed in the education sector, which is one of the biggest employers in China as elsewhere.

Training of Middle-Level Technicians

5.11 The shortage of qualified middle-level technicians and skilled workers requires a rapid and major expansion of secondary and postsecondary vocational/technical education and training in industry, agriculture, transportation and other major economic activities. The current imbalance between general and technical education must be adjusted as soon as possible. The standard and relative output of graduates should be comparable to the achievements of technical/vocational education in neighboring developing countries. Initially, the Government needs to consider several issues (detailed below) related to technical and vocational education and training.

5.12 The first issue concerns the level of the courses. The recent overproduction of general senior secondary school graduates ^{/1} has led many of them to apply to technical and vocational schools. But as most of the courses at these schools only assume junior secondary education as a basis, this may imply an unnecessary lengthening of the study time, some subject repetition, and thus a waste of human and material resources. Most technical and vocational education should be at the senior secondary level. But courses at the postsecondary level are also necessary. It has been suggested in a Unesco survey that a system similar to the American Community Colleges be developed at the top of the vocational school system. Similar colleges, with job-related curricula, could meet an obvious need and constitute a natural development of existing postsecondary programs. Appropriate curricula must be developed and a balance between the two educational levels achieved.

5.13 A second important issue concerns the degree of coordination between vocational and technical education and enterprises. Technical and vocational schools can either be completely managed by enterprises and run to meet their specific needs, or they can be run by specialized agencies and ministries, including the Ministry of Education. In the latter case, the schools would meet general manpower needs in agriculture, industry, etc., but their courses may be less employment oriented and not designed to meet acute training needs.

^{/1} There is unemployment among such graduates in major cities such as Shanghai.

5.14 Other issues concern the purpose of training (should the vocational and technical schools be specialized institutions, whose graduates cannot progress to higher education, or should their curricula be so general that the graduates could easily enter universities?), the length of courses, the role of TV and other distance education, and how to make agricultural education and training more attractive to the young. The Government should study these issues carefully before expanding and improving its secondary and postsecondary vocational and technical education training programs./1

Quality of Primary and Secondary Education

5.15 Curricula. The problems with the senior secondary school curriculum (para. 3.38) are also likely to affect the lower levels of education. The Government should therefore review and if necessary update curricula and syllabi in primary and secondary education, with the aid of appropriate domestic and foreign technical experts. The review should also cover learning equipment and learning methodologies that would be appropriate in the Chinese context. Account should be taken of the need to increase teacher demonstrations and student laboratory work.

5.16 Equipment and Buildings. To complement the curriculum review a study should also be carried out of the learning equipment and facilities in primary and general secondary education. Equipment factories and textbook publishing agencies need to be expanded and improved, so that a major program to supply primary and secondary schools with more equipment and to a lesser extent with more textbooks can be launched. The review of buildings and building needs should at least establish national standards for school buildings.

5.17 Teachers. Teacher training programs should be reviewed, and if necessary revised and expanded. The Government should furthermore focus its staff improvement program on upgrading unqualified teachers rather than on training new teachers. This approach is economically, socially and probably also educationally preferable. Plans to expand teacher training schools and normal universities should be reviewed and possibly revised. The Government should also review the feasibility of merging preservice and in-service teacher training schools (paras. 3.49-3.50). The upgrading program should continue to use correspondence and TV instruction, with a view to saving on resources and utilizing the best available teacher trainers in China.

5.18 The needed review of vocational and technical secondary education (para. 3.48) should also cover the teacher situation, but as the percentage of unqualified teachers is a low 10% according to government standards, the

/1 These studies might need to include subsector manpower studies.

emphasis should be on training new teachers. The vocational and technical education system will, furthermore, expand more than any other education subsector, creating a demand for expanded training. The training of vocational and technical teachers might include study tours abroad.

Efficiency

5.19 Underutilization of Staff. The staff work load, as measured in class contact hours, is low by international standards at all levels of education in China. The Chinese authorities justify the low work load by the many unqualified teachers who need more time to prepare for classes and to mark papers than is required by well-trained staff. After staff upgrading programs, this need would diminish and the scheduled work load could increase to international levels. This change would reduce the need for new teachers and also the total number of teachers needed in China. The Government should initiate these staff saving measures in a way that allows employed teachers to retain positions in education and use the natural attrition for replacements. The extensive use of subject teachers needs to be changed.

5.20 Space Utilization. At the few primary and junior secondary schools that have facilities other than classrooms, space utilization presents no problem. Scheduling difficulties are more common at the senior secondary schools that have laboratories and other special classrooms, and at the vocational and technical schools and universities, which have facilities of all types. Many of these facilities are underutilized, and some institutions (particularly at the tertiary level) could accommodate more students with appropriate scheduling.

5.21 Location Planning. The senior secondary and postsecondary education system will have to be expanded during the 1980s; this expansion should be based on the school location planning methodology developed by the International Institute for Educational Planning, the Unesco affiliate in Paris. The size and location of new vocational schools and those that are re-established should minimize the cost of boarding and commuting students. An economic balance should be achieved between day students and boarders. Location planning can also be applied to the planned new higher education institutions, particularly the community colleges, to determine the location of the institutions within provinces, prefectures, etc., and their location within the communities.

5.22 Measuring Achievement. The curricula in primary and secondary education need to be reviewed. In this connection, the Government could benefit from participation in the international work on achievement measurements and from joining the international network of research institutes and public education agencies working in education evaluation. China would gain access to the latest international work in achievement measurements, to the most recent evaluation techniques and to the most experienced researchers.

This would provide Chinese authorities and researchers with tools to assess the quality of Chinese education and make comparisons within and between nations. They could then identify possible reasons for underachievement in some areas of the country or in some subjects and undertake remedial action. The Government would also be able to assess the outcome and impact of the reinstated key school system and eventually make any changes needed to achieve China's overall long-term objectives in education.

5.23 The international assessment work described in the previous paragraph has converted research techniques into operational tools for education decision makers; it has made a significant contribution to our understanding of the links between education and society. Active participation in this work would confer these benefits on Chinese education administrators and researchers, and it would place them on the frontier of education developments.

5.24 Data Collection and Utilization. During the Cultural Revolution, many education statistics were destroyed and no new statistics collected for several years. The statistical system is now being rehabilitated, but will still be inadequate for modern education planning and decision making. Many statistics are collected manually and processed without the help of computers. Much information is missing. China's education system is diversified, with financial and educational responsibility shared among many authorities; the system is to be further decentralized. While this may improve efficiency, it will require a better information collection system. The Government needs to review its current system for collecting and processing educational statistics at all levels, so that it can modernize the system based on a review of consumer needs.

Investment Levels

5.25 China can increase its investments in human resources development without jeopardizing the national economy. Its ability to improve the education system is in many ways better than that of other developing countries. Its population control policy has so far been successful; quantitative education targets should now be neither too difficult nor too expensive to achieve, so the Government can focus its efforts on qualitative improvements. China should be able to enhance the quality of curricula, teaching and learning in an improved physical environment, with better equipment and more textbooks at all educational levels, without its education budget exceeding those of other developing countries at the same income level. Its success will, however, be dependent upon improving internal efficiency.

6. THE GOVERNMENT'S EDUCATION POLICY AND DEVELOPMENT PLANS, 1981-90

Education Policy

6.01 A general education policy for China for the 1980s has been formulated in a paper by the Ministry of Education. The paper states:

- "(a) Education must be geared to the needs of socialist construction and modernization, and the proportion of expenditure on and investment in education must be adjusted and raised;
- (b) education is to be developed effectively and steadily in accordance with the policy of readjusting, restructuring, consolidating and improving the economy;
- (c) in view of our large population, and poor economic foundation, and the unbalanced development of economy and education, in developing education, there should be priorities and resources shouldn't be evenly distributed among too many projects;
- (d) the relationship between popularization and the raising of standards should be handled correctly; to make primary education universal should be taken as a priority, and enough attention should be given to education in areas inhabited by minority nationalities;
- (e) educational structure must be transformed;
- (f) a diversified educational system should be adopted so as to achieve greater, faster, better and more economical results in educational development; and
- (g) efforts should be made to raise the level of teachers and to further strengthen the teaching force."

The seven general principles of the above paragraphs are supplemented by operational targets as described in the following.

Development Plans, by Level and Type of Education, 1981-90

6.02 Higher Education. The Chinese intend to expand university and college education from the current enrollment of 1.0 million students in 633 institutions to 2.2 million in some 1,100 universities and colleges, with an

aggregate output of some 4 million graduates during the ten-year period.^{/1} The annual intake would amount to 500,000 in 1990. About half of the new institutions would be colleges and technical institutions offering two or three year programs, as suggested in the Unesco survey of higher education. The development of the proposed community colleges would be preceded by a pilot project. The full community college program, comprising some 250 colleges and involving 500,000 students, might cost at least \$1 billion equivalent.

6.03 The Government also plans to expand postgraduate programs. The projected postgraduate enrollment during the next ten years would be 210,000, and 120,000 students would finish their courses during this period. The intake would grow from 24,000 in 1985 to 73,000 in 1990. The planned cost is not known.

6.04 Immediate improvements in higher education include: (a) expansion and improvement of science and engineering education and research in 26 universities, by providing testing laboratories, computer centers, staff and management development; (b) thereafter, expansion and improvement of the main disciplines at 43 other universities in medicine, agriculture, forestry, science, engineering and teacher training. The total program costs would amount to over \$400 million equivalent.

6.05 The projected improvement and increased output of higher education would meet China's manpower needs in science and technology in the early 1990s ^{/2} and would have the highest priority in China's education program (para. 2.19). Even after expanding higher education, China would have a small stock of skilled manpower (measured in relative terms). University output would also remain modest by international standards. The university program would not meet immediate manpower needs and should, in fact, be supplemented by equally important nonformal education programs in industry and agriculture, which would help to meet short-term needs (para. 5.10).

6.06 There would be few physical constraints to the university expansion programs and sufficient qualified students. There would, however, be staffing constraints, and staff upgrading programs need to be undertaken. Much new equipment must be provided. The cost effectiveness of the system should be improved, by a gradual increase in student/teacher ratios from the current 4:1 to at least 10:1. Management should also be improved.

^{/1} This corresponds to an annual increase of 7%, matching the projected economic development.

^{/2} The annual output of scientists and engineers might then amount to some 120,000-130,000 graduates.

6.07 The projected improvements and doubling of enrollments in higher education will require heavy capital investments,^{/1} but it should be possible to lower recurrent unit costs through the measures suggested above (para. 6.06). In this way, the recurrent costs of higher education would be manageable.

6.08 Vocational and Technical Education. The Government has declared that vocational and technical education at the senior secondary and postsecondary levels must be expanded and restored, at least to their pre-1966 levels. A very large program has been proposed. The current enrollment in technical and vocational secondary and postsecondary education (excluding primary teacher training) is over 1.3 million, with 0.7 million in schools administered by central government agencies and 0.6 million in schools run by industry or labor bureaus. The Government intends to increase enrollment in technical/vocational schools to over 9 million students in ten years; the annual intake will eventually amount to 2-3 million students. Aggregate output during 1981-90 would amount to over 5 million technical and vocational school graduates.^{/2}

6.09 The Government is thus aware of the urgent need to expand and improve vocational and technical education. It intends to proceed with its program only after careful review and testing of pilot projects. This approach should resolve issues regarding the structure, content and teaching methods of technical and vocational training (paras. 5.12-5.14).

6.10 Vocational/technical school enrollments are projected in Appendix L for 1980-89. The projections indicate that attaining the planned output of vocational/technical school graduates might be possible without expanding enrollment as much as intended by the Government. This would in turn reduce the demand for staff and facilities, which would, nevertheless, be considerable.

6.11 The supply of qualified teachers would be a serious constraint to the proposed expansion program. China has 102 colleges for "teacher training in professional fields" (industry, agriculture, forestry, health, finance, physical culture and arts), with an annual output that might average about 30,000 teachers in the 1980s. The annual demand for new technical and vocational teachers during the 1980s would, however, amount to 50,000 with the current student/teacher ratio of 10:1. An increase in the ratio to a

^{/1} Estimated by the Ministry of Education at over \$5 billion for existing institutions.

^{/2} The Government's paper does not state whether the plan figures also include the training of primary teachers.

more economical, but still pedagogically viable, 15:1 would be needed to match demand and supply (Appendix M). Schools located in industries could presumably use staff already employed in workshops and drawing offices as temporary instructors. But the schools run by ministries have no direct link to industry or other enterprises and would face a real teacher supply problem if student/teacher ratios are allowed to remain at low levels.

6.12 Many of the restored vocational and technical schools would use facilities originally designed as schools, but used for other purposes since the Cultural Revolution. The usefulness of these facilities would largely depend on their condition. Most of the workshop and laboratory equipment left in these institutions is probably outdated. The provision of equipment is thus likely to be an even more serious constraint to the full operation of these schools than the teacher shortage. The Government would have to provide at least 4.5 million new student places in vocational and technical education. The cost for equipping this number of places (assuming double-shift use and excluding costs for buildings, boarding facilities, etc.) would amount to at least \$2 billion equivalent, based on unit costs in Bank-financed education projects during the last decade at 1980 prices. This should be compared with the Government's estimate that the cost of its total expansion and improvement program in primary, secondary and teacher training schools would only amount to twice this figure, and with the current annual investment by the Ministry of Education, which amounts to some \$0.45 billion equivalent.

6.13 The high investment cost could be reduced by using industries, hospitals, etc., for shop and laboratory work and integrating it with production, which is already a common practice in China and one that could be further expanded. This implies, however, that vocational and technical training opportunities would be reduced for those not living in industrial areas or that boarding facilities must be provided. School location planning (para. 5.21) could appropriately be used before undertaking the suggested large secondary vocational and technical school construction program. It would be particularly important in ensuring that the needs of agriculture are met.

6.14 The recurrent costs of the proposed vocational/technical education program would be considerable and in proportion to the enrollment increase. Unit costs are many times higher in vocational/technical education than in general education. They would remain high even if the Government can raise student/teacher ratios as suggested. It is reasonable that enterprises, which will eventually employ the vocational/technical school graduates, should share these costs with the Government.

6.15 General Senior Secondary Education. The Government's target in general senior secondary education is to make it universal in large cities by 1990. Enrollment is expected to increase from the current 13 million primarily in a two-year course, to about 14 million in a three-year course, with an annual, well-controlled intake of 5 million students. This implies that the enrollment ratio would decrease from the current 29% to about 25%. The Government further plans to improve the quality of teachers and provide schools with a total of 2,000 new laboratories after some pilot projects.

6.16 In contrast to the vocational/technical schools, the enrollment targets for general senior secondary education could be achieved without serious problems: enrollment would change gradually (first a slow decrease, then a slow increase), and the demand for teachers and facilities could be met (Appendix N). The aggregate need for new teachers (primarily for replacement) would amount to 270,000 by 1989, or 30,000 per year (Appendix O), which is within the capacity of the 59 colleges training general secondary education teachers. In fact, if the student/teacher ratio were increased to the developing country ratio of 23:1 (primarily through an increase in the teaching load), about 14,000 new teachers would be required per year during the 1980s. The freed capacity could be used to reduce the deficit of junior secondary teachers during the peak demand period (para. 6.19). About 50% of current senior secondary teachers are unqualified, and upgrading programs should be offered to these teachers. Increases in recurrent costs would primarily be caused by the higher percentage of qualified teachers.

6.17 The provision of improved facilities (2,000 laboratories) is a necessity. Secondary education cannot be improved without laboratories and science equipment. These should be provided after the necessary review (para. 5.16).

6.18 Junior Secondary Education. The Government's target is to make junior secondary education universal in cities, towns and other economically developed regions by 1990. Enrollment is expected to peak at around 67 million in the mid-1980s and then level out at 50 million (Appendix P). No separate cost estimate for this program is available.

6.19 This peak enrollment in junior secondary education will cause a strain on staff and facilities. The long-term enrollment target would not be difficult to achieve because of the shape of the age pyramid, although the geographic distribution of students would change (enrollment in some overcrowded schools in major urban areas would decline; in other areas, schools would have to expand and new schools be constructed). The projected short-term expansion during the next few years, from an enrollment of 46 million in 1979 to 67 million in 1985 or 7% annually (3.5 million new student

places/year), would, however, be difficult to achieve. It could lead to a further deterioration in the quality of staff and facilities or require staff training and school construction programs, which would create an oversupply in the 1990s.

6.20 The Government has calculated that it needs 1.5 million new junior secondary teachers during the 1980s, or 150,000 new teachers per year. This is above the current capacity and output of the normal colleges (310,000 and 24,000, respectively). The mission's projections (Appendix Q) indicate that even 150,000 graduates would be insufficient to meet short-term needs. There would be a deficit of 700,000-800,000 teachers during the peak period, which could be reduced to 100,000-200,000 if China increased the student/teacher ratio to 23:1. The deficit would not disappear until the end of the decade. The teacher supply situation is worsened by the urgent need to upgrade the 70% of current staff who are unqualified.

6.21 The shortage of physical facilities would also be critical in junior secondary education during the peak enrollment period. The facilities of existing junior secondary schools are unsatisfactory: there are no laboratories, very little science equipment, and materials are often lacking in other subjects. Existing schools have little capacity to accept an annual 7% increase in enrollment. The Government would therefore have to construct temporary facilities within a short time for some 10-15 million junior secondary school students. In a few years, these schools would have to be used for other purposes.

6.22 The Government should review its current plan for junior secondary education, which would be difficult to execute in its present form. The most appropriate development plan would aim to consolidate enrollment at around 50-51 million, improve the quality of teaching through teacher upgrading, and rehabilitate existing facilities. This would imply that the intake, measured as a percentage of the age group, would be reduced during the mid-1980s, while the target of universal junior secondary education by 1990 would be achieved as planned in urban areas. Students excluded from junior secondary education in the mid-1980s could be offered opportunities for nonformal adult education. This approach would free resources to meet urgent needs in vocational and technical senior secondary education and keep the recurrent costs of junior secondary education within reasonable limits, despite the teacher upgrading program, which will increase the salary part of the budget.

6.23 Primary Education. The Government's target is to make primary education universal by 1990. The enrollment ratio would increase to over 95% and the retention rate would be increased to over 80%. The high percentage of

average students would be decreased. Universal primary education would be achieved without any expansion of enrollment because of the shape of the population pyramid, which shows stable or even decreasing age groups. Total enrollment would decrease from the 147 million in 1979 to about 98 million, and output from the 18 million in 1979 to about 16 million in 1990/91.

6.24 It should be possible to achieve universal primary education as planned. Appendix R contains projections by year and grade that show a continued decrease in enrollment but a maximum output of 25 million students in the mid-1980s. The children who do not enroll in primary education or who drop out prematurely are primarily girls in remote, rural areas and children of nomad families. The central government may need to make a special effort to enroll and retain these children (such as giving assistance to local school authorities). The construction of new schools, including some boarding schools, would be necessary. Total investments have not been calculated but would be comparatively modest, as the number of student places needed would be small by Chinese standards.

6.25 The Government plans predict a need for 600,000 new primary teachers, and that primary teacher training institutions would graduate 200,000 new teachers p.a. during the next five years. The demand for new teachers has been projected (Appendix S) under two assumptions: (a) a continued student/staff ratio of 25:1; and (b) an increase in the student/staff ratio /1 to 34:1, a usual level in other developing countries. It has furthermore been assumed that the Government would conduct comprehensive, in-service upgrading of unqualified teachers, which would make replacement of these unqualified teachers unnecessary. The projection shows that producing 200,000 teachers p.a. up to 1985, then tapering down to the current 100,000 p.a., would cause a teacher surplus under both assumptions. In fact, the current output from the primary teacher training schools would suffice during the first few years of the 1980s and could then be reduced.

6.26 The suggested upgrading of unqualified primary teachers would increase salaries, but the way enrollment develops would nevertheless allow total expenditure on primary education to be reduced. An increase in the student/staff ratio as suggested would also reduce unit costs.

6.27 The Government's plan discusses quality problems in primary schools only in connection with teacher qualifications, rather than by raising other important issues (paras. 3.20-3.22). The Government should be alerted to deal with these issues as it implements its primary education plan, as learning can also be improved by using better equipment, furniture and buildings.

/1 Primarily through increases in the teachers' work load.

6.28 Teacher Training. The Government plans a large program to improve in-service and preservice training of primary and secondary teachers. The program would start with pilot activities in eight colleges and would include overseas study tours. The program would later cover teacher training institutions in each province of China. The institutions would be re-equipped, their teaching staffs retrained and the teacher training curricula modernized. The program is estimated to cost some \$40 million equivalent.

6.29 The improvement of teacher training institutions is a prerequisite for the preservice and in-service programs for primary and secondary school teachers; it should therefore be given high priority by the Government. The program should give priority to upgrading (in-service) programs and explore a possible merger of preservice and in-service training (para. 5.17). The Government's plan does not discuss possible use of the TV universities in the upgrading program, though a continuation of their role would be important, and close cooperation should be established between the teacher training schools and the TV universities.

6.30 The teacher training program should be preceded by a careful projection of the future need for teachers (paras. 6.11, 6.16, 6.20, 6.25). Full consideration should be given to the reduction in demand due to possible increases in staff work loads and better use of distance education.

6.31 Nonformal Education. In nonformal education, the Ministry of Education is focusing on further expansion of technical secondary and higher education for adults. Total enrollment in technical secondary education schools for adults would amount to 7 million in 1990, almost tripling the approximately 2.6 million in 1979. In higher education, the increase in enrollment would be from 860,000 (280,000 of them in the TV universities) to 4 million (half in the TV universities). No details are otherwise available on increases in spare-time and full-time, off-the-job technical secondary education for adults, which as hitherto would be closely tied to the employing enterprise.

6.32 Plans to augment the existing TV universities are better defined and include the following:

- (a) within 5-10 years, the TV university courses should be expanded to cover the broad range of a university curriculum, adding, for example, social sciences, agriculture, and medicine to the current technical subjects;
- (b) the TV university should start to employ modern audiovisual devices in the classroom and computer facilities (for administrators and students studying computer sciences); and

- (c) the TV university should raise its standards, so that its students can receive the newly introduced university degrees (para. 3.67).

6.33 The Ministry has approved plans for expanding enrollments to 1985; targets for 1990 are still being considered (Table 6.1). Plans for expansion at the provincial level focus on establishing 500 local centers, which will be located in areas currently or soon to be reached by television transmissions. Each center is expected to require 3,000 sq m of space, and the foreign exchange costs of each center, including equipment, is estimated at \$630,000 equivalent. The Minister of Education has also proposed that the Government purchase a communications satellite for educational broadcasting, principally for use by the TV university.

Table 6.1: TV UNIVERSITY: ENROLLMENT TARGETS, 1980-90

	1980	1985	1990
Total enrollments ('000) (full-time and part-time)	420	1,200	2,000
Number of year-long courses offered	18	50	100
Central Broadcasting and TV University (Beijing)			
(i) staff		700	2,000
(ii) space (sq m)		40,000	130,000
(iii) foreign exchange requirements (\$ millions)	3.3	6.3	12.6
Total staff <u>/a</u> of central and provincial TV universities		20,000 +	40,000

/a Estimated at one teaching staff member per 50 students and one administrative staff member per 100 students.

6.34 The Government's attempts to expand technical/vocational education for adults are well justified, given the high costs of developing a traditional vocational and technical secondary system for junior and senior secondary school graduates. The proposed extension of the TV university also responds to the urgent need for short-term higher education programs (para. 5.10) to meet the demand for engineers and scientists. It would offer much needed courses in the social sciences and should also offer courses in

teacher upgrading (para. 6.29). These nonformal programs would require less capital investment than expansion of formal training programs, and the recurrent costs of such programs would be reasonable. The purchase of a communications satellite appears less necessary, as the existing broadcasting system has proven cost effective.

6.35 The proposed adult education programs rightly focus on technical and vocational secondary education and on higher education. The difficulty in providing sufficient opportunities for junior secondary education (paras. 6.19-6.21) indicate that nonformal junior secondary education programs will continue to be required in enterprises and evening schools.

Summary

6.36 The Government is well aware of the major constraints that the education and training system will face in meeting the need for high- and medium-level manpower and skilled labor in China's industry, agriculture, transportation, administration, and other sectors. It rightly considers the expansion and improvement of higher education its first priority. It should move on two fronts: universities should take care of the country's long-term needs, and enterprises should be encouraged to further expand and improve their in-service education programs (using the TV universities, correspondence courses and worker colleges) to meet short-term needs.

6.37 The Government sees the rapid expansion and improvement of technical/vocational education as a second priority, but it may have underestimated the large investments needed to bring the relevant schools up to the standards of such institutions elsewhere. It might be necessary to provide much vocational/technical education within enterprises and, for financial reasons, execute the program over a longer period. The vocational/technical education program should be preceded by a review of the objectives, content, structure, size, levels, staffing and management of vocational/technical education in China.

6.38 Teacher training is a third priority in China's education and is in fact a precondition for the execution of other education programs. The Government appears to give equal weight to preservice and in-service training. Given the current teaching staff, which is dedicated but often underqualified, in-service training should be emphasized, since it is economically, socially and pedagogically justified. A review of preservice teacher training projections shows that the training of vocational teachers might have to be expanded, but that other teacher training institutions could consolidate their current enrollments. Preservice and in-service institutions should merge. Again, TV and other distance education media should be used to improve teacher training and reduce its unit cost.

6.39 The 1990 targets in primary and general secondary education are reasonable, but an enrollment peak in junior secondary schools in the mid-1980s would require staff and facilities that might be difficult to

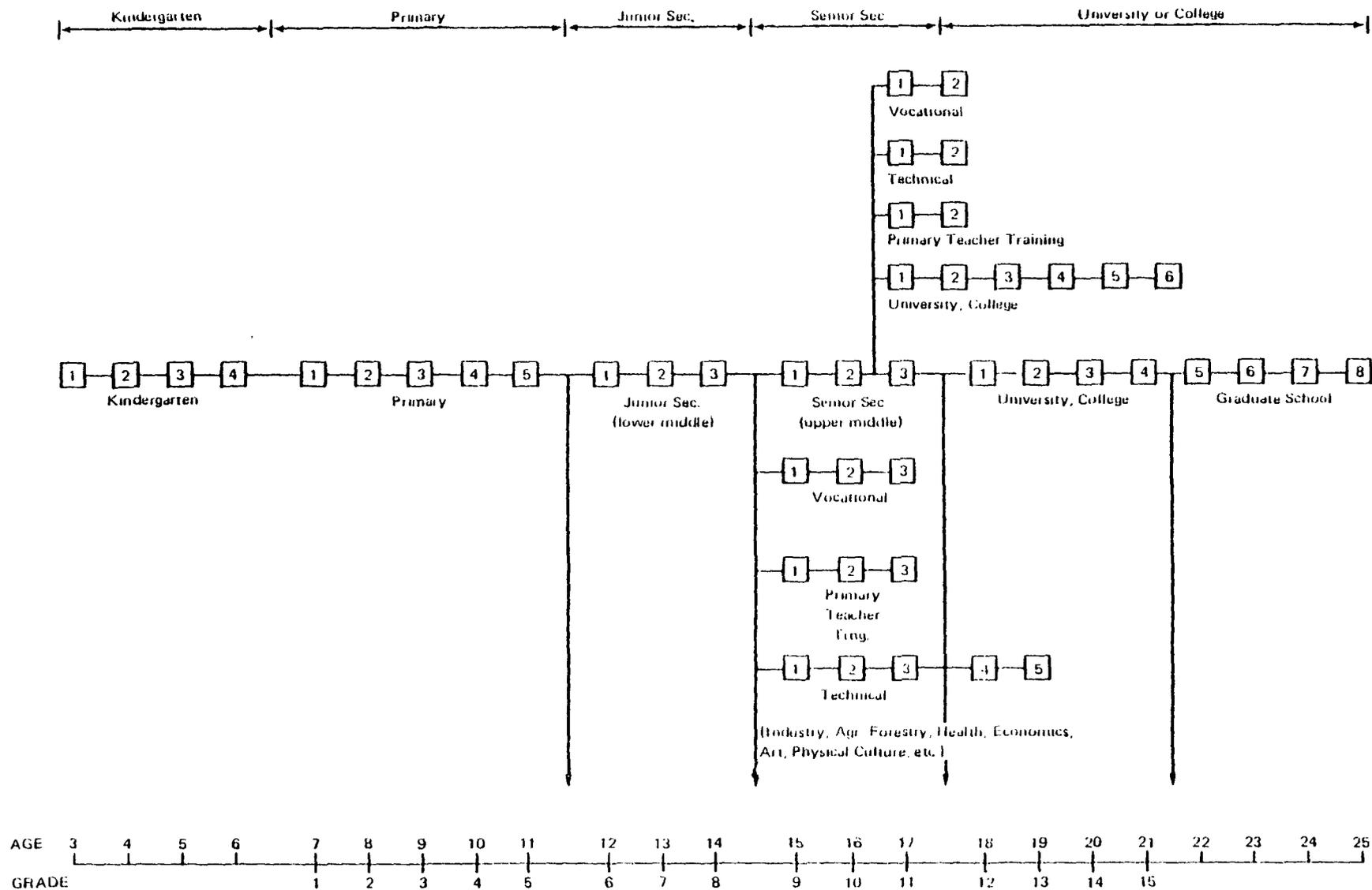
provide. The Government should keep junior secondary enrollment reasonably constant during this period and provide nonformal educational opportunities for students who cannot enter regular junior secondary schools. The Government has paid insufficient attention to the quality of learning in its primary and secondary education plans; it should review and update curricula in both primary and secondary education and follow up its review with an assessment of the need for teachers and facilities. The review and updating could be conducted simultaneously with the other education programs; they would be comparatively inexpensive but would require technical assistance.

6.40 The curriculum review and teacher training should be followed by a further improvement of primary and general secondary schools by providing equipment and facilities. This would require an expansion of China's production of education materials, textbooks and equipment.

6.41 As these five programs are executed, efforts should be made to increase the efficiency of the education system, through better staff and space utilization, location planning, improved collection and utilization of education statistics, and achievement monitoring. These measures are not discussed in the Government's education plans, but they are a high priority.

6.42 China is in the fortunate position of being able to make primary and junior secondary education universal or close to universal by 1990 with a stable or decreased absolute enrollment. It can also reduce recurrent unit costs at all levels of the education system by improved teacher utilization. The country has, furthermore, spent comparatively less on education than other countries in the same income bracket. These circumstances facilitate the necessary expansion and improvement of higher and technical/vocational education and the general improvement of education at other levels. China will need considerable assistance for capital investments in education, but the Government should be able to maintain a considerably improved education system and still keep recurrent expenditures within the average range of developing countries (measured as a percentage of GNP). A table of issues and government plans is shown in Appendix V.

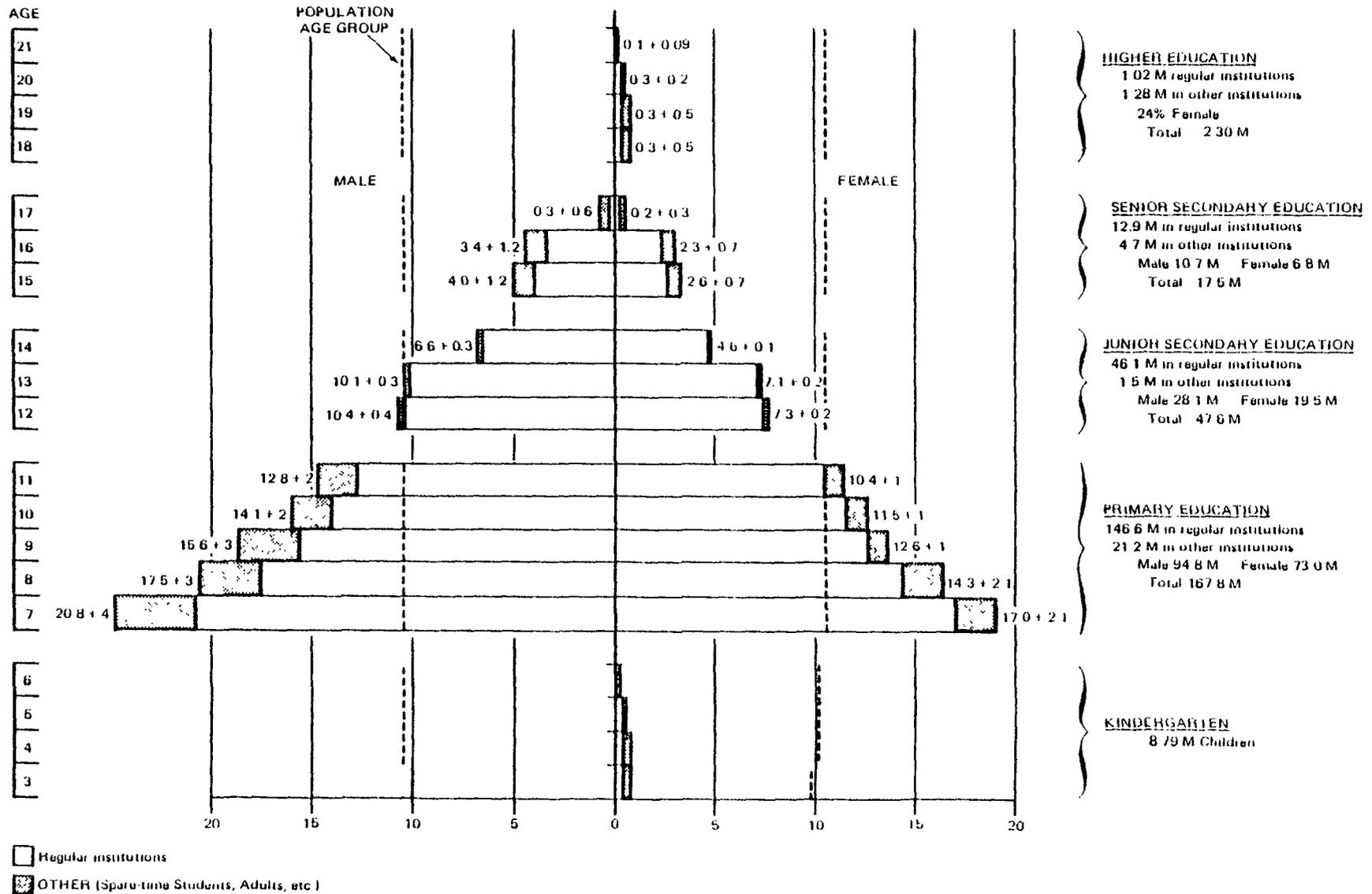
STRUCTURE OF EDUCATION IN CHINA



Source: Ministry of Education

World Bank - 22431

EDUCATION ENROLLMENT PYRAMID IN CHINA, 1979 INCLUDING FORMAL AND NON-FORMAL EDUCATION



Grade Distribution of Girls and Spare Time Students is estimated by the Bank Mission from Aggregate Data in primary and secondary education. No sex distribution estimates have been made for preschool and higher education.
 Source: Ministry of Education and World Bank Estimate

EDUCATION IN CHINAFormal Education: Students, Schools and Teachers, 1979
(in millions)

Grade	Primary education	Junior secondary education	General senior secondary education
1	37.79	17.74	6.322 0.055
2	31.81	17.15	6.483 0.046
3	28.22	11.24	- 0.014
4	25.65	-	- -
5	23.16	-	- -
(Graduates	20.90)	-	- -
<u>Total</u>	<u>146.63</u>	<u>46.13</u>	<u>12.92 /a</u>

/a Of the 12.92 million students, 0.226 million study an agricultural curriculum.

Primary education teachers	: 5.382 million	(27 students/teacher)
Primary schools	: 0.92 million	(159 students/school)
Primary classes	: 4.27 million	(34.3 students/class)
Primary school admin. staff	: 0.493 million	
Junior secondary teachers	: 2.4 million	} (19 students/teacher)
Senior secondary teachers	: 0.667 million	
General secondary schools	: 0.144 million	(410 students/school)

Primary Teacher Training

Students	: 484,000	(0.102 million graduates)
Colleges	: 1,053	(460 students/school)
Teachers	: 34,000	(14 students/teacher)

Source: Ministry of Education.

EDUCATION IN CHINAStudents, Schools and Teachers: Technical Secondary and
Postsecondary Education, 1979

	Industry	Agri- culture	Forestry	Medical/ Health	Economics/ Business	Physical Culture	Arts	Others	Total
Schools	627	337	35	543	297	23	70	48	1,980
Students (mln.)	0.243	0.110	0.011	0.210	0.105	0.005	0.012	0.016	0.714
Graduates (mln.)	0.024	0.011	0.002	0.025	0.013	0.004	0.002	0.001	0.079
Teachers (full-time equivalent, million)									0.083
Students/school									360
Students/teacher									8.6
<u>Skilled Worker Training Schools (at senior secondary and postsecondary levels)</u>									
Students (million)			0.640						
Schools			3,000		Students/school	210			
Teachers (full-time equivalent, million)			0.055		Students/teacher	11.6			

Source: Ministry of Education.

EDUCATION IN CHINA

Number of Higher Education Institutions and Number of Students, by Classification and by Province, 1979

Region	Number of institutions							Number of students						Students per 10,000 of pop.	
	Total	Compre- hensive univ.	Inst. of science & engin.	Inst. of agr. & forestry	Inst. of teacher training	Inst. of med. & pharmacy	Others	Total	Compre- hensive univ.	Inst. of science & engin.	Inst. of agr. & forestry	Inst. of teacher training	Inst. of med. & pharmacy		Others
Sichuan	42	1	12	5	12	5	7	69,055	5,216	24,598	5,118	20,778	8,219	5,126	7
Guizhou	14	1	1	1	6	3	2	18,244	1,767	2,235	1,601	8,367	1,750	524	7
Yunnan	15	1	2	2	7	2	1	18,979	2,874	4,108	915	7,993	2,213	876	6
Xizang	4	-	-	1	1	1	1	1,480	-	-	591	441	133	315	9
Shaanxi	28	2	13	1	5	3	4	43,392	3,392	22,592	1,974	8,181	2,206	5,047	19
Gansu	12	1	2	1	5	2	1	15,563	2,721	3,725	1,223	5,651	1,241	1,000	8
Qinghai	6	-	1	1	2	1	1	3,736	-	479	84	1,641	684	848	11
Ningxia	4	1	-	1	1	1	-	3,630	1,350	-	841	697	742	-	10
Xinjiang	10	1	1	3	3	2	-	11,666	2,699	1,190	2,865	2,326	2,167	419	11
Henan	24	1	5	4	8	5	1	33,804	2,603	5,853	3,731	15,843	5,254	518	5
Hubei	33	1	13	1	9	6	3	60,200	4,062	24,304	3,553	15,400	9,672	3,209	13
Hunan	22	2	6	2	8	3	1	42,912	2,500	14,129	4,156	14,721	5,328	1,878	9
Guangxi	17	1	4	1	5	4	2	21,213	2,687	1,137	2,162	10,021	3,506	1,700	6
Guangdong	29	2	3	4	8	7	5	42,382	5,411	9,132	6,255	12,003	7,081	2,500	8
Shanghai /a	27	1	15	-	2	3	6	67,404	5,520	38,979	472	11,267	5,798	5,368	61
Jiangsu	36	1	15	3	8	8	1	73,943	4,855	26,981	2,902	26,628	11,868	709	13
Zhejiang	19	1	3	3	7	3	2	32,227	3,784	8,929	3,209	11,693	3,768	764	9
Anhui	20	2	6	1	6	4	1	33,290	3,533	10,095	2,293	12,973	3,968	426	7
Fujian	16	1	4	3	5	2	1	40,555	4,155	7,118	4,528	20,759	3,092	903	17
Jiangxi	17	1	6	1	5	3	1	29,139	2,195	7,206	2,149	11,405	5,320	864	10
Shandong	34	1	11	2	10	7	3	44,771	3,376	12,917	3,515	17,446	7,297	220	6
Beijing /a	48	2	14	4	3	4	21	72,991	12,061	33,279	2,528	7,999	5,294	11,830	86
Tianjin /a	14	1	4	-	2	3	4	28,197	4,571	14,425	292	3,877	2,119	2,893	40
Hebei	27	1	10	3	8	4	1	35,952	2,333	11,251	4,293	13,150	4,734	191	7
Shanxi	16	1	5	1	5	3	1	25,308	3,185	7,334	2,266	7,898	3,268	1,377	11
Nei Monggol	13	1	2	3	4	3	-	15,674	1,289	2,309	1,549	8,167	2,204	216	18
Liaoning	34	1	15	2	5	6	5	58,007	2,965	12,582	2,569	10,429	5,876	3,586	16
Jilin	25	2	8	4	5	4	2	35,670	5,977	10,661	2,446	10,948	4,721	917	16
Heilongjiang	27	1	10	3	6	5	2	40,566	2,187	15,952	4,270	11,512	5,690	1,489	12
	<u>633</u>	<u>33</u>	<u>191</u>	<u>61</u>	<u>161</u>	<u>107</u>	<u>80</u>	<u>1,019,950</u>	<u>99,268</u>	<u>353,540</u>	<u>74,672</u>	<u>310,174</u>	<u>176,613</u>	<u>55,713</u>	<u>11</u>

/a Universities that recruit on a national basis.

Source: Ministry of Education.

EDUCATION IN CHINANumber of Graduates from Higher Education,
by Discipline, 1978 and 1979

<u>Classification</u>	<u>1978</u>	<u>1979</u>
Engineering	56,512	21,362
Agriculture	13,929	9,748
Forestry	2,605	1,281
Medicine and pharmacy	27,459	13,483
Teacher training	35,430	24,331
Liberal arts	11,808	5,421
Science	12,743	5,682
Finance and economics	1,627	1,904
Politics and law	99	-
Physical culture	1,256	1,498
Arts	1,113	375
<u>Total</u>	<u>164,581</u>	<u>85,085</u>

Source: Ministry of Education.

EDUCATION IN CHINAHigher Education Institutions
and Students, by Classification, 1979

Number of higher education institutions:	633
Number of students	1,020,000
Full-time teaching staff:	237,000
Students/teacher:	4
Students/college-university:	1,600
Number of graduates:	85,000
Number of postgraduate students:	15,500

Source: Ministry of Education.

EDUCATION IN CHINAStudents, Schools and Teachers in Nonformal Education, 1979Kindergarten

8.79 million children
 0.166 million kindergartens - (53 children/kindergarten)
 0.314 million classes - (28 children/class)
 0.533 million teachers - (16 children/teacher)

Primary Level

21.2 million students, of whom 16.4 million are in literacy courses.

Secondary - Postsecondary Level

4.7 million students, of whom 1.5 million are estimated to be in junior secondary education, 0.6 million in general senior secondary education, 2.2 million in technical secondary education and 0.4 million in technical postsecondary education. Full-time students are estimated at 0.6 million, while the rest are spare-time students.

University Level

200,000 students are in full-time studies and 660,000 students are in spare-time courses (TV, correspondence, night schools, etc.).

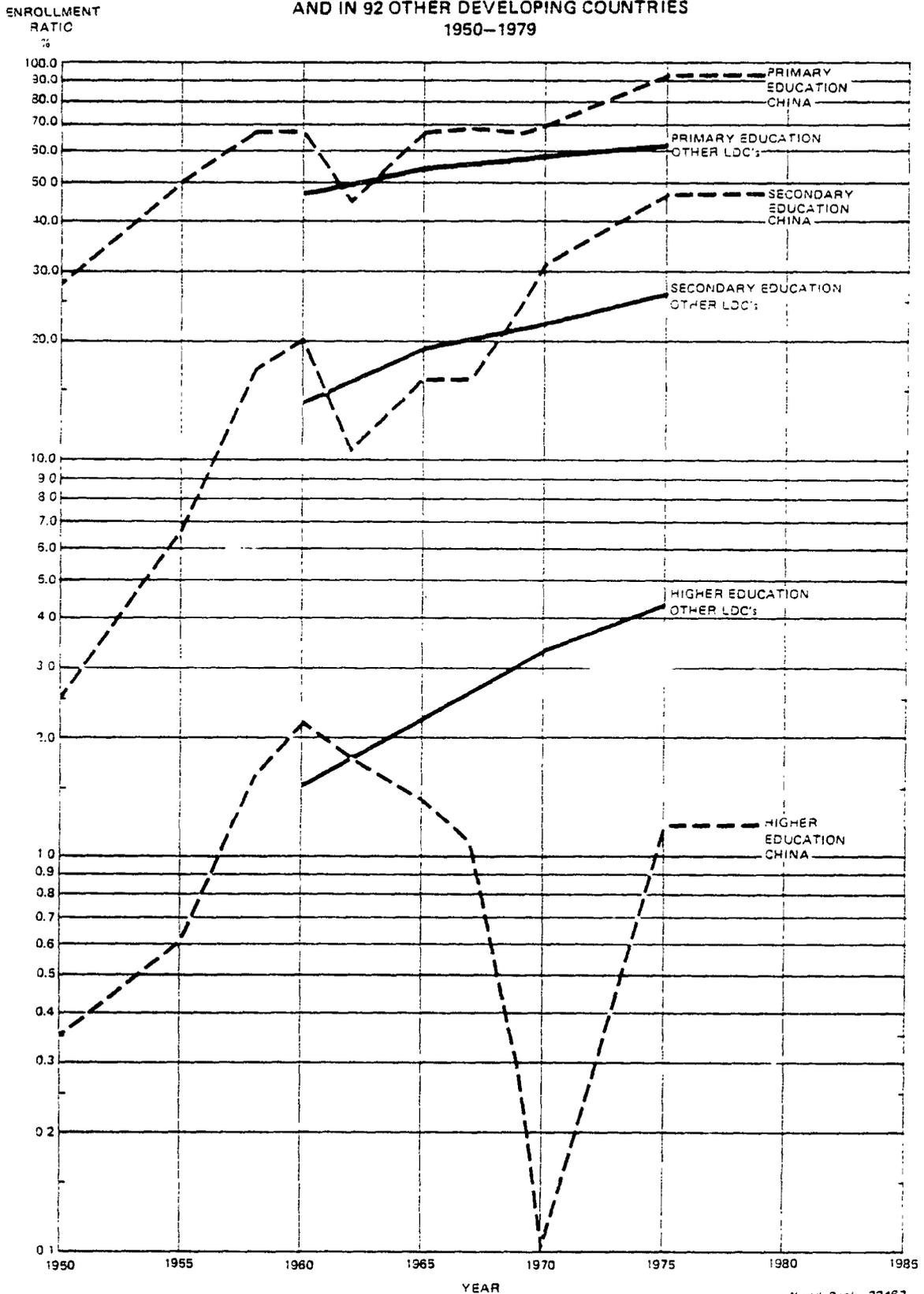
Teachers in Nonformal EducationFull-time

Primary education	- 0.120 million
Secondary education	- 0.026 million
Higher education	- 0.020 million

Part-time

Primary education	- 1.000 million
Secondary education	- 0.135 million
Higher education	- 0.033 million

ENROLLMENT RATIOS IN FORMAL EDUCATION IN CHINA AND IN 92 OTHER DEVELOPING COUNTRIES 1950-1979



EDUCATION IN CHINA

Age Distribution by Grade: Chinese Primary Schools
(October–November, 1980)

Grade	School	N/a	Age								
			7	8	9	10	11	12	13	14	15
I	Beijing (urban)	84	38	43	3	-	-	-	-	-	-
	Gansu (Lanzhou)	25	10	9	5	1	-	-	-	-	-
	Gansu (rural)	160	16	54	42	34	10	2	2	-	-
	Jiangsu (Nanjing)	59	46	8	3	1	1	-	-	-	-
	Jiangsu (rural)	91	18	55	13	2	3	-	-	-	-
II	Beijing (urban)	29	19	9	1	-	-	-	-	-	-
	Gansu (Lanzhou)	30	-	9	17	2	1	1	-	-	-
	Gansu (rural)	107	-	4	19	41	28	10	4	-	-
	Jiangsu (Nanjing)	80	8	38	18	8	5	1	2	-	-
	Jiangsu (rural)	71	-	7	21	29	13	1	-	-	-
III	Beijing (urban)	132	4	23	40	58	6	1	-	-	-
	Gansu (Lanzhou)	34	-	1	1	20	9	3	-	-	-
	Gansu (rural)	119	-	1	5	16	40	35	13	3	6
	Jiangsu (Nanjing)	86	-	2	41	28	8	6	1	-	-
	Jiangsu (rural)	74	-	13	22	19	14	5	1	-	-
IV	Beijing (urban)	137	-	-	28	70	32	7	-	-	-
	Gansu (Lanzhou)	34	-	-	-	1	16	16	1	-	-
	Gansu (rural)	103	-	-	1	4	6	32	34	13	13
	Jiangsu (Nanjing)	79	-	-	3	29	26	13	7	1	-
	Jiangsu (rural)	94	-	-	1	22	36	22	13	-	-
V	Beijing (urban)	148	-	-	-	1	21	68	57	1	-
	Gansu (Lanzhou)	31	-	-	-	-	-	14	17	-	-
	Gansu (rural)	57	-	-	-	-	-	4	19	14	20
	Jiangsu (Nanjing)	44	-	-	-	-	20	18	4	2	-
	Jiangsu (rural)	96	-	-	-	1	13	63	17	2	-

/a N is the number of students measured from the indicated group of schools.

Source: Mission tabulations from data on specific (not necessarily representative) schools supplied by the Ministry of Education and the Education Bureaus of Gansu and Jiangsu.

EDUCATION IN CHINAIndicative Weekly School Program in Primary and Secondary Education (1981)

Subject	Primary					Junior secondary			Senior secondary	
	1	2	3	4	5	1	2	3	1	2
Civics	1	1	1	1	1	2	2	2	2	2
Chinese	11	12	11	9	9	6	6	6	5	4
Mathematics	6	6	6	7	7	5	6	6	6	6
Foreign language	-	-	-	(3)	(3)	5	5	5	4	5
Physics	-	-	-	-	-	-	2	3	4	5
Chemistry	-	-	-	-	-	-	-	3	3	4
Natural Science	-	-	2	2	2	-	-	-	-	-
Geography	-	-	-	2	-	3	2	-	2	-
History	-	-	-	-	2	3	2	-	3	-
Biology	-	-	-	-	-	2	2	-	-	2
Physiology & health	-	-	-	-	-	-	-	2	-	-
Physical education	2	2	2	2	2	2	2	2	2	2
Music	2	2	2	2	2	1	1	1	-	-
Art	2	2	2	1	1	1	1	1	-	-
Production labor	-	-	-	1	1	-	-	-	-	-
Hours of scheduled instruction/week	24	25	26	27	27	30	31	31	31	30
School (class meeting)	1	1	1	1	1	-	-	-	-	-
Pioneer activity	-	-	-	-	-	-	-	-	-	-
Recreation, sports & science	4	4	4	4	4	-	-	-	-	-
Independent study	2	2	2	2	2	-	-	-	-	-
<u>Total Activities</u>	<u>31</u>	<u>32</u>	<u>33</u>	<u>34</u>	<u>34</u>	—	—	—	—	—

Notes: 1. Each class is 45 minutes long.

2. If primary schools are unable to offer English, an English course may be added for junior middle students. If there are too few teachers available for physics and chemistry, these subjects may be dropped. These class times may then be used for mathematics, language, and junior middle agricultural courses.

3. The "Late marriage and family planning lecture" may be added in senior secondary year two on a flexible basis. There may also be other minor interschool variations in the senior secondary school curriculum amounting to a few hours per week.

4. Students in junior secondary schools do two weeks and students in senior secondary schools do four weeks of production labor per year.

EDUCATION IN CHINA

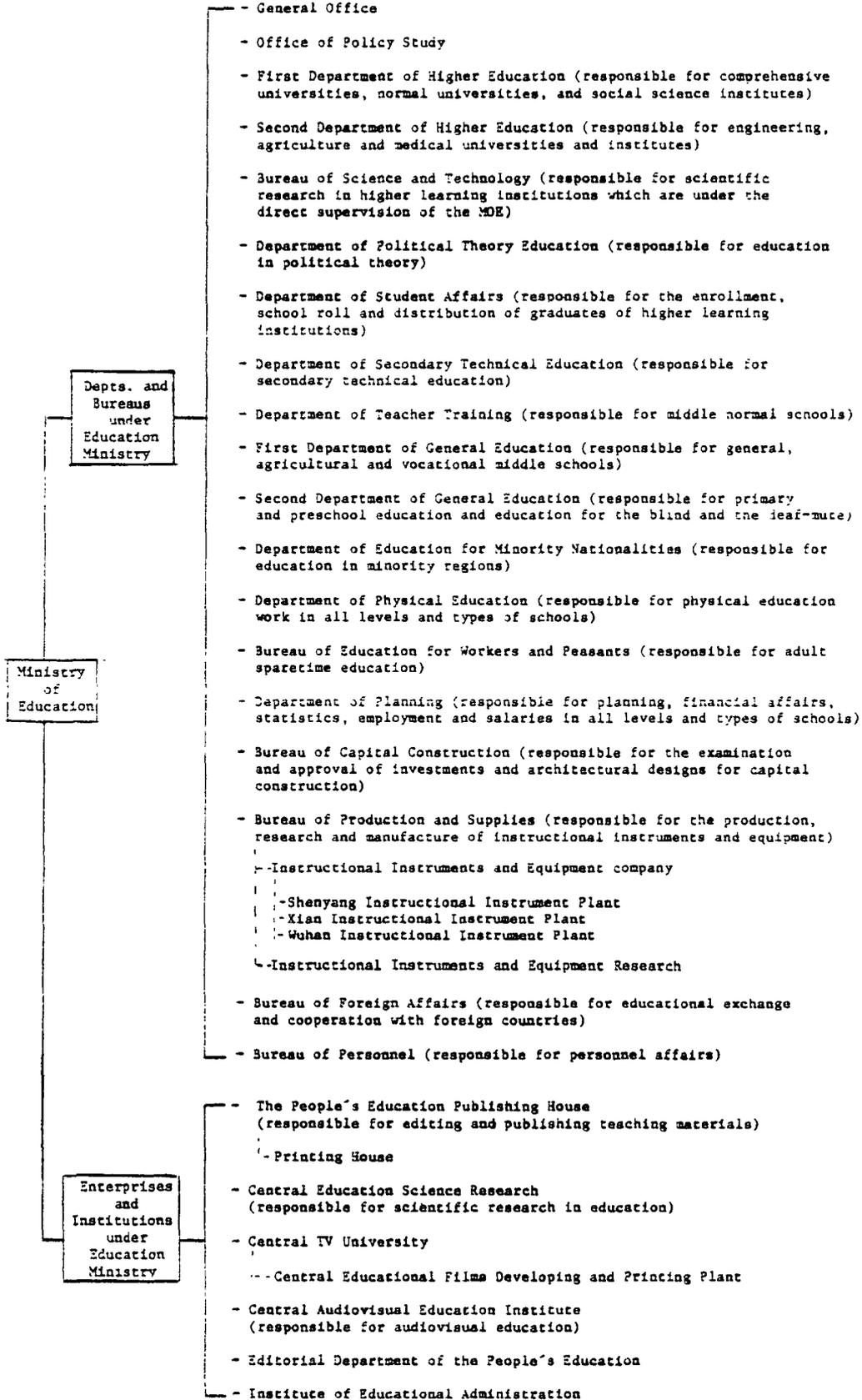
Distribution of Faculty, by Rank, Qualifications and Experience

	Rank					Qualifications				Experience				Total	
	Prof.	Assoc. prof.	Lect.	Asst.	Other	Total	1-3 (years of third level study)	4-5	6+	Total	1-5	6-15	16-30		31+
Sichuan Univ.	34	82	777	429	17	1,339	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Chongqing Univ.	12	68	802	197	134	1,213	126	1,043	36	1,205	133	120	906	46	1,205
Xian Jiaotong Univ.	35	182	899	369	8	1,493	314	1,081	90	1,485	211	197	966	111	1,485
Lanzhou Univ.	24	52	541	104	271	992	164	744	75	983	139	314	474	57	984
Zhongshan Univ.	60	74	617	306	221	1,278	129	1,140	9	1,278	113	257	820	88	1,278
South China Inst. of Tech.	52	101	1,157	707	143	2,160	245	1,478	129	1,852	303	558	1,178	83	2,122
Huazhong Inst. of Tech.	67	328	1,141	425	315	2,276	383	1,641	173	2,197	325	540	1,233	99	2,197
Fudan University	109	234	1,084	471	280	2,178	325	1,517	189	2,031	207	744	950	130	2,031
Shanghai Jiaotong Univ.	57	261	785	517	-	1,620	166	1,262	192	1,620	248	184	1,063	125	1,620
East China Normal Univ.	49	58	853	252	119	1,331	288	922	121	1,331	229	128	823	151	1,331
Nanjing Univ.	90	223	1,112	295	48	1,768	267	1,315	178	1,760	213	235	1,199	113	1,760
Nanjing Inst. of Tech.	38	63	1,050	248	27	1,426	258	1,044	108	1,410	199	33	1,098	96	1,426
Zhejiang Univ.	32	92	924	640	60	1,748	337	1,409	118	1,864	108	366	1,292	98	1,864
Univ. of Science & Tech. of China	21	64	738	442	139	1,404	186	1,023	109	1,318	295	469	535	19	1,318
Xiamen Univ.	22	39	571	341	4	977	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Beijing Normal	44	101	713	424	42	1,324	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Beijing Agricultural Univ.	41	91	372	82	72	658	80	695	77	852	57	126	546	123	852
Beijing Medical College	59	91	380	57	134	721	140	403	178	721	243	61	302	115	721
Tianjin Univ.	61	223	1,116	492	289	2,181	332	1,741	143	2,216	290	508	1,280	138	2,216
Dalian Inst. of Tech.	30	187	966	119	224	1,526	281	1,174	71	1,526	220	134	1,076	96	1,526
Total	937	2,614	16,598	6,917	2,547	29,613	4,021	19,632	1,996	25,649	3,533	4,974	15,741	1,688	25,936
(%)	3.2	8.8	56.1	23.4	8.6	100.0	15.7	76.5	7.8	100.0	13.6	19.2	60.7	6.5	100.0

Source: Data from universities.

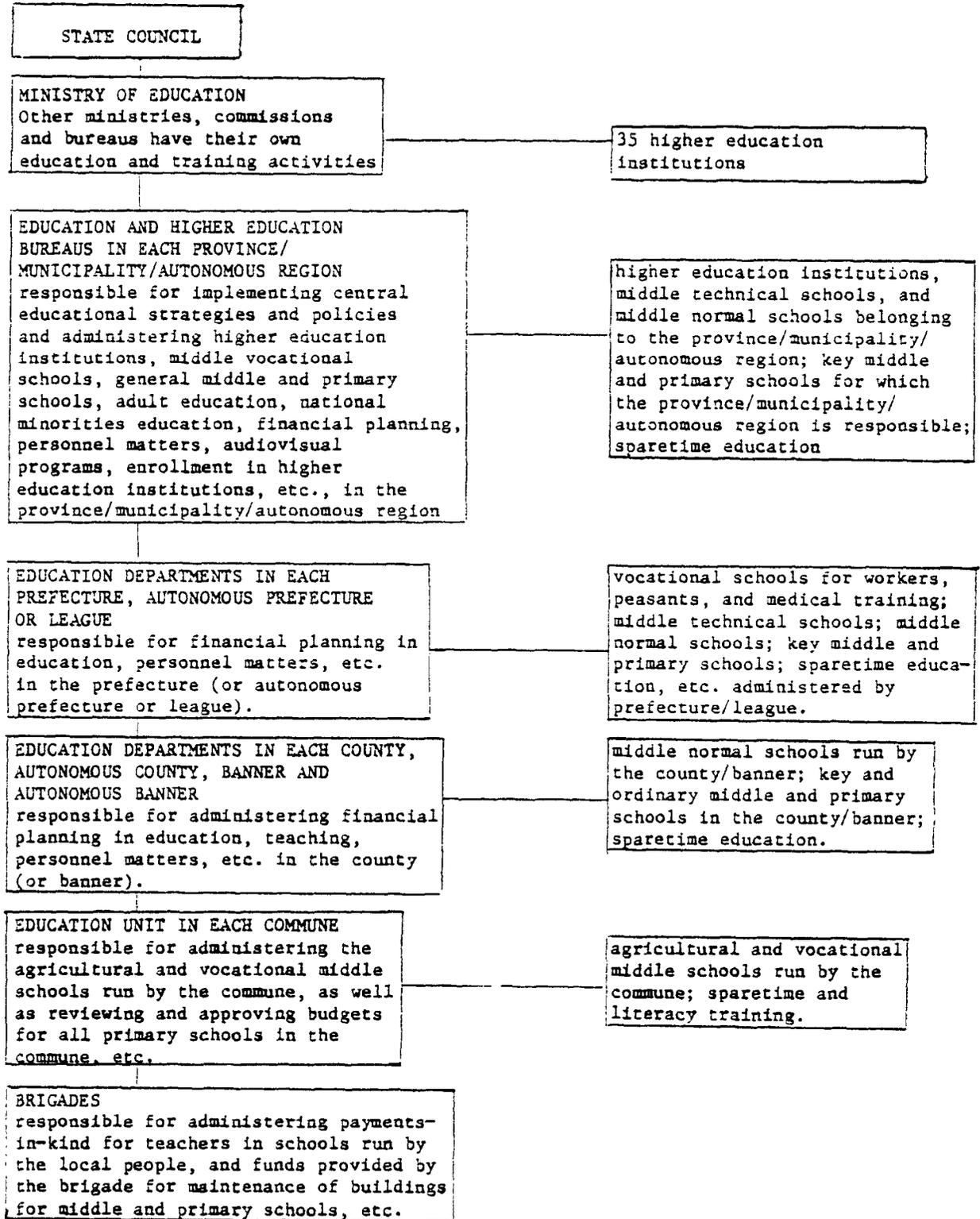
EDUCATION IN CHINA

Organogram of the Ministry of Education



APPENDIX I

ADMINISTRATION OF EDUCATION IN CHINA



EDUCATION IN CHINAMajor Items of Educational Expenditure by the Ministry of Education, 1978
(Y 100 million)

	Total expen- ditures		Salaries	Subsidies	Staff benefits	Student subsidies	Utilities & others	Consum- able instr. matl.	Eqpt.	Maint. of bldgs.
Higher education	11.40 (19%)		3.39	0.14	0.14	0.94	1.39	1.21	2.67	1.05
Normal schools	2.00 (3%)		0.42	0.04	0.02	0.54	0.23	0.09	0.25	0.35
Secondary schools	21.70 (36%)		11.28	1.05	0.46	0.86	2.30	0.53	1.72	3.38
Primary schools	17.70 (29%)		11.23	1.36	0.58	0.06	1.16	0.17	0.61	2.37
Subsidies to commune-run secondary schools and primary schools	8.10 (13%)		-	-	-	-	-	-	-	-
<u>Total</u>	<u>60.90 (100%)</u>		<u>26.32</u>	<u>2.59</u>	<u>1.20</u>	<u>2.40</u>	<u>5.08</u>	<u>2.00</u>	<u>5.25</u>	<u>7.15</u>

EDUCATION IN CHINAMajor Items of Educational Expenditure by the Ministry of Education, 1979
(Y 100 million)

	Total expen- ditures		Salaries	Subsidies	Staff benefits	Student subsidies	Utilities & others	Consum- able instr. matl.	Eqpt.	Maint. of bldgs.
Higher education	15.80 (23%)		3.90	0.30	0.25	1.44	1.84	1.80	4.18	1.66
Normal schools	2.40 (3%)		0.43	0.06	0.03	0.78	0.26	0.09	0.27	0.44
Secondary schools	23.90 (34%)		12.10	1.71	0.76	0.88	2.44	0.51	1.68	3.51
Primary schools	19.50 (28%)		11.72	2.05	0.98	0.06	1.23	0.18	0.56	2.37
Subsidies to commune-run secondary schools and primary schools	8.40 (12%)		-	-	-	-	-	-	-	-
<u>Total</u>	<u>70.00</u> (100%)		<u>28.15</u>	<u>4.12</u>	<u>2.02</u>	<u>3.16</u>	<u>5.77</u>	<u>2.58</u>	<u>6.69</u>	<u>7.98</u>

EDUCATION IN CHINA
Education Indicators, 1979

1. Population in millions	971
2. GNP per capita (\$)	156
3. Literacy rate of adults (literate people aged 15 and over, divided by the population aged 15 and over)	45%
4. Total expenditure on education as a percentage of GNP /a	3.1%
5. Per capita expenditure on education (\$)	6.8
6. Public expenditures on education as a percentage of total expenditures on education	92%
7. Central government expenditure on education as a percentage of public expenditure on education	89%
8. Central government expenditure on education as a percentage of central government expenditures	7.5%
9. Central government capital expenditure on education as a percentage of central government capital expenditures	1.5%
10. Central government recurrent expenditure on education as a percentage of central government recurrent expenditures	7.1%
11. Foreign aid to education as a percentage of central government expenditures on education	-
12. Expenditures on primary education as a percentage of total cost of education	34%
13. Public recurrent expenditures on secondary education as a percentage of total costs of education	35%
14. Expenditures on higher education as a percentage of total costs of education	27%
15. Recurrent unit costs of primary education as a percentage of GNP per capita	4
16. Recurrent unit costs of secondary education as a percentage of GNP per capita	10%
17. Recurrent unit costs of higher education as a percentage of GNP per capita	14%
18. Salaries as a percentage of recurrent costs in primary education	5%
19. Salaries as a percentage of recurrent costs in secondary education	5%
20. Salaries as a percentage of recurrent costs of higher education	25%
21. Enrollment ratio in primary education /b	93% net, 154% gross
22. Enrollment ratio in secondary education /b	61% gross
23. Enrollment ratio in higher education /b	6.9% gross /c
24. Female enrollment as a percentage of total enrollment in primary education	45%
25. Female enrollment as a percentage of total enrollment in secondary education	41%
26. Female enrollment as a percentage of total enrollment in higher education	24%
27. Completion rate of the first four grades (proportion of those entering primary school that complete 4th grade)	72%
28. Completion rate in primary education	64%
29. Completion rate in lower secondary education	90%
30. Completion rate in upper secondary education	84%
31. Transition rate from primary to lower secondary education	43%
32. Transition rate from lower to upper secondary education	37%
33. Transition rate from secondary to university education	4%
34. Student/teacher ratio in primary education	27:1 /d
35. Student/teacher ratio in secondary education	19:1
36. Qualified teachers in primary education	47%
37. Qualified teachers in junior secondary education	30% /e
38. Qualified teachers in senior secondary education	51%
39. Primary teachers' average salary as a ratio of GNP/cap.	1.4
40. Secondary teachers' average salary as a ratio of GNP/cap.	1.4
41. Primary teachers' weekly work load	12-20 periods
42. Secondary teachers' average weekly work load	10-14 periods
43. Average class size, secondary education	47
44. Average student/teacher ratio in higher education	4.3:1

/a Total public expenditure on education as % of GNP: 3.1%
Central government expenditure on education as % of GNP: 2.1%

/b Gross ratios include enrollment in spare-time schools.

/c 1.6% in formal higher education.

/d 25:1, including principals.

/e 11% if only teachers with a college degree are included.

Notes: Exchange rate: ¥ 1.5703 = \$1.00
GNP : ¥ 391.3 billion

EDUCATION IN CHINAVocational/Technical School Enrollment Projection, 1980-89
('000 students)

Year	Intake	Grade 1	Grade 2	Grade 3	Graduates	Total /a
1980	-	800	390	160	128	1,350
1981	400	480	679	328	262	1,487
1982	633	681	452	576	461	1,709
1983	866	934	590	419	335	1,943
1984	1,099	1,192	806	574	411	2,512
1985	1,332	1,451	1,035	696	557	3,182
1986	1,565	1,710	1,264	897	718	3,871
1987	1,798	1,969	1,495	1,101	881	4,565
1988	2,031	2,228	1,725	1,306	1,045	5,259
1989	2,264	2,487	1,955	1,510	1,208	5,952

/a Assumptions: promotion rates for all grades = 80%, dropout rates for all grades = 10%, repetition rates for all grades = 10%. Normal schools are not included.

Note: Projections by mission.

EDUCATION IN CHINAVocational/Technical School Teachers' Stock and Demand, 1980-89
(⁰⁰⁰)

Year	Stock <u>/c</u>	Teachers <u>/a</u> required per year	Surplus (+) or deficit (-)	Teachers <u>/b</u> required per year	Surplus (+) or deficit (-)
1980	138	135	+3	90.0	+48.0
1981	134	149	-15	99.1	+34.9
1982	130	171	-41	113.9	+16.1
1983	126	194	-68	129.5	-3.5
1984	122	251	-129	167.5	-45.5
1985	119	318	-199	212.1	-93.1
1986	115	387	-272	258.1	-143.1
1987	112	457	-345	304.3	-192.3
1988	108	526	-418	350.6	-242.6
1989	105	595	-490	396.8	-291.8

/a Constant student/teacher ratio of 10:1.

/b Constant student/teacher ratio of 15:1.

/c Assumes a retirement rate of 3% p.a.

Note: Mission projections.

EDUCATION IN CHINASenior Secondary Enrollment Projection, 1980-89
(Million students)

Year	<u>Two-year system</u>				<u>Three-year system</u>					Total
	Intake <u>/a</u>	1	2	Sub- total <u>/b</u>	Intake <u>/a</u>	1	2	3	Sub- total <u>/b</u>	
1980	4.9	5.1	5.9	11.0	0.1	0.1	0.1	0	0.2	11.2
1981	4.8	4.9	4.8	9.7	0.2	0.2	0.1	0	0.4	10.1
1982	4.5	4.6	4.6	9.2	0.5	0.5	0.2	0.1	0.9	10.1
1983	3.9	4.0	4.3	8.4	1.1	1.1	0.5	0.2	1.8	10.2
1984	2.6	2.8	3.8	6.5	2.4	2.4	1.0	0.4	3.7	10.4
1985	-	0.1	2.6	2.7	5.0	5.1	2.2	1.0	8.2	10.9
1986	-	-	-	-	5.0	5.2	4.7	2.0	11.9	11.9
1987	-	-	-	-	5.0	5.2	4.8	4.3	14.3	14.3
1988	-	-	-	-	5.0	5.2	4.8	4.5	14.5	14.5
1989	-	-	-	-	5.0	5.2	4.8	4.5	14.5	14.5

/a Intake of 5 million students per annum. Assumes that by 1986, all senior secondary schools will adopt the three-year system.

/b Assumptions: promotion rates for all grades = 91%, dropout rates for all grades = 6%, repetition rates for all grades = 3%.

Note: Mission projections.

EDUCATION IN CHINASenior Secondary Teachers' Stock and Demand, 1980-89
(⁰⁰⁰)

Year	Stock <u>/c</u>	Teachers <u>/a</u> required per year	Surplus (+) or deficit (-)	Teachers <u>/b</u> required per year	Surplus (+) or deficit (-)
1980	647	591	+56	488	+159
1981	628	532	+96	439	+189
1982	609	531	+78	439	+170
1983	590	537	+53	444	+146
1984	573	549	+24	454	+119
1985	556	576	-20	476	+80
1986	539	624	-85	516	+23
1987	523	753	-230	622	-99
1988	507	764	-257	631	-124
1989	492	765	-273	632	-140

/a Constant student/teacher ratio of 19:1. By 1986 all senior secondary schools would be on a 3-year system.

/b Constant student/teacher ratio of 23:1. By 1986 all senior secondary schools would be on a 3-year system.

/c Assumes a retirement rate of 3% p.a.

Note: Mission projections.

EDUCATION IN CHINAJunior Secondary Enrollment Projection, 1980-90
(Million students)

<u>Year</u>	<u>Intake /a</u>	<u>Grade 1</u>	<u>Grade 2</u>	<u>Grade 3</u>	<u>Total /b</u>
1980	17	18	18	16	52
1981	19	20	18	17	55
1982	20	22	20	17	59
1983	21	23	21	19	63
1984	23	25	22	20	67
1985	20	22	24	21	67
1986	19	21	22	23	66
1987	17	19	20	21	60
1988	16	17	18	20	55
1989	16	17	17	18	52
1990	15	16	17	17	50

/a Assumes 93% of primary school graduates enter junior secondary schools.

<u>/b</u> Assumptions:	<u>Grade 1</u>	<u>Grade 2</u>	<u>Grade 3</u>
Promotion rates	90	88	78
Dropout rates	2	4	14
Repetition rates	8	8	8

Note: Mission projections.

EDUCATION IN CHINAJunior Secondary Teachers' Stock and Demand, 1980-90
(million)

Year	Stock <u>/c</u>	Teachers <u>/a</u> required per year	Surplus (+) or deficit (-)	Teachers <u>/b</u> required per year	Surplus (+) or deficit (-)
1980	2.3	2.7	-0.4	2.3	0
1981	2.3	2.9	-0.6	2.4	-0.1
1982	2.2	3.1	-0.9	2.6	-0.4
1983	2.1	3.3	-1.2	2.7	-0.6
1984	2.1	3.5	-1.4	2.9	-0.8
1985	2.0	3.5	-1.5	2.9	-0.9
1986	1.9	3.5	-1.6	2.9	-1.0
1987	1.9	3.2	-1.3	2.6	-0.7
1988	1.8	2.9	-1.1	2.4	-0.6
1989	1.8	2.7	-0.9	2.3	-0.5
1990	1.7	2.6	-0.9	2.2	-0.5

/a Constant student/teacher ratio of 19:1.

/b Constant student/teacher ratio of 23:1.

/c Assumes a retirement rate of 3% p.a.

Note: Mission projections.

EDUCATION IN CHINAPrimary School Enrollment Projection, 1980-90
(Million students)

Year	Intake <u>/a</u>	Grade 1	Grade 2	Grade 3	Grade 4	Grade 5	Total <u>/b</u>
1980	27	31	34	31	27	25	148
1981	25	28	28	33	30	26	145
1982	24	27	26	28	32	29	142
1983	23	26	24	25	28	31	134
1984	22	25	23	24	25	27	124
1985	22	24	22	23	23	25	117
1986	21	23	21	22	22	23	111
1987	20	22	21	21	21	22	107
1988	19	22	20	20	21	21	104
1989	19	21	19	19	20	20	99
1990	19	21	19	19	19	20	98

/a Assumes that the rate of over- or underage students declines from 30% in 1979/80 to about 3% in 1990, and that 95% of 7 year old children will be enrolled in primary schools in 1990.

<u>/b</u> Assumptions:	<u>Grade 1</u>	<u>Grade 2</u>	<u>Grade 3</u>	<u>Grade 4</u>	<u>Grade 5</u>
Promotion rates	80	88	88	88	80
Dropout rates	10	2	2	2	10
Repetition rates	10	10	10	10	10

Note: Mission projections.

EDUCATION IN CHINAPrimary School Teachers' Stock, Supply and Demand, 1980-90 /a
(million)

Year	Stock /d	Additions of new teachers	Total supply	Teachers /b required per year	Surplus (+) or deficit (-)	Teachers /c required per year	Surplus (+) or deficit (-)
1980	5.7	0.2	5.9	5.9	0	5.9	0
1981	5.5	0.4	5.9	5.8	+0.1	5.6	+0.3
1982	5.4	0.6	6.0	5.7	+0.3	5.3	+0.7
1983	5.2	0.8	6.0	5.4	+0.6	5.0	+1.0
1984	5.0	1.0	6.0	5.0	+1.0	4.4	+1.6
1985	4.9	1.2	6.1	4.7	+1.4	4.0	+2.1
1986	4.7	1.3	6.0	4.4	+1.6	3.7	+2.3
1987	4.6	1.4	6.0	4.3	+1.7	3.5	+2.5
1988	4.5	1.5	6.0	4.2	+1.8	3.3	+2.7
1989	4.3	1.6	5.9	4.0	+1.9	3.0	+2.9
1990	4.2	1.7	5.9	3.9	+2.0	2.9	+3.0

/a With a five-year primary school system.

/b Constant student/staff ratio of 25:1.

/c Increases the student/staff ratio of 25:1 to international level of 34:1.

/d Assumes a retirement rate of 3% p.a.

Note: Mission projections.

EDUCATION IN CHINAEnrollment in Formal Education (Absolute Figures), 1949-79

Year	Primary	Secondary	Tertiary	Total
	----- (million students) -----			
1949	24.39	1.27	0.117	25.78
1950	28.92	1.57	0.137	30.63
1951	43.15	1.96	0.153	45.26
1952	51.10	3.15	0.191	54.44
1953	51.66	3.63	0.212	55.50
1954	51.22	4.25	0.253	55.72
1955	53.13	4.47	0.288	57.89
1956	63.47	6.01	0.403	69.88
1957	64.28	7.08	0.441	71.80
1958	86.40	12.00	0.660	99.06
1959	91.18	12.90	0.812	104.89
1960	93.79	14.87	0.962	109.62
1961	75.79	10.34	0.947	87.08
1962	69.24	8.34	0.830	78.41
1963	71.58	8.38	0.750	80.71
1964	92.95	10.20	0.685	103.84
1965	116.21	14.32	0.674	131.20
1966	103.42	12.97	0.534	116.92
1967	102.44	12.55	0.409	115.40
1968	100.36	14.05	0.259	114.67
1969	100.67	20.25	0.109	121.03
1970	105.28	26.48	0.048	131.81
1971	112.11	31.49	0.083	143.68
1972	125.49	36.17	0.194	161.85
1973	135.70	34.95	0.314	170.96
1974	144.81	37.14	0.430	182.38
1975	150.94	45.37	0.501	196.81
1976	150.06	59.06	0.565	209.69
1977	146.18	68.49	0.625	215.30
1978	146.24	66.37	0.856	213.47
1979	146.63	60.25	1.020	207.90

Source: Ministry of Education.

EDUCATION IN CHINAPopulation (1979) and School-Age Population (1949-79) Data

Population	970.92 million (increased by 12.83 million over 1978)
Birth rate	1.79%
Mortality rate	0.62%
Growth rate	1.17%

Source: Statistics published by the State Statistical Bureau (quoted in the People's Daily, May 1, 1980).

School-Age Population /a By Age Group, 1949-79
(in millions)

Age group	1949	1958	1965	1979 /b
7-12	65.8	86.7	117.0	106.0
13-18	62.4	68.9	90.1	127.5
19-22	38.4	42.5	46.8	82.3

/a Estimated using data from World Bank EPD Data Bank.

/b Age groups for 1979 are: 7-11 years, 12-17 years, 18-21 years.

EDUCATION IN CHINA

Issues, Plans and Programs

Issues	Government Plan (a) Government Program (b)	Comments	Priority
I. Shortage of qualified high-level manpower in industry, agriculture, transportation, construction, administration, research, computer technology, etc.	(a) Expansion and improvement of undergraduate and postgraduate university, and college education. (b) 26 universities in a first phase and 43 universities in a second phase.	The Government's plans/programs would meet an urgent long-term need. Equipment, staff development and improved management are needed. Programs should also include measures to meet short-term needs. Existing spare-time colleges, TV universities, etc. should therefore also be expanded to provide in-service upgrading programs in enterprises and elsewhere.	1
II. Shortage of qualified middle-level technicians in industry, agriculture, transportation, construction, etc.	(a) Significant expansion of vocational, technical secondary/postsecondary education. (b) Pilot projects. Community Colleges.	Execution of the plan would meet urgent needs but should be preceded by a review of vocational/technical education and of the respective roles of the authorities and enterprises. The costs would be very high and programs would probably have to be phased over a longer period than originally anticipated. Serious constraints in staff, equipment and facilities. Both enterprises and formal schools should be used for training.	2
III. Quantity and quality of primary and secondary education.	(a) Government plan proposes universal primary education and in some respects universal secondary education by 1990. Some qualitative improvement suggested. (b) Projects to improve teacher training (TV), supply secondary schools with laboratories, and expand production of textbooks and education equipment. Pilot projects.	It should be fairly easy to reach the quantitative targets in 1990 because of the shape of the population pyramid, although the introduction of six years of primary education should be gradual. The Government should take measures to avoid a sharp peak in junior secondary school enrollment in the mid-1980s. Curricula appear outdated and the government should be advised to review and revise them prior to executing a large program in teacher training, and textbooks and equipment production. The quality of school buildings should be improved.	3
IV. Teacher quality.	(a) The Government proposes programs in preservice and in-service teacher training. (b) Pilot projects, general staff and facility improvements.	It is necessary to reduce the high percentage of unqualified teachers in primary and secondary schools. This should primarily be done through in-service programs. Demand for new teachers could be reduced if the Government applied international LDC standards for student/teacher ratios. Teacher training should continue to use TV universities and other "nonformal" programs. Pre-service and in-service teacher training institutions should merge.	3
V. Efficiency.	No government plans.	The Government should be advised to improve the efficiency and cost effectiveness of education in China through: (a) increased staff utilization; (b) increased space utilization; (c) introduction of school location planning; (d) systematic use of education evaluation; and (e) improved collection and utilization of education statistics.	
VI. Education funding.	The Government expects education funding to increase nationwide during the 1980s (but not necessarily from central government sources).	The Government should be advised that education in China could be expanded and improved without expenditures going beyond the average range for developing countries (measured as a percentage of GNP).	

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