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CHINA

Socialist Economic Development

Volume III
The Social Sectors
Population, Health, Nutrition, and Education

CHINA
Socialist Economic Development

Volume I
The Economy, Statistical System, and Basic Data

Volume II
The Economic Sectors
Agriculture, Industry, Energy, Transport,
and External Trade and Finance

Volume III
The Social Sectors
Population, Health, Nutrition, and 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

PRINCIPAL ABBREVIATIONS

BOC	-	Bank of China
CAAC	-	Civil Aviation Administration of China
MOA	-	Ministry of Agriculture
MOC	-	Ministry of Communications
MOE	-	Ministry of Education
MOF	-	Ministry of Finance
MOFT	-	Ministry of Foreign Trade
MOPH	-	Ministry of Public Health
MOR	-	Ministry of Railways
NMP	-	net material product
SCCC	-	State Capital Construction Commission
SEC	-	State Economic Commission
SPC	-	State Planning Commission
SSB	-	State Statistical Bureau

FISCAL YEAR

January 1 - December 31

TRANSLITERATION

The Pinyin system is used in this report.

Preface

This report is based on the findings of an economic mission comprising several teams, which visited China for periods of 4-5 weeks between October and December, 1980. The mission was led by Parvez Hasan (mission chief) and Edwin R. Lim (deputy mission chief), and also consisted of Ramesh Chander (statistics), Mats G. Hultin (education), Dean Jamison (population, health and nutrition), Adrian Wood (principal economist), Shu-Chin Yang (foreign trade), S. Josephine Woo (research assistant), Helen Kung (mission secretary), and the following teams:

Agriculture: David J. Turnham (team leader), Theodore J. Goering (agricultural economist), Wen-poh Ting (agriculturalist), and Henri Boumendil (irrigation engineer - consultant);

Energy: Bernard Chadenet (team leader - consultant), Darrel G. Fallen-Bailey (energy resources and technology), David P. Hughart (energy economist), Kuo-Chang Ling (power engineer), and Vatsal P. Thakor (power engineer);

Industry: Donald B. Keesing (team leader), Magdi Iskander (industrial economist), and H. Geoffrey Hilton (industrial engineer);

Transport: Vincent W. Hogg (team leader), Jacques Yenny (transport economist), Ernst G. Frankel (port specialist - consultant), Paul Banner (railway specialist - consultant), and Clell G. Harral (highway specialist).

In addition to the mission members, the following also participated in the preparation of the report: Nancy Birdsall was the co-author of Annex H (Population, Health and Nutrition); Sulekha Patel, Suan Ying, and Janson Chang assisted the mission members in research; Linda Mitchell edited the report; and Dianne Esson was responsible for its processing.

Hollis B. Chenery (Vice President, Development Policy) and Caio Koch-Weser (Chief, China Division) participated in the final two weeks of the mission.

During its stay, the mission was hosted by the following organizations in the Chinese Government: the Ministry of Finance, which coordinated the mission's overall activities; the State Planning Commission and the State Statistical Bureau, which worked mostly with the general economic team; the Ministry of Agriculture, with the agriculture team; the Ministries of Communications and Railways, with the transport team; the Ministry of Education, with the education team; the State Economic Commission, with the industry team; and the Ministries of Electric Power and Coal, with the energy team. In addition to the many officials of these ministries who worked closely with the mission during the two months, the following Chinese economists worked with the various teams: Zhu Rongji (State Economic Commission), Xing Guang (Ministry of Finance), Zheng Li (State Planning Commission), Zhao Renwei (Economic Institute, Academy of Social Sciences), Zhu Fulin (Ministry of Finance), Chen Lian (Agriculture Institute, Academy of Social Sciences), Hong Huiru (Industry Institute, Academy of Social Sciences), Gong Shaowen (Ministry of Agriculture),

He Enlin (Ministry of Railways), Luo Yunqin (Ministry of Communications), Cao Weigong (Ministry of Electric Power), and Gao Huan (Ministry of Education). Xing Guang, Zhao Renwei, Zheng Li and Zhu Fulin also prepared brief background papers for the general economic team. This list is far from exhaustive; the mission teams were also assisted by many others who are not mentioned above, including officials at the government agencies and institutions that the teams visited on field trips.

The mission teams travelled extensively outside Beijing. During the two months, the various teams visited two other municipalities, Shanghai and Tianjin, and seventeen provinces - Fujian, Gansu, Guangdong, Guizhou, Hebei, Heilongjiang, Henan, Hubei, Hunan, Jiangsu, Liaoning, Shaanxi, Shandong, Shanxi, Sichuan, Xinjiang, and Zhejiang.

To prepare for its work in the field, the mission commissioned a number of background papers on China's economy to be written by foreign scholars, including: Randolph Barker, Cornell University (agricultural development); Wlodzimierz Brus, Oxford University (socialist planning); P.C. Chen, Wayne State University (population and health); Mark Elvin, Oxford University (historical background); Shigeru Ishikawa, Hitotsubashi University (macroeconomic issues); Nicholas Lardy, Yale University (agricultural planning); Dwight Perkins, Harvard University (rural development); Thomas G. Rawski, Toronto University (industrial development); Ashwani Saith, Oxford University (brigade enterprises); Peter Schran, University of Illinois (agricultural statistics and prices); and Christine Wong, Mount Holyoke College (small-scale industries). These papers were generally completed during the summer of 1980 and were discussed with the authors prior to the mission's departure for China.

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This report was first issued on June 1, 1981. It was reprinted on March 10, 1982, at which time changes were made in a few places, mainly to correct factual and statistical information. The present printing is the first to be released for public distribution.

Annex H

Population, Health, and Nutrition

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SUMMARY AND MAIN ISSUES

1. China has achieved remarkably low death rates for its income level, yet it has nonetheless managed to reduce birth rates sufficiently so that its population growth rate is among the lowest in the developing world. This Annex provides a descriptive account of China's success in reducing its population growth rate and in improving its citizens' health. This summary begins by reviewing the Annex's treatment of health and nutrition, then population; it concludes with an overview of the main issues.

Health and Nutrition

2. The determinants of health - as measured by illness as well as death rates - are much broader than is sometimes supposed. One determinant is people's consumption of certain goods and services, including food, housing, fuel, soap and water, as well as medical care. Another is the health environment - climate, standards of public sanitation, and the prevalence of communicable diseases. A third is people's understanding of nutrition, health and hygiene.

3. Chinese health policies reflect an unusually good and early grasp of these determinants, in combination with a strong commitment to improve the health of the mass of the people under tight financial constraints. Raising incomes and expanding basic education have in this sense both been part of the drive for better health, as has been food distribution policy.

4. In the area of health care narrowly defined, Chinese policy has had three distinctive features. One is a very strong emphasis on preventive measures and on improving the health environment - by vaccination and infectious disease vector control, and by strict enforcement of elementary aspects of private and public sanitation. An important aspect of the preventive emphasis has been a strong 'vertical' organization, with central authorities responsible for campaigns against specific diseases, combined with effective use of the clinical services in support of preventive measures. A second has been very wide diffusion of basic curative care - most notably the barefoot doctors at the team and brigade level - backed up by referral of difficult cases to better equipped and trained personnel at commune health centers and county hospitals. Corresponding arrangements exist in urban areas. A third has been continued reliance on traditional Chinese medicine - personnel and drugs.

5. There are only 2,458 people per (fully qualified Western) doctor in China, as compared with 9,900 in other low-income countries and about 4,310 in middle-income countries. The ratio of population to other medical personnel (including nurses and doctors of Chinese medicine) is even more favorable - 892 excluding barefoot doctors and 365 including them, as compared with 8,790 in other low-income countries and 1,860 in middle-income countries.

6. In part because the pay of most medical personnel is very low by international standards, this has been achieved at an estimated total annual cost of under $7 per capita, of which $4 is public expenditure. Almost two thirds of expenditures are for drugs. By the standards of low-income developing countries, the level of public expenditure is high - it compares with $2 in India and $1 in Indonesia. But in other low-income countries, large sections of the population, and in particular the rural poor, have little or no access to health care, whereas in China coverage of some sort is virtually universal - a situation found usually only in countries rich enough to spend many times as much per capita on health.

7. It is not possible to disentangle the relative contribution of the health care system from that of the other factors mentioned, but there can be little doubt that it has played an important part in the tremendous improvements in health that have occurred since the revolution. Life expectancy (which is determined mainly by infant and child mortality rates) is estimated to have risen from 36 years to 64 years over the past three decades. The incidence of disabling as well as killing diseases such as schistosomiasis, malaria, tuberculosis, trachoma, plague and cholera has been drastically reduced. Case fatality rates have also fallen sharply - in measles, from 6.46% in 1950 to 0.66% in 1979.

8. Progress of this sort has also been made in other developing countries - even the low-income ones, where life expectancy is estimated to have risen from 35 years in 1950 to about 50 years in 1978. But the advance has been much faster in China (a gain of 28 years in life expectancy, as compared with an average of 15), and thus the level of life expectancy in China at the present time is well above the average not only for low-income but also for middle-income countries (61 years). Indeed, China's life expectancy is some 16 years greater than would be expected (on the basis of cross-country comparisons) in a country at its income level.

9. Nonetheless, although gains have been impressive, available data indicate that in poorer provinces of China life expectancy is 10 to 13 years less than in Shanghai. Furthermore, data on causes of death indicate that while China's pattern is beginning to look more like that of a high-income country (with cancer and circulatory diseases increasingly important), many millions still die of the more easily preventable diseases of low-income countries.

10. Little of China's gains can be attributed to climatic differences between China (which is half-temperate) and other low-income countries (which are nearly all tropical): cold is a hazard to health, especially among children; China's life expectancy in 1950 appears similar to that of other low-income countries; and life expectancy today in nontropical low-income countries such as Nepal and Afghanistan is well below the low-income average. Instead, on the basis of evidence from other developing countries, the main contributors to China's superior performance are probably fourfold. First, the food rationing system has almost eliminated acute malnutrition, which

appears to contribute to between one third and two thirds of all child deaths in other developing countries. Second, near-universal basic curative and preventive health care has greatly reduced the incidence and fatality rates of common respiratory and diarrheal diseases - which remain major killers in other developing countries (as well as in poorer parts of China). Third, widespread primary education, especially of women, has contributed to improved nutrition and health practices in child-rearing. Finally, lower fertility rates create conditions conducive to the health of mothers and children, and China's population policies have thus had important health benefits./1

11. Within China, despite the near universality of basic coverage, health and health care facilities are unequally distributed. Urban areas are better provided for than rural areas. Similarly, within rural areas, the quality of health care provided at the commune and subcommune levels varies according to income, with some of the poorest brigades and teams having reportedly cut back their provision of services in recent years. These variations are smaller than in most other developing countries, but they are nonetheless a cause for concern.

12. Average food consumption in China at the present time compares well with other developing countries. Food energy consumption, at 2,441 calories per person per day and 103% of estimated requirements, is above that of India and the average for all low-income countries (both around 2,000 calories and 91%), and not far below the average for middle-income countries (2,600 calories and 108%). The 1979 level represents a substantial improvement from the 1957 level of approximately 2,020 calories; almost all this improvement has taken place subsequent to 1977 due to sharp increases in food production. Protein availability per person is also above that of many low-income countries, though below that of such middle-income countries as Korea and Mexico. The evidence suggests, however, that the Chinese diet contains an unusually low proportion of meat and fats.

13. But as research on nutrition has increasingly made clear, the extent of malnutrition in a country is only weakly related to its average food consumption. Of far greater importance is the way in which food is distributed, and in particular the relative consumption levels of lower income groups. In this regard, China is way ahead of all but a tiny handful of developing countries - either low-income or middle-income.

14. In urban areas, staple foods have consistently been rationed in the usual way with monthly entitlements that vary with age, sex, and occupation, but which appear to provide for an adequate (though spartan) level of consumption. These have to be purchased, but prices have been such in relation to incomes that the great majority of households (and by now virtually all of them) have been able to afford their full allotment.

/1 For further discussion of the issues in this paragraph, see World Development Report 1980, pages 53-57.

15. In rural areas, the Government has guaranteed to sell enough grain to households to make up any gap between the amount of grain distributed as income in kind by their teams and a floor level of 200 kg (of unprocessed grain) per person per year in rice-growing areas and 150 kg in other areas. Again, this ration has to be purchased, but loans and social relief grants are made available where necessary. Rural meat rations, however, are only a quarter to a half of those in urban areas. The floor level, it should be emphasized, is low - equivalent to about 1,400 calories per day for the rice ration and several hundred calories less than that for the mixed grain ration. But it is almost invariably supplemented by food grown on private plots or purchased with money income from collective or private activities (though until recently grain could not be privately traded).

16. Detailed data on the distribution of food intake per person are unavailable. But two sorts of evidence strongly suggest that the Chinese system has, as mentioned earlier, virtually eliminated the acute malnutrition that is common in many developing countries (and that unquestionably contributes to early death, ill health and other physical suffering, and mental retardation). One is the high level of life expectancy mentioned earlier, which is associated with an infant mortality rate of 56 per thousand (as compared with 100-200 in other low-income countries).

17. The second sort of evidence concerns the height and weight of school children. Although anthropometric data of this kind are generally biased by lower school attendance among malnourished children, enrollment rates are very high in China. It is thus significant that in the rural and urban schools surveyed, there appeared to be almost no acute malnutrition, as measured by abnormally low weight for height (known as "wasting"). It is also significant that the proportion of children who are chronically malnourished (as measured by abnormally low height for their age, known as "stunting") even in rural schools in the very poor province of Gansu is below that of Asian countries at comparable income levels.

18. However, the anthropometric data do indicate that a substantial proportion of Chinese children are stunted, and that there are major differences in this regard between poorer and richer parts of the country. Among children aged 3-10, only 5% are stunted in urban areas (less than 2% in Beijing), and this proportion appears to have declined substantially since 1958; but in rural areas, the proportion is anything from 20% to 35%, with the highest proportions in the areas with the lowest personal incomes. (The trend of rural malnutrition over time is not known, although the necessary data were collected in 1959.) The adverse effects of low height - by the standards of rich countries - on mental development and other aspects of personal well being are incompletely documented. But the same Chinese data indicate that it

slows individual children's progress in school. The Chinese Government, moreover, has recently expressed concern about malnutrition in rural areas./1

Population

19. No account of either growth or poverty in China can overlook the near-doubling of population since 1949 (when it was already over 500 million). By the end of 1980 China's population (excluding Taiwan) was 982.6 million. As in other developing countries, the death rate has fallen rapidly. But the crude birth rate, after declining in the 1950s, rose to a peak of 43.6 per thousand in the mid-1960s, when population was growing at a rate above 3% a year. Over the whole period 1949-79, the average annual population growth has been a little under 2%, similar to other developing countries. Since 1965, however, the birth rate has almost halved - a decline faster than that recorded in any other country. As a result, and despite a remarkably low death rate, population growth (1.19% in 1980) is now extremely slow by developing country standards though above that of industrialized countries. The Chinese plan is to reduce the growth rate still further with the goal of limiting total population to 1.2 billion in the year 2000. While this objective may be overly hopeful, past success in fertility limitation suggests that it is not unreasonable to expect the Chinese to come close to that goal./2

20. The official estimates for birth and death rates and for population growth show slight inconsistencies,/3 but even if birth and death rates are adjusted upwards to eliminate the inconsistency to 21.1 and 7.8 per thousand respectively in 1979, they are both very low by comparison with other developing countries. The contrast is particularly striking when income is taken into account. In general, the birth rate tends to be lower, the higher a country's per capita GNP - the lowest rates being in the industrialized countries, the highest in the poor countries of sub-Saharan Africa and the Indian subcontinent. China's birth rate, however, is less than half what would be expected in a country of its income level; it would appear normal in a country with several times China's income.

/1 Micronutrient deficiencies appear less serious in China than in many other low-income countries. But mild anemia (caused partly by inadequate iron in the diet, partly by hookworm infestation) is widespread. Rickets, goiter and Keshan disease (caused respectively by vitamin D, iodine and selenium deficiencies) also affect significant proportions of the population, and have been the subject of government campaigns and research.

/2 In late 1979 the goal of population policy had been to achieve a zero population growth rate by 2000; this goal, which is much more ambitious than limiting the population total to 1.2 billion, appears to have been put aside.

/3 The quality of demographic data available concerning China is improving, however, and a census currently scheduled in July 1982 should greatly improve the core data base.

21. One reason for China's unusually low birth rate is its unusually low death rate, and in particular the low rate of infant mortality, which reduces the number of children that a mother needs to bear in order to attain any given desired family size. Another reason is the unusually high proportion of people - and especially women - with at least some primary education, which has been shown by research in other countries to alter attitudes concerning family size and the use of modern contraceptives. But these factors cannot account for the speed with which fertility has recently declined in China; nor are they sufficient to explain the low level it has reached. An important additional cause is the Government's birth planning policy.

22. In this regard, as in others, there have been various changes in direction. In 1956, following the 1953 census, the Government announced a policy of promoting late marriage and birth limitation, but this was soon replaced by ideological polemics against population control during the Great Leap Forward, which started in 1958. Although attempts were made to reintroduce the birth planning program during the 1960s, it was not until the end of the decade that the program was resumed, expanded and intensified.

23. Since the early 1970s, however, China has had one of the world's most active and effective fertility reduction programs. Contraceptives are universally available and free, as are abortion and sterilization. There has been a successful effort to raise the age of marriage. Study groups in communes and brigades (and at analogous levels in urban areas) set birth quotas and allocate births to couples in a particular order. And since 1979, there has been a campaign to promote the one-child family.

24. The program owes its effectiveness partly to the commitment with which it has been pursued by officials at all levels, but also to two sorts of incentives and disincentives. The first is economic - paid vacations or work points for undergoing planned birth operations since the early 1970s, and more recently, in some provinces, financial allowances and priority in education, employment and housing for couples who pledge to have only one child, combined with financial penalties for those who have more than two children. The second is social: intense efforts are made to influence couples to conform with the birth planning policy, both through the media and (more important) through discussions between couples, local officials charged with implementing the policy and other local people.

25. As in most other developing countries, there are as yet comparatively few old people in China - about 5% of the population is over 65, by comparison with 16% in Sweden. The proportion of the population under 15 (about 35%) is likewise much greater than in the industrialized countries (typically around 25%); but, due largely to the decline in fertility in the 1970s, it is at the low end of the developing country spectrum. As a result, the ratio of population of working age to total population - an important influence on per capita income - is about 60% in China, as compared with 56% in India, 51% in Mexico, and 66% in the USA. Of those of working age,

moreover, some two thirds are actually working - a high proportion by international standards, and one that has risen significantly in the past three decades.

26. Official estimates put the urban population share at 13% in 1979 - very similar to the proportion in 1953, and much lower than the proportions in other developing countries (India, 22%; Indonesia, 20%; all low-income countries, 21%; all middle-income countries, 51%). The low growth and low current share of urban population in China may be to some degree attributable to a current definition of "urban" that is somewhat different from that of most other countries and that used in China in the 1950s. But they undoubtedly also reflect the policy of "industrialization without urbanization" pursued fairly consistently since about 1957. Communes and brigades have been encouraged to establish industries of all kinds in rural areas (which currently account for about 10% of total industrial production); and migration to urban areas has been restricted by the Government.

27. Migration policy has in fact varied over time. During the Great Leap Forward (1958-60), large numbers of rural people were encouraged to come to work in urban industry, but returned to the countryside during the subsequent economic difficulties. Restrictions on migration were then tightened, and indeed during the period of the Cultural Revolution (1966-76) several million urban people (especially the young and the politically discredited) were sent into the countryside, though there was also movement in the opposite direction. Since 1977, however, most of those sent to rural areas have returned, and it remains difficult for rural people to leave their communes with the exception of the few who manage to obtain a university or technical secondary education, or who were able to find employment outside their communes (usually in coal mines or the army).

28. Less is known about migration between rural areas, although it too has been regulated by the Government. There appears, however, to have been no major change in the geographical distribution of population: as in 1949, about 95% of the population lives in the eastern half of the country.

Issues: Health and Nutrition

29. Health. Several important classes of decisions face the Chinese leadership concerning health policy. These include: How rapidly (and where) should they expand hospital facilities, and how should they equip (or re-equip) new and existing facilities? How much should inequality in the provision of health services be reduced? What types of training (pre- and in-service) should be provided to health care practitioners? What pharmaceuticals should be produced, how should they be priced, and who should control their use? (Decisions concerning pharmaceuticals are of particular importance given the very high proportion of total medical expenditure that they account for.) How rapidly should the preventive facilities of the anti-epidemic stations be refurbished (in the aftermath of the Cultural Revolution), and what should be their primary tasks in light of changing patterns of

disease and death? How much assistance should the state provide for medical care in poor areas, and how much of that should be through the health services directly and how much through other measures such as improving water supplies and nutrition levels? What type of data collection and applied research will contribute most to the evolution of China's health care policies?

30. The answers to these and other questions will shape the direction of China's health sector investments in the coming decade, and this Annex, based as it is on a brief review of the sector, can only suggest insights into some of the answers. An important observation, however, is that the appropriate answers to the specific policy questions are highly interrelated and that they should flow from a general sense of health sector strategy. What, then, are the strategic options? Four can be considered: consolidation of existing services, extension of geographical equity, improvement of high-level clinical services, and preventive measures directed toward cancer, circulatory, and pollution-caused diseases.

31. The consolidation strategy would be one of neither expanding the scope nor changing the broad direction of health services; within existing budget constraints, increases in efficiency would be sought. An important aspect of a consolidation strategy is the objective of ensuring that, where progress has already been substantial, achievements are not allowed to erode. This will require continued vigilance and commitment to strong preventive measures and frequent retraining of health workers, especially primary health workers such as the barefoot doctors.

32. The geographical equity strategy would seek both to finance and to provide the material resources required to bring poorer regions of the country up to health levels now found in richer ones. Limited available data imply that a substantial fraction of the population retains disease and mortality patterns much closer to those of typical low-income countries than to the better-off parts of China. Primary health care policies that have proved highly cost-effective already in China would likely continue to succeed if they were more intensively extended geographically.

33. A strategy of improving clinical services would seek to provide improved curative care for the increasingly frequently seen diseases of high-income countries, such as cancer and circulatory disease. Physicians and facilities for handling those diseases are in short supply in China, and demand for them will steadily increase. Treatment of cancer and circulatory diseases, however, is relatively expensive - requiring fully trained physicians and costly drugs and equipment - and relatively ineffective in terms of prolongation of life.

34. A final strategy is that of improving public preventive measures against the diseases increasingly prevalent in high-income areas. Some such measures involve campaigns for improved diet, exercise, and smoking habits; others might be politically unpopular (e.g., punitive taxes on cigarettes); still others, like pollution control on factories, can be very costly indeed.

35. Clearly, the last three of these strategies can be simultaneously pursued, and elements of current government policy point in each direction. Nonetheless, in a very real sense the strategies are competitors: resources expended on one are unavailable for others. Choices must be made, not only in broad matters of resource allocation, but in specific decisions about facilities, equipment, training, and research. The requirements for pharmaceuticals, training, and research, for example, implied by a strategy of geographical equity differ substantially from those for, say, a strategy of improving clinical services. It is for that reason that broad decisions of strategy should precede and inform specific resource commitments.

36. In evaluating alternative strategies, the Government should not be too quickly or comprehensively seduced by the appeal of Western medical equipment and technology. Precisely because emotional arguments for the best in medical equipment are always compelling, it is desirable to be very hard-headed in evaluating particular proposals. Greater gains in health and life expectancy are likely to result from investments in consolidating the existing system and in geographical equity than from investments of the same amount in costly technology.

37. Nutrition. As in health, the most important advances have already been made, and acute malnutrition is probably rare. Some disorders due to micronutrient deficiencies remain, whose treatment is often very cost-effective, but here also the Government has been active. The outstanding problem is thus widespread moderate retardation of growth (as measured by low height-for-age), especially in the poorer rural areas. This could result from inadequate diet, from frequent childhood disease or from high energy requirements needed to support physical activity in rural areas. At present, however, not enough is known about either the causes or the consequences of moderate malnutrition in China.

38. As regards the causes, the problem is partly one of food distribution - some people having to live on or close to the low state-guaranteed minimum grain supply because their cash income or private production provides an insufficient supplement. Thus part of the solution might lie in raising the guaranteed minimum, while making eligibility to purchase grain from the state contingent on the level of private as well as collective food production. In addition, it would be desirable to increase grants and loans for food purchase, as well as making more general efforts to raise the earning power of the rural poor. Likewise, to the extent that slow growth results from high prevalence of disease, particularly diarrheal disease, strengthening of rural health services could be important.

39. The fact that moderate growth failure is widespread in some rural areas, however, may also be in part due to the composition of the local diet, and in particular to low intakes of oils and fats (concentrated sources of calories) and high-quality protein. Insofar as this is the case, efforts could be made to target quality foods to children during what appear

to be the vulnerable preschool and early school years. Special low-cost rations of such foods for the child might be a highly desirable incentive to include in the incentive package for the one-child family.

40. As regards the consequences of moderate malnutrition, there is some (including Chinese) evidence that it hinders mental development, as well as reducing physical strength, but not enough evidence to permit general benefit-cost analysis of programs to combat it. In particular, no satisfactory answer can at present be given to the question, "How much might it be worth spending to make the average Chinese (or Indian or Indonesian) reach the genetically determined potential of his growth in height?"

41. At the least, however, further efforts to attack the distributional and health causes of malnutrition have a relatively strong claim on government resources. It should be stressed, however, that little is known at present about the extent and causes of malnutrition in China, nor about its detailed geographical pattern, and applied research on these subjects can be an invaluable guide to policy. In this connection, the nationwide dietary survey scheduled for 1982 could provide an extremely useful data base.

Issues: Population

42. The World Bank's "intermediate" projection of the Chinese population is based on a 1979 estimate of 2.75 for the total fertility rate (i.e. the expected number of children a woman will bear during the course of her child-bearing years), and on the assumption that fertility will decline to replacement level between the years 2000 and 2005. (Even if fertility declines to the replacement level, however, the population would continue growing for many years because of the disproportionate number of women entering childbearing age.) Under these assumptions the Bank's intermediate projection is of a population total of 1.24 billion in the year 2000 - only slightly above the Chinese goal of 1.2 billion. For the Chinese to reach their goal, however, simulations suggest that much more substantial fertility declines between 1980 and 2000 will be required than are assumed in the Bank's intermediate projection; the total fertility rate would need to decline to 1.6 rather than 2.2. The more rapid fertility decline implicit in attainment of the Chinese goal has important implications for the size of the labor force and school age population after the year 2000, but the effects are small before then. Even reducing the total fertility rate to 2.2 by the year 2000 will, however, take a sustained, substantial effort and at least moderate success in implementing the one-child family policy. Policies concerning fertility limitation are thus of high importance.

43. The central question is whether and at what cost the goal of lower fertility over an extended period of time can be attained. Three aspects of this question are pertinent. First, even with economic incentives, will rural parents restrict fertility further - to one child - without alternative guarantees of support in old age? And what sort of guarantees would be credible to parents? Second, will the poorer provinces be able to finance a system of financial incentives to discourage births? And third, will efforts

to increase productive efficiency - e.g. by removing restrictions on labor migration - weaken the tightly-knit system of community pressure, reinforced by common awareness of local land scarcity, that now backs up the goals of birth planning?

44. Though for society as a whole, the increase in the support burden represented by the elderly is not unmanageable, parents today are likely to seek a guarantee of security in old age that is closer to home. In this respect, it is important to distinguish between urban and rural areas in terms of the incentives for having large families. Only for the 10 to 15% of the population working in urban areas is there presently a system of employer-provided social security. In rural areas there is no such system, except in a few well-off communes. In peasant societies, children have always been the best insurance against both near-term difficulties as well as long-term needs. This is surely still the case throughout most of rural China, where not only is there no regular system of old-age security, but no formal system of sick leave. Large families can spread the risks of sickness, poor agricultural harvests (if some members can work in nonagricultural jobs, or work in other communities) and other work interruptions. This is particularly the case in poor communities; the poorer the group as a whole, the less can any individual count on communal beneficence in bad times.

45. Moreover, the security children provide to parents in old age does not come at a high current monetary cost, at least to rural parents. At about age 11 many children begin earning workpoints, at about 50% the adult rate, and at about age 12 they are counted as adults in the allocation among households of food rations.

46. The problem is exacerbated by the continuing disparity, in terms of future support, in the value of sons and daughters. Despite efforts of the Government to raise the status of women, and to exhort parents to value daughters as much as sons (e.g. "women hold up one-half of the sky"), the reality is still that sons provide a better guarantee of future support. A survey of one-child households in Anhui province indicated that of one thousand children of holders of one-child certificates (indicating they have pledged to have no more children), 607 were male and 393 female, indicating the importance to parents of having a son./1 (Such a result also raises the difficult issue of the long-run effect of giving priority, in education and employment, to only children, should it turn out that a high proportion of only children are males.) Preference for a son, particularly if there is to be only one child, is not surprising. Marriage in most of rural China is still patrilocal, i.e. women at marriage move to their husband's village; under these circumstances, parents cannot anticipate that daughters will be able to provide financial, or even emotional support. Females in rural areas reportedly receive only about two thirds of the number work points that men

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/1 "A Survey of Single-Child Families", Anhui Population, Population Research Office, Anhui University, no date.

receive for the same time worked; and women are reportedly much less likely than men to receive the prized nonagricultural jobs in commune enterprises. Women, by necessity and by government encouragement, now work extensively in agriculture, but because agricultural work is the least well paid, women's income remains lower than men's in rural areas. In addition, because agricultural work is relatively easily combined with child rearing - in part because it is easy to work less than full-time and in part because the work is close to home - such work is probably not a disincentive to having many children.

47. Two policy questions thus are: Should the Central Government encourage the establishment in rural areas of more formal systems of old-age support, and help finance them? And should the Government consider imposing on production teams in rural areas regulations to guarantee equal pay for equal work to women and men, and equal access for women to nonagricultural jobs?

48. If further reductions in rural fertility are to be encouraged by a system of locally-financed incentives, problems of cost raise the question of whether poorer areas, where fertility is systematically higher, will be able to finance such incentives. Calculations indicate that at the national level, even if all women who enter childbearing years between now and the year 2000 had only one child, the cost of providing a wage or workpoint subsidy of between 5 and 10% would be less than 1% of estimated 1980 GNP./1 But if such subsidies are completely financed locally, the burden in poorer areas will be relatively greater. The issue is how much local areas can afford and whether, without support from the center, financial incentives can be implemented in the areas where they are most needed to discourage births. The financing of incentives seems a particularly pressing issue, given that even what is viewed as acceptable pressure to keep births down has been used as much as possible already at the local level. (There are scattered reports of "excesses" and coercion in implementing birth planning goals; and there are recent discussions in public sources of the problem that statistics, including those on births, have occasionally been falsified by local party officials.)/2

49. One factor that may have encouraged smaller family size, or at least provided a rationale for a community goal of reducing family size, is pressure on land. With migration to urban areas severely restricted, the implications of high fertility are obvious, both for the family of many children, among whom private land plots must be divided, and for the community of many neighbors' children, who will need to be absorbed into the community workforce, further reducing the marginal product of labor. This is in

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/1 See Appendix Table A.19 for examples of incentive systems now in place.

/2 For example, see Sun Yefang, "Consolidate Statistics Work, Reform the Statistics System," Jingji Guanli No. 2, February 15, 1981 (quoted in Foreign Broadcast Information Service, March 26, 1981).

contrast to the situation in most poor countries where parents may believe that additional children increase the probability that at least one will obtain regular work in an urban area, a windfall that could enable that one to support the rest. A loosening of the policy of restricted migration - which may follow if there is more investment in light industry, in textiles and in manufactured goods for export - would of course reduce the importance of this one incentive for fewer births in rural areas. Though migrants to urban areas would presumably adopt the lower fertility of urban residents, only extremely large migrant flows would change the proportion of the population becoming urban enough to offset any increases in rural fertility.

50. In addition to the above three direct policy issues relevant to birth planning, there are two related points that should be considered. The first is that adequate medical technology is required for IUDs, sterilizations, and abortions, and that strengthening the medical system in areas now poorly served is probably important to continuing fertility reduction. This is an important factor in considering the merits of the "geographical equity" strategy for continued health sector investment. The second point concerns the importance of improved data collection and applied research; with further fertility reductions likely to be increasingly difficult, it will be important both to have the data with which to assess progress and the research tools for identifying the most cost-effective interventions.

1. INTRODUCTION

1.01 This Annex deals with China's policies, and its considerable achievements, in two areas of human development. One concerns the size of the population, its growth rate, and its geographical distribution. The second concerns the population's physical well-being, its health and nutrition. A third major area of human development - education and training - is treated separately in Annex I. China's post-revolution leadership has consistently placed high value on improving health and nutrition standards, though the relative emphasis on preventive and curative and rural and urban services has changed with time. Policy objectives toward population limitation evolved more slowly but are now well-established.

1.02 In consequence of the policies it has followed, China has achieved remarkably low death rates for its income level, yet it has nonetheless managed to reduce birth rates sufficiently so that its population growth rate is among the lowest in the developing world. This Annex describes and attempts to account for China's success in reducing population growth and in improving its citizens' health. It begins with health, discussing declines in mortality, morbidity and malnutrition, and the circumstances and policies that led to those declines. It then turns to discussion of the size and growth of the population and the factors that have led to China's remarkable decline in fertility. Despite these successes, however, important problems and issues remain; these are discussed in the preceding summary section.

1.03 Analyses of progress in health and population are necessarily based both on epidemiological and demographic data and on complementary data concerning the resources, utilization, and distribution of health and birth planning services. The pages that follow are based on available data, including relevant data assembled by the mission, but it is important to note at the outset that important data gaps exist and available data are of uneven (and often unknown) quality. A particularly critical data gap is the virtually complete absence of information on morbidity, infant mortality, and life expectancy in poor regions; the absence of such data can lead to underestimation of the magnitude of remaining problems. The quantity and quality of data available to outside analysts is nonetheless improving rapidly, though the Cultural Revolution period has left enduring limitations on the data gathering and analytic capacities of all parts of the Chinese Government; these problems, and the operation of the statistical system in general, are discussed in Annex A.

2. HEALTH AND NUTRITION

2.01 This section begins by reviewing evidence on current mortality, morbidity, and nutrition levels in China and how they have evolved in the past 30 years. It then turns to discussion of the reasons for this progress - in terms both of health sector policy and of the changes in other aspects of the environment that affect health. It closes with a brief description of the institutions in China for health services delivery and an assessment of their costs.

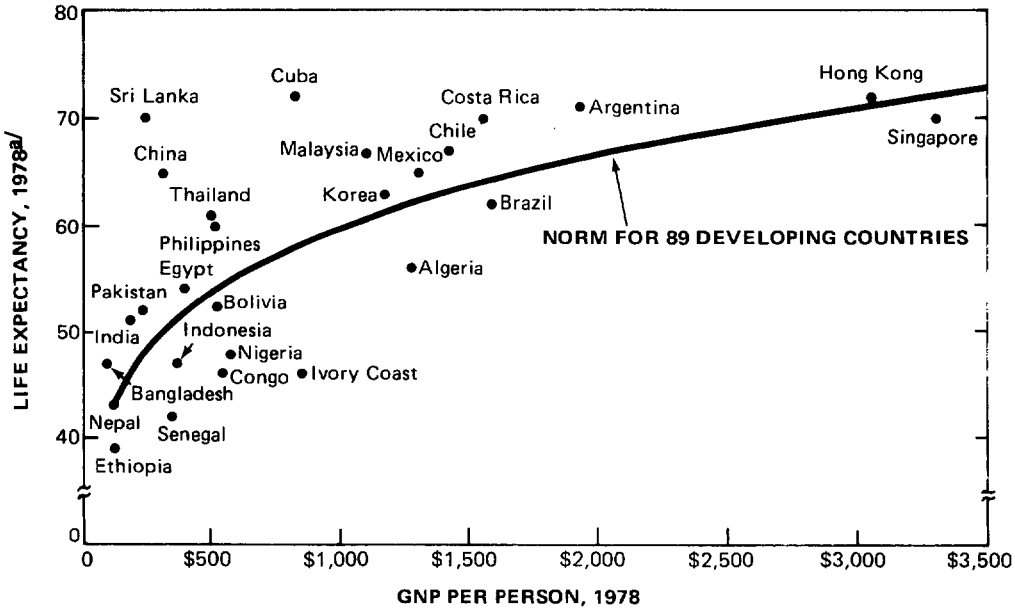
A. Post-Revolution Achievements and Current Status

2.02 Mortality. Figure 1 illustrates China's success in improving its population's health with a comparison of life expectancy there with the norm for other low income countries. Life expectancy is perhaps the best single indicator of a country's health status,/1 and the dramatic declines in death rate that followed the revolution of 1949 have pushed China's life expectancy to a level that would be expected of a country with several times its per capita income. China's estimated life expectancy of 64 years/2 far exceeds the 50-year average of other low-income countries and is even noticeably better than the 61-year average for middle-income countries. There is, however, substantial variation in estimated life expectancy across provinces - from 59 years in the mid-1970s in Guizhou to 72 in Shanghai municipality (Appendix Table A.11) - and in the provinces with lower life expectancies continued reduction in mortality rates remains an important health goal. Elsewhere the currently high levels of life expectancy suggest the difficulty of substantial further improvements; future health gains are likely to come at higher cost, and to emphasize reductions in morbidity and improvements in nutrition more than reductions in mortality.

/1 Figure 1 is based on life expectancy rather than death rates. Crude death and birth rates (that is, the number of births and deaths per thousand population per year) only partially reflect individual levels of mortality and fertility, as each is affected by the age distribution of the population. For any given level of life expectancy, crude death rates are higher the greater the proportion of old people in the population. The life expectancy measure is purged of these age distribution effects, but of course it is less closely linked to the overall rate of population growth than are the crude death and birth rate measures.

/2 The official life expectancy reported for 1979 is 68.2 years. See Table 2.2, footnote a.

Figure 1: LIFE EXPECTANCY IN RELATION TO INCOME: DEVELOPING COUNTRIES, 1978



a/ Life expectancy at birth is the average number of years a newborn could be expected to live if current mortality conditions were to continue throughout his or her lifetime.

Source: Updated from Nancy Birdsall, Population and Poverty in Developing Countries, World Bank Staff Working Paper No. 404 (Washington, DC: 1980) Figure 1—3B (reproduced from Population Bulletin 35:5, Washington DC, Population Reference Bureau, December 1980). See Appendix B of Staff Working Paper for an explanation of the procedure used to derive the line shown. China and Cuba are not included in the estimation of this line, but their locations on this figure do indicate their life expectancy and GNP per person.

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2.03 Table 2.1 documents the increases over time in life expectancy in China, and the accompanying decreases in crude death rates. Outside analysts have made allowances for the probable under-reporting of births and deaths so that outside estimates of the crude death rate are systematically substantially higher than the official Chinese figures. By any account, however, there have been dramatic improvements that were consolidated in the early 1960s, after recovery from the severe agricultural difficulties during the Great Leap Forward. Table 2.2 provides comparisons of China with other low-income countries and shows in more detail than did Figure 1 the extent of China's achievements. It is interesting to note, however, that other centrally-planned economies have also typically placed strong emphasis on health, and that life expectancies in Cuba (72 years) and the Democratic Republic of Korea (63 years), to take two examples, are also high.

2.04 China's patterns of mortality indicate that it is well on its way through what has been labelled the "epidemiological transition," in which mortality from infectious and parasitic diseases is much reduced, and the fraction of deaths due to cancer and circulatory diseases is much increased. Table 2.3 and Figure 2 document the extent to which this has happened for China; they indicate that mortality patterns in China are about midway between those for typical low- and high-income countries.

2.05 Morbidity. Much has been written concerning China's success in reducing the prevalence of important endemic diseases, particularly parasitic and infectious diseases, but relatively little detailed statistical information is available. Table 2.4 provides summary information on progress that has been made on a number of the more important parasitic and infectious diseases./1 Even though the epidemiological evidence is scanty, it is clear from data that are available, including data on mortality, that there has been great progress. Cholera, plague, and venereal disease, for example, were rampant in pre-revolution China; they are now virtually eradicated. Though tuberculosis and schistosomiasis remain major problems, even with these there has been much progress. Nonetheless the apparently high remaining prevalence of ascariasis (roundworm infection), though not of major concern in itself, suggests that much progress remains to be made in hygiene, at least in rural areas.

2.06 Malnutrition. Issues of nutrition can be approached either through examination of food production, processing, distribution, and consumption, or through indicators of a population's nutritional status (distribution of heights and weights, prevalence of specific nutritional disorders). The two approaches are complementary and, taken together, they provide a picture of the nutritional status of a population. The paragraphs below discuss both nutrient availability and available information on nutritional status.

/1 Appendix Tables A.25 and A.26 provide current incidence and case fatality data on the infectious diseases currently found in China.

Table 2.1: ESTIMATES OF DEATH RATES AND LIFE EXPECTANCY IN CHINA, SELECTED YEARS AND PLACES

Nationwide	Crude death rate (per 1,000 population/year)			Life expectancy (in years)		
	World Bank /c	Banister /a	Semi-official /b	World Bank /c	National Cancer Survey /d	Semi-Official
1948/49		35-45	28			36/e
1950		> 30	18			
1957		15-20	10.8			57/a
1961		> 35				
1963		15	10.1			
1970			7.6			
1973-75		8.3-9.3/d			61.7-64.9/d	
1975-78			7.3			68.2/e
1979	7.8		6.2	63.9		64 /f

Specific places	Life expectancy (years)
Farm areas, 1929-31 (22 provinces)	34.8/g
Nanjing, 1935	33.5/g
Manchuria, 1953-55	43.4/g
Ch'ang Ch'un, 1958	61.6/g
Anhui, 1973-75	65.7/h
Guizhou, 1973-75	59.3/h
Heilongjiang, 1973-75	70.4/h
Shanghai, 1979	73.1/e
Beijing, 1979	70.9/e

/a See Chapter 4 of Judith Banister, China's Pattern of Population Growth (Stanford University Press, forthcoming) for these estimates (or references to them) and a discussion of the rationale for them.

/b See Appendix Table A.1, for the sources for these estimates, except for the 1948/49 estimate, which is cited in Banister, note /a above.

/c These figures are for the World Bank's 'intermediate' population projection for China.

/d These estimates of the crude death rate and life expectancy are based on data made available from the National Cancer Survey in China, which is described in "National Survey of Cancer Mortality in China," by Li Bing and Li Junyao, Chinese Journal of Oncology, March 1980. Demographic analyses from these data undertaken by J. Banister and S. Preston ("Mortality in China," Population and Development Review, March 1981) provide a range estimates from 61.7 to 64.4; Yung Shao-De and colleagues provide figures of 63.62 for males and 66.31 for females, yielding a (weighted) average of 64.9 (Appendix Table A.11).

/e See news release, Xinhua News Agency, April 30, 1980.

/f See "The Economic Development of China," by Ding Chen, Scientific American, September 1980, p. 159.

/g For references for these figures, see Table GM.5 of Haitung King and F.B. Locke, "Selected Indicators of Current Health Status and Major Causes of Death in the People's Republic of China," US National Cancer Institute, 1980.

/h Appendix Table A.11.

Table 2.2: INDICATORS OF MORTALITY, CHINA AND OTHER COUNTRIES

Locale and date	Crude death rate (per thousand population)	Infant mortality rate (per thousand live births)	Life expectancy (years)
China, 1975	8.3-9.3	53-63	61.7-64.9
China, 1979 /a	7.8	56	64
US Chinese, 1968-72	..	..	75
India, 1978	14.0	..	51
Cuba	6.0	25	72
Korea	8.0	..	63
Indonesia, 1978	17.0	..	47
Sri Lanka, 1978	6.0	..	69
Nepal, 1978	21.0	..	43
Thailand, 1978	8.0	68	61
Low-income developing countries, 1978	15.0	..	50
Middle-income developing countries, 1978	11.0	..	61

/a The official figures for 1979 indicate lower mortality rates than those used here. The official crude death rate is 6.29; the official infant mortality rate is 12 in cities and 20-30 in rural areas; and the official life expectancy is 68.23 years.

Sources: For China, see Table 2.1 for death rates and life expectancy and Appendix Table A.27 for infant mortality. For US Chinese, see King and Locke, footnote /g on Table 2.1. For other countries, see World Bank, World Development Report 1980, pp. 144-145 and 150-151.

Table 2.3: PERCENTAGE DISTRIBUTION OF DEATHS BY CAUSE, CHINA AND MODEL HIGH- AND LOW-INCOME COUNTRIES

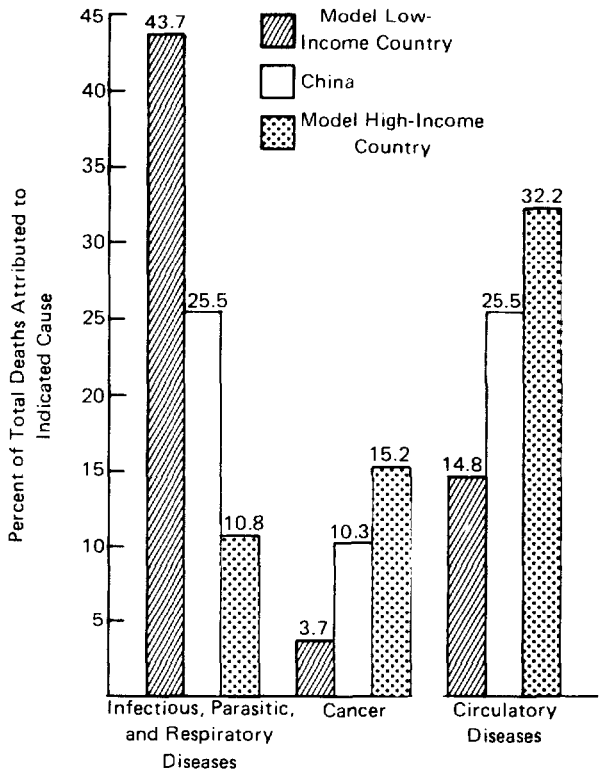
Cause	Percentage distribution of deaths		
	China 1973-75	Model low-income country	Model high-income country
Infectious, parasitic and respiratory diseases	25.5	43.7	10.8
Cancer	10.3	3.7	15.2
Circulatory diseases	25.5	14.8	32.2
Trauma and accidents	9.4	3.5	6.8
Other causes	29.3	34.3	35.0

Notes: 1. Causes of death were allocated into the four broad categories indicated in the table from quite different initial breakdowns; errors of classification may, therefore, exist. The percentage of deaths due to tuberculosis is the percentage of total deaths, not of the percentage of those in the "Infectious ..." category.

2. Appendix Table A.23 contains data on causes of death by age group in Beijing (1979); figures from these are closer to those of the model high-income country than are the figures from China as a whole.

Sources: For China, 1973-75, see Appendix Table A.22. For the model low- and high-income countries, see Health Sector Policy Paper, World Bank, 1980, p.13.

Figure 2: PERCENTAGE DISTRIBUTION OF DEATHS BY CAUSE, CHINA AND MODEL HIGH AND LOW-INCOME COUNTRIES



Source: Table 2.3.

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Table 2.4: PROGRESS ON SELECTED PARASITIC AND INFECTIOUS DISEASES

Disease	Progress
Parasitic Diseases	
Schistosomiasis (snail fever)	This disease is internationally widespread and prevalent in areas, like those for rice farming, where the water-dwelling snail host can both breed and come into contact with man. Schistosomiasis has generally proved impossible to eradicate and difficult to control. Estimates vary, but perhaps 10 million Chinese were afflicted in the immediate post-revolution era, and 2 to 2.5 million (in 13 provinces including Shanghai) are afflicted now. Snail-infested agricultural areas have been reduced from about a million hectares to perhaps 250,000 hectares.
Malaria	For thousands of years, malaria has been prevalent in southern parts of China at altitudes below about 1000 m. As many as 30 million individuals were estimated to be afflicted in the late 1950s, though the case fatality rate of malaria, then and now, is low. Intensive efforts to control the mosquito vector have substantially reduced malaria's prevalence, though incidence data in Appendix Table A.25 indicate about 2.4 million new cases in 1979.
Ancyclostomiasis (hookworm)	Hookworm is widespread in southern China, and estimates of the late 1950s suggested that about 50 million persons were afflicted in Shanghai and in 14 southern provinces. Blood loss from hookworm can exacerbate anemia, particularly when diets are low in iron. Improved environmental sanitation has reduced the prevalence of hookworm, but the problem remains widespread.
Kala-azar	Kala-azar, a parasitic disease afflicting the spleen and liver, had been a problem principally in northern China. It is now virtually completely eliminated (see Appendix Table A.25).
Ascariasis (roundworm)	Roundworm infestation of the intestine is perhaps the most prevalent parasitic disease in the world, and it is principally caused by inadequate environmental sanitation. Generally regarded as fairly harmless, it may have adverse nutritional consequences. Ascariasis remains widespread; the mission was informed, for example, that in Lanzhou about 34% of children under 7 are infected and that perhaps 87% of children in the surrounding rural areas are infected.

Table 2.4: (continued)

Disease	Progress
Infectious Diseases	
Tuberculosis	Tuberculosis was the leading cause of death in pre-liberation China, with an estimated mortality rate of 200 per 100,000 population per year./a By 1975, TB had become the 9th cause of death and the mortality rate had dropped to 43/100,000 (Appendix Table A.22). This was accomplished through environmental improvement, provision of curative services, and, principally, widespread administration of the effective BCG vaccination.
Trachoma	Trachoma is an infectious eye disease that can lead to blindness and that had been an extreme public health problem in China - half the population was estimated to have been afflicted in the mid-1950s. While no data appear to be available on current prevalence, it is clear that the problem is now greatly reduced.
Venereal diseases	These had been major problems before 1949 and, through cure and social change, they have been almost completely eliminated.
Diarrheal disease and cholera	Cholera has ceased to be a widespread killer, though it remains endemic in parts of China. Prevalence of other diarrheal diseases has probably been greatly reduced./b
Measles	Measles is a common childhood disease throughout the world, but it poses a threat to life only among children already ill or malnourished. In China, the fatality rate for measles was 6.46% in 1950, declining to 1.7% in 1956 and 0.66% by 1979 (Appendix Table A.24).

/a See "Tuberculosis Control in New China," by Peking Tuberculosis Research Institute, Chinese Medical Journal, July 1977.

/b See Technical Visit on Control of Diarrheal Diseases, World Health Organization, January 1981.

Sources: Unless otherwise noted, material in this table comes from three sources: (a) J.W. Salaff, "Mortality Decline in the People's Republic of China and the United States," Population Studies, vol. 23, 1973; (b) H. King and F.B. Locke, "Selected Indicators of Current Health Status and Major Causes of Death in the People's Republic of China," US National Cancer Institute, 1980; and (c) J. Banister, China's Pattern of Population Growth, Stanford University Press, forthcoming (Chapter 4).

2.07 A fundamental measure of a country's success in meeting its population's economic needs is the extent to which undernutrition is eliminated. Insufficient food intake results in retarded growth in stature; it lowers activity levels, ultimately to the point of severely impairing work capacity and motivation; it retards intellectual development;/1 and severe malnutrition leads to substantially increased risk of disease and death. China has a generally adequate level of nutrient availability both with respect to requirements and in comparison to low and middle-income countries (see Tables 2.5 and 2.6). If food were equally distributed, 103% of caloric requirements and 163% of protein requirements would be met./2 Data on aggregate nutrient availability, however, such as presented in Tables 2.5 and 2.6, provide only partial measures of success both because malnutrition has multiple causes and, more important, because inequalities in distribution (particularly of protein) can leave large fractions of a population malnourished even when aggregate supplies are more than adequate. Thus a valuable complementary guide to the prevalence of malnutrition is data from anthropometric surveys, particularly of height-for-age and weight-for-height of children.

2.08 The means (and standard deviations) of the distributions of anthropometric statistics provide important insights into the extent of malnutrition, and substantial amounts of new anthropometric data were gathered for the mission to complement data provided by the Ministry of Public Health. These data are not necessarily representative of the entire country, but they do cover many regions, and a number of general observations can be made with some confidence.

2.09 Three contrasts emerge clearly from the analyses that have been undertaken. These are:

(a) urban nutritional status has improved dramatically between the mid-1950s and the mid-1970s;

/1 The mission used data collected by the Ministry of Education to examine the effect of children's malnutrition on their progress in school. Even the relatively moderate malnutrition (particularly as measured by height for age) that exists in China tends to result in children falling behind their peers in school.

/2 The 'requirements' used in Table 2.6 are those of the Food and Agriculture Organization of the UN. The mission has separately calculated energy and protein requirements for China using the available data on the age distribution of the population and average weights at different ages; Appendix Tables A.29 and A.30 show these calculations. The mission calculations result in lower requirement levels than those provided by the FAO, in part because we probably use lower estimates for average adult weight than does the FAO.

Table 2.5: NUTRIENT SOURCES AND AVAILABILITY, 1979

Foodstuffs	Annual per capita consumption (kg)	Daily per capita consumption		
		Food energy (calories)	Protein (grams)	Fats (grams)
Vegetable				
Rice	97.1	974	17.0	2.1
Wheat	59.3	576	16.4	2.3
Other grains	38.3	382	8.4	1.6
Tubers	29.5	76	1.0	0.2
Pulses	7.2	67	4.4	0.3
Vegetable oil	2.3	53	0	6.0
Soya products	3.8	39	3.6	1.4
Sugar	3.7	39	0	0
Vegetables	84.5	52	3.2	0.5
Fruits	5.9	4	0.1	0
Animal				
Pork, beef and mutton	10.9	101	3.4	9.4
Other meat	1.6	3	0.5	0.2
Poultry	2.9	10	1.0	0.6
Fish	3.3	12	1.9	0.4
Eggs	3.4	14	1.1	0.9
Milk	3.5	9	0.6	0.5
Animal fats	1.2	30	0	3.3
Total	349.7	2,441	62.6	29.8
Vegetable	331.6	2,262	54.1	14.5
Animal	26.8	179	8.5	15.3

Source: Appendix Table A.28.

Note: Production data from 1957 and 1977 reported in Annex B allow estimates to be made of caloric availability in those years. Per capita caloric availability was estimated at 2,024 per day in 1957 and 2,044 per day in 1977. Per capita protein consumption was estimated to be 58.4 grams per day in 1957 and 54.1 in 1977.

Table 2.6: ENERGY (CALORIES) AND PROTEIN AVAILABILITY, CHINA AND OTHER COUNTRIES

	Per capita daily availability of				
	Energy		Protein		
Country	Calories	% of requirement	Total (grams)	% of requirement	% animal and pulse
China, 1979	2,441	103	62.6	163	26
Bangladesh	1,812	78	36.0	100	18
Brazil	2,562	107	62.7	161	56
Hong Kong	2,883	126	86.0	257	59
India	2,021	91	50.0	136	26
Indonesia	2,272	105	47.0	130	13
Korea, Rep. of	2,785	119	73.0	183	21
Mexico	2,654	114	66.0	173	41
Nepal	2,002	91	48.0	121	19
Pakistan	2,281	99	63.0	165	32
Sri Lanka	2,126	96	43.0	121	16
Low-income countries	2,052	91	n.a.	n.a.	n.a.
Middle-income countries	2,590	108	n.a.	n.a.	n.a.

Sources: For China, Table 2.5. For other countries, information on energy availability is for 1977 and comes from the World Bank, World Development Report 1980, pp. 152-153. Information on protein availability comes from the World Bank's Social Indicators Data Sheet, October 1980. Energy and protein requirements are those calculated by the Food and Agricultural Organization of the UN in May, 1977.

(b) urban nutritional status has improved somewhat between 1975 and 1980; and

(c) though rural nutritional status has improved (where data are available), nonetheless nutritional status, as measured by height-for-age, is markedly worse in the rural areas around the cities surveyed than in the cities themselves./1

The second and third of these conclusions conform reasonably well to what one would predict from food supply data (see Annex C, Agricultural Development) and probable patterns of prevalence of diarrheal disease. The first conclusion is somewhat surprising given that aggregate per capita food availability changed little between 1957 and 1977. Improvements may, however, have occurred during that period in the relative position of cities vis-a-vis rural areas; Lardy has documented a tendency in that direction in terms of food supply./2 In addition, improvements in health and sanitary conditions in cities may have increased efficiency of food intake and thus improved nutritional status. Unfortunately, at present virtually no rural anthropometric data are available from the late 1950s with which to explore this issue further.

2.10 Table 2.7 displays urban-suburban and age differences in malnutrition by presenting figures on the fraction of children unduly low in height, given their age. Low height-for-age, known as 'stunting', is perhaps the most widely used indicator of long-term (through perhaps relatively mild) malnutrition. The most striking feature of Table 2.7 is the much higher fraction of stunted children in suburban areas than in urban areas. The high rate of stunting indicated among young teenagers probably results from late maturation rather than permanent stunting. Low weight-for-age is another widely used measure of malnutrition; in China, however, children's weight-for-height tends to be high. This partially compensates for low height-for-age in terms of weight, and the number of children malnourished in terms of low weight-for-age is very small./3

/1 In 1975, for example, a sample of 7-year-old boys in Beijing proper averaged 122 cm in height; their counterparts in rural parts of Beijing municipality averaged 114 cm, a difference corresponding to well over one standard deviation. Figure 3 illustrates rural-urban differences in height from the same survey for four cities and the suburban areas around them.

/2 See N. Lardy, "Food Consumption in the People's Republic of China" (World Bank, mimeo, 1980). The note to Table 2.5 indicates that per capita caloric availability in 1957 was about 2,024 and that in 1977 it was 2,044; no data were available on rural-urban differences.

/3 In 1975 approximately 1% of children were badly malnourished in terms of weight-for-age, according to the MOPH; badly malnourished was defined as "Gomez" categories 2 or 3. The prevalence of malnourishment by this definition was eight times greater in rural than urban areas.

Table 2.7: MALNUTRITION IN CHINA - PERCENTAGE OF CHILDREN STUNTED, 1975

	Males			Females		
Age	Urban Beijing	National urban	National suburban	Urban Beijing	National urban	National suburban
3-3.5	1.7	4.4	21.8	0.3	4.4	24.2
5-5.5	1.3	5.9	21.5	1.4	3.8	24.5
7-8	1.1	4.4	26.1	1.9	5.8	26.8
9-10	1.2	4.5	23.0	4.8	6.9	33.0
11-12	8.4	10.6	37.1	6.2	13.1	43.6
13-14	16.1	22.7	50.0	4.8	11.1	34.8
15-16	10.6	14.9	39.0	3.0	4.0	10.0
17-18	4.1	7.6	23.6	2.0	2.7	7.5

Source: Based on estimates of children's weight for height calculated from data collected by MOPH in a 1975 survey of nine cities.

Notes: (i) "Stunting" is defined in terms of a child having low height for his age; specifically a child is defined as stunted if his height is less than 90% of the median height for children of that age according to the NCHS standard. Nutritionists regard stunting as the appropriate measure for chronic (but not necessarily severe) malnutrition.

(ii) The national urban areas for which data are reported in this table are from a survey of nine cities - three in northern China, three in central China, and three in the south. The suburban areas are ones located just outside these nine cities; they are, therefore, probably somewhat better off than typical rural areas. The data from urban Beijing are from the same survey.

2.11 It would be useful for policy if the anthropometric data could provide insight into the extent to which the undernutrition that does exist in China results from shortages of particular foodstuffs more than from shortages in overall food supply - i.e. if it were possible to form a judgment whether diet quality rather than quantity is a problem. While the patterns in rural areas of very low height-for-age combined with adequate weight-for-height (Figures 3 and 4) are consistent with the hypothesis of a poor quality (possibly low animal protein) diet,/1 further research would be required to establish this conclusion. Figures 3 and 4 also illustrate a relation between provincial income level and height-for-age, though the effect is fairly weak.

2.12 One important nutritional concern, that of pregnant and lactating women, is one to which China seems to have devoted considerable attention. Poor maternal nutrition is one important cause of low (i.e. less than 2,500 grams) birthweights of children, and low birthweight increases the probability of neonatal illness or death. Medical visitors to China report that antenatal care results in a very low prevalence of low birthweights./2

2.13 In addition to information on problems of inadequate energy or protein intakes, some data are available on prevalence of disorders due to deficiencies of a number of specific micronutrients in the diet (Table 2.8). Many of the data are available only for children. Generally speaking, micronutrient deficiencies appear to be less of an issue in China than in many low-income countries. However, mild anemia is widespread - in part because of inadequate iron intake in the diet, and in part because of iron losses due to hookworm infestation. Other deficiency diseases that remain important in China are rickets (vitamin D deficiency), goiter (iodine deficiency), and Keshan disease (selenium deficiency). There is relatively little vitamin A deficiency, which, in a number of other countries, is an important cause of impaired vision or blindness. Control of goiter has been the subject of extensive campaigns in recent years and will probably cease to be an important

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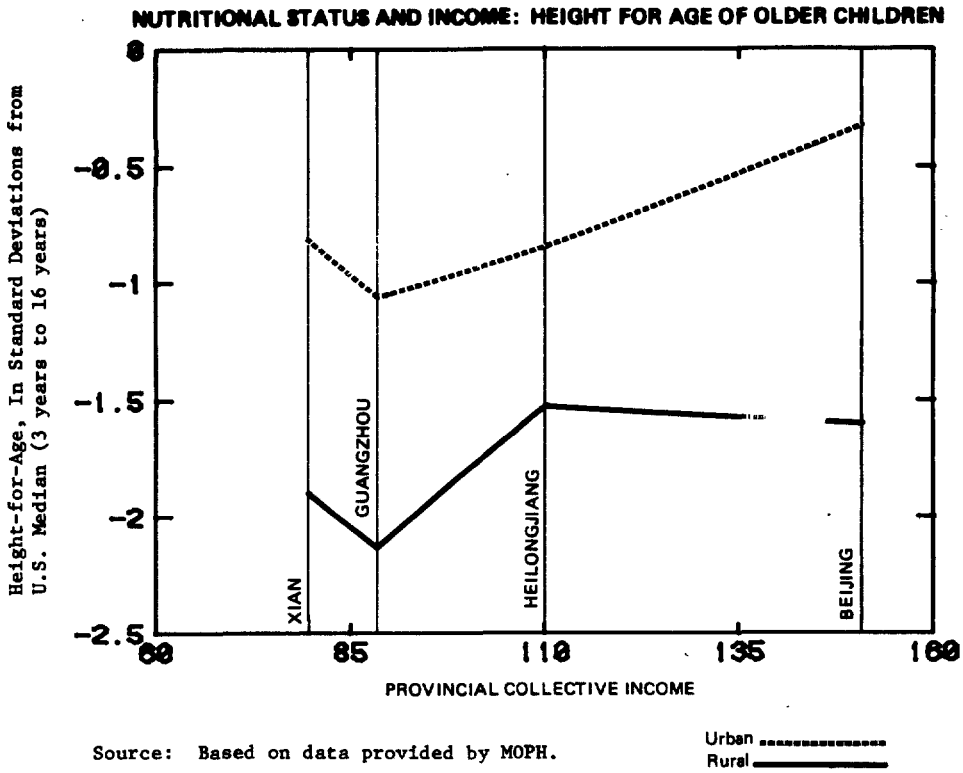
/1 Staff of the Department of Nutrition and Food Hygiene (of the Institute of Health, Chinese Academy of Medical Sciences) expressed their concern to the mission about the low levels of fats and oils and of animal protein in the Chinese diet. Adding to their concern for low average levels of animal protein availability was the observation that its consumption is much more unequally distributed than is that of other foodstuffs; some rural dwellers, they estimated, consume only 1% of their total protein as animal protein.

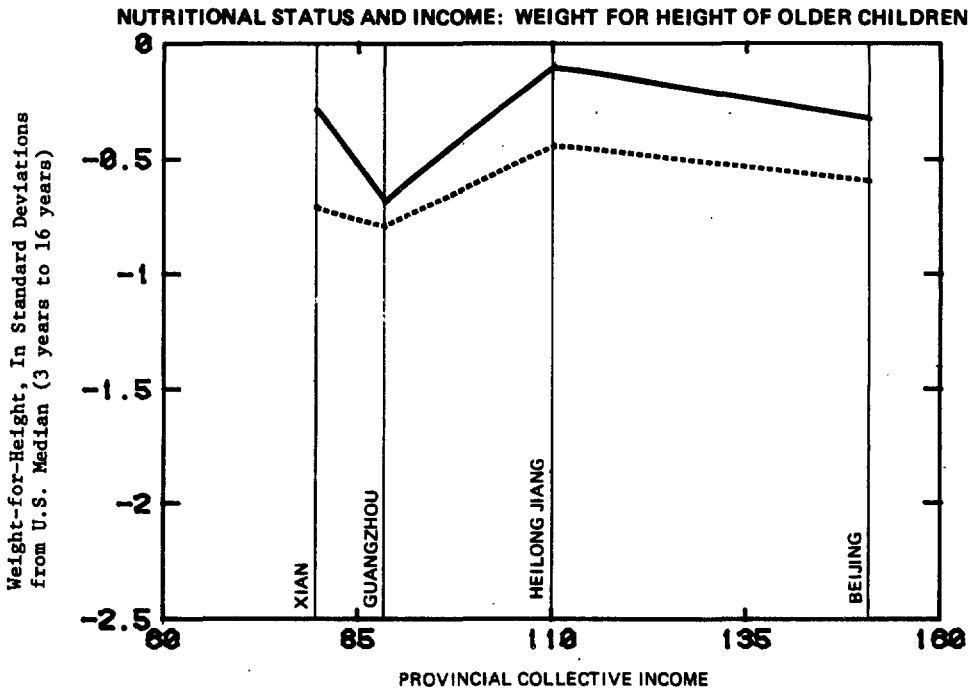
/2 See "Report of a Trip to China to Develop a Collaborative Program in Health Services Research," by Dr. C.E. Taylor, November 1980. Le Monde (February 25, 1981) reports the World Health Organization to ascribe a 6% prevalence of low birthweight to China nationwide; this must be an underestimate, given that Taylor reports the Beijing average to be 6%.

Figure 3:



Source: Based on data provided by MOPH.

Figure 4:



Source: Based on data provided by MOPH.

Table 2.8: MAJOR MICRONUTRIENT DEFICIENCY DISEASES

Deficiency	Current status
Rickets (Vitamin D deficiency)	Either insufficient exposure to sunlight or insufficient dietary intake of vitamin D can lead to rickets, the consequence of which is inadequate bone development. This has historically been a major problem in North China and remains so; a 1979 10-province survey of over 70,000 children 3 years old and younger found a prevalence of rickets of 29%. There was virtually no difference between rural and urban areas. The role of large monthly doses of vitamin D in prevention is now being studied.
Anemia (iron deficiency)	Anemia, which leads to low energy levels, can result from iron-deficient diets or from losing the blood's iron because of parasitic infection or menstruation. As with many developing countries, anemia is widespread in China; a 1979 survey of children 1 month to 7 years of age in Beijing and Shanxi found 47% moderately anemic (hematocrit of 9-12 g/mm) and 2.4% severely anemic (hematocrit less than 9 g/mm).
Keshan disease (Selenium deficiency)	Keshan disease, named for a county in China where it is severely endemic, is found in many of the hilly and mountanous regions of China; prevalence in those regions reaches 1% of children under ten years old. In the recent past the case fatality rate was close to 80%; improvements in treatment methods has reduced this to 13%. Selenium supplementation of food appears to be an effective preventive measure.
Goiter (iodine deficiency)	Iodine is an essential ingredigient in the hormones produced by the thyroid gland in the throat, and its absence in the diet causes the thyroid to swell with the visible symptoms of goiter. High prevalence of goiter is associated with cretinism, and there is some evidence that moderate iodine deficiency is also harmful. A 5-year goiter control program (providing iodized salt and, sometimes, injections of iodized oil) has recently been judged successful in 607 counties of North China. Over 10 million individuals have been cured and 130 million are being protected.

Sources: For rickets and anemia, information supplied by MOPH. For Keshan disease, Department of Nutrition and Food Hygiene, Chinese Academy of Medical Sciences, and "Epidemiological Studies on the Etiologic Relationship of Selenium and Keshan Diease," Chinese Medical Journal, v. 92, 1979. For goiter, article in People's Daily, October 30, 1980.

problem in the near future. Keshan disease seems to be found exclusively (or almost exclusively) in perhaps half a dozen provinces in China; it is virtually unknown elsewhere in the world. It frequently leads to death in adolescence through heart failure, and almost half of nutrition research in China is directed to understanding this disorder. Selenium supplementation of food in affected locales seems promising.

2.14 In concluding the discussion of nutrition it is worth noting that success in improving nutrition levels does have the (minor) disadvantage that improvements can be expected eventually to result in increases in the average heights and weights of the population at all age levels. For adults this translates into increased food requirements (Appendix Tables A.29 and A.30). A rough calculation suggests that per capita food requirements are now growing at a rate of about .15% per year for this reason, and that this rate will increase to about .25% per year by the year 2000. This compares with the 1.2% current annual increase in requirements resulting from population increase.

B. Policies for Overcoming Health Problems

2.15 Health Problems. What accounts for China's success in reducing mortality and morbidity? The major sources of health problems in developing countries can usefully be divided into four broad categories - overpopulation, malnutrition, environmental pressures, and infectious and parasitic diseases. The paragraphs that follow discuss the relation between these factors and China's success in reducing mortality. The subsequent subsections provide a description of how China's health and nutrition policies have addressed these problems. An important fact underlying much of China's success is the relatively high literacy rate of the population, and this point is briefly discussed.

2.16 Population and health policies join together in a number of important ways in that improved health eventually tends to reduce the population growth rate and that smaller families allow for higher nutritional and environmental health standards. Close child spacing and large numbers of children can reduce per capita food availability and shorten the period of relatively good nutrition and immunological protection that breast-feeding provides; crowding increases problems of environmental sanitation and facilitates the spread of communicable diseases. Slowing population growth can thus facilitate improvement in health standards. And the reverse is also true: reducing child mortality results in a decreased demand for children, and the provision of adequate maternal and child health (MCH) and other credible curative services in a community creates both a mechanism for and receptivity to the introduction of contraceptive and sterilization services. Thus China's success with population control, to be discussed in Chapter 3, has no doubt been an important factor in improving health conditions and reducing mortality, particularly infant mortality.

2.17 Malnutrition can take either of two major forms. The first is general inadequacy of food intake, principally energy and protein, and is labeled protein-energy malnutrition (PEM). The second consists of inadequate intakes of individual nutrients, which can result in specific deficiency diseases. It is thoroughly documented that PEM reduces resistance to disease and increases the probability that disease will lead to death. Malnutrition was discussed at greater length in Section A, and it suffices to note here that, despite the continued prevalence of some malnutrition, greatly improved nutrition levels have no doubt contributed to improved health.

2.18 Two important environmental conditions contribute to health problems in many low-income countries. The first and predominant of these is lack of access to regular water supplies and hygienic sanitary facilities. Lack of access to water makes hygiene difficult /1 and facilitates transmission of water-borne diseases (principally gastroenteric), though this is less of a problem in China than in many other countries because of the general Chinese practice of boiling drinking water. The UN General Assembly, in recognition of the near universality of water-supply problems, designated the decade of the 1980s as the "International Drinking Water and Sanitation Decade," and China is participating in that effort. China's massive efforts to improve water supply and sanitation have contributed importantly to reduction of mortality. Nonetheless, there is much room for progress as the comments on ascariasis in Table 2.4 made clear./2

2.19 A second important environmental factor contributing to poor health is inhalation of polluted air. Smoking and industrial pollution cause chronic bronchitis and cardio-pulmonary disorders, and these are diseases that can sharply impair productivity throughout much of an individual's life span. Though the extent to which these disorders are important public health problems remains to be understood, there is some indication (including the fact that respiratory disease is the leading cause of death, Appendix Table A.22) that they do remain important in China./3 Curing chronic pulmonary disease is either impossible or prohibitively costly, and,

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/1 An important consequence of poor hygiene is that infections and parasites carried through feces become highly prevalent.

/2 Experiments have been reported that show the standard ways of treating nightsoil leave many ascaris eggs viable and that, unfortunately, more thorough treatment appears to reduce the value of nightsoil as fertilizer. See R.G. Feachem's "Impressions of Water Supply and Sanitation in the People's Republic of China," mimeo, November 1980.

/3 See J. Banister, China's Pattern of Population Growth (Stanford University Press, forthcoming), Chapter 4.

unfortunately, industrial pollution control can also be expensive./1 While this is principally a problem of cities, China's policy of rural industrialization can be expected to result in increased pollutant levels in rural areas.

2.20 Finally, infectious and parasitic diseases contribute greatly to mortality, and it is in controlling these that the health service, particularly the preventive health service, has its greatest role to play. Table 2.4 documented China's progress in controlling selected infectious and parasitic diseases. This progress, too, has played an important role in reducing mortality.

2.21 The following subsections turn to consideration of the broad policies that have guided China's approach to addressing health and nutrition problems.

2.22 Health Policy. Health policy is formed along a number of dimensions. One concerns the extent to which resources will be made available, and how provision of those resources will be financed. A second concerns the relative extent to which preventive and curative measures will be emphasized. A third concerns the extent to which responsibility for health rests with highly trained professionals, with lower-level staff, and with the individual. A fourth concerns the extent to which health problems are addressed directly, through the health care system, or indirectly by, for example, improving water supply and sanitation or nutrition levels. A fifth important dimension of policy concerns the extent to which a broad range of health services will be "integrated" into a common delivery package for a specific geographic area, or whether separate "vertical" (or categorical) programs will address specific diseases - tuberculosis, schistosomiasis, etc.

2.23 The Chinese have taken relatively consistent positions on these policy issues, though emphasis has changed from time to time.

2.24 China's leadership placed great value on improving the health of the people, and a substantial volume of resources has been made available to improve health. Financing is in part by the State (for State and enterprise employees), in part by communal or subcommunal levels of organization, and in part by the individual. While there is great variation in financing arrangements throughout the country, it is a fair generalization that the State and communal levels, combined with self-help, finance the greater part of the preventive measures leading to relative uniformity of their distribution around the country. Curative services, on the other hand, tend to be financed at the individual and brigade level, and the major nationwide income inequalities at these levels are reflected in the uneven quality of medical services provided (see Table 2.9 for data on interprovincial variation in health service inputs and outcomes).

/1 In many countries cooking over open indoor fires contributes greatly to chronic respiratory disease; members of the mission were informed that this practice is rare in China.

2.25 Compared to virtually all other countries, China has strongly emphasized public preventive over curative health services./1 Major campaigns were mounted shortly after 1949 to improve environmental sanitation; to eliminate the (then) "four pests" - rats, flies, mosquitoes, and bedbugs; to vaccinate against and cure infectious diseases; and to control the vectors of major endemic disorders such as malaria and schistosomiasis. The allocation of health resources to preventive activities (and to curative services in urban areas, to the extent they were provided) generated a demand for at least minimal curative services and pharmaceutical availability in the rural areas, and health policies of the Great Leap and Cultural Revolution periods responded to that concern./2 While these vigorous preventive efforts were undoubtedly enormously successful in effecting the morbidity and mortality reductions that were discussed in Section A of this chapter, the demand for curative care could be ignored only up to a point. Today the clinical referral system provides at least minimal access to curative care to most of China's population; 67.6% of China's over 600,000 production brigades have their own cooperative medical stations manned by an average of 2.3 barefoot doctors.

2.26 China's policy toward highly professionalized versus lower-level staff follows naturally from its emphasis on public preventive relative to private curative services, and on providing at least minimal levels of curative service for large numbers. (Table 2.10 lists and defines the categories of health manpower in China.) Clearly the training requirements for giving vaccinations or assisting with environmental sanitation differ substantially from those for open-heart surgery, to take extreme examples. Preventive measures also place greater responsibility on communities for their own health conditions. As the basics of hygiene and community involvement in preventive health become more established, however, it will become necessary to upgrade the skills of the barefoot doctor to undertake (and be trusted with) more complicated tasks, and the MOPH plans, within a decade, to have upgraded 50% to

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/1 This orientation is deeply imbedded in Chinese tradition. A recent western review of medical policy in China begins by noting that "The keystone of the Chinese medical tradition is the notion that medicine is the art of maintaining health, not curing disease." (See D.M. Lampton, The Politics of Medicine in China, Westview Press, 1977.)

/2 It has been argued that dramatic increases in pharmaceutical production in the immediate post-1949 years were devoted almost entirely to production of vaccines and chemicals of use in preventive medicine; this led, in rural areas, to insufficiency of even basic curative medicines. (See L. Orleans, Health Policies and Services in China, 1974, Committee Report, Committee on Labor and Public Welfare, United States Senate, March 1974, pp. 32-34.)

Table 2.9: REGIONAL DISTRIBUTION OF HEALTH CARE INPUTS AND LIFE EXPECTANCY

Province	Population per hospital bed, 1979	Population per barefoot doctor, 1979	Life expectancy, 1973-75
Southwest Region			
Sichuan	557	530	60.10
Guizhou	683	927	59.25
Yunnan	536	861	60.56
Xizang (autonomous region)	444	319	61.30
Northwest Region			
Shaanxi	527	332	64.56
Gansu	565	429	n.a.
Qinghai	349	356	61.28
Ningxia (autonomous region)	512	595	62.25
Xinjiang (autonomous region)	297	684	62.51
Central South Region			
Henan	676	438	66.89
Hubei	426	505	n.a.
Hunan	452	539	62.48
Guangzi (autonomous region)	766	795	n.a.
Guangdong	547	726	n.a.
East Region			
Shanghai (municipality)	237	471	71.97
Jiangsu	517	650	67.17
Zhejiang	633	479	68.43
Anhui	660	679	65.66
Fujian	543	649	67.25
Jiangxi	479	606	63.18
Shandong	626	371	n.a.
North Region			
Beijing (municipality)	325	300	69.53
Tienjin (municipality)	413	406	70.92
Hebei Sheng	587	387	68.60
Shanxi Sheng	368	326	66.63
Nei Monggol (autonomous region)	398	490	66.25
Northeast Region			
Liaoning	320	632	69.68
Jilin	366	595	65.84
Heilongjiang	345	633	70.36

Sources: Population per hospital bed, Appendix A.21. Population per barefoot doctor in 1979 provided to mission by the Ministry of Public Health. Life expectancy data, Appendix A.11.

60% of barefoot doctors to the level of assistant doctor./1 Likewise, the increasing prevalence of degenerative diseases (Figure 2) places greater demands on the upper end of the spectrum of health care worker, and thus increases are being made in the training period for senior doctors. All these factors have combined with reaction against policies of the Cultural Revolution, when quality of services was often given inadequate attention, to lead to increased professionalization of medical staff. It should also be stressed that the intensive and active involvement of the (nonprofessional) political leadership at every level is a key element in implementing China's health policies. The Army has also played a role in providing rural medical care.

2.27 China's concern with prevention has also led to pursuit of a health strategy that reaches well beyond the health system per se. In particular, provision of safe water supplies and sanitary and convenient means of waste disposal has been a major policy objective./2 National data on access to safe water were unavailable, but the mission was informed that in Jiangsu Province, where provision of safe water remains viewed as a serious problem, approximately 70% to 90% of urban dwellers have access to relatively safe piped water; in rural areas, this number falls to about 5%, but another 36% have reasonably good supplies from wells. The remaining population uses less safe surface water sources, though, as noted, the practice of boiling water makes this less of a problem than in many countries./3

2.28 A final policy issue is that of integrated services versus vertical programs. Figure 5 provides a schematic overview of the structure of health care delivery in China, though it should be emphasized that there is substantial local variation in the structure and organization of the service. (Appendix Table A.20 shows the organization of the central Ministry of Public Health.) The three main boxes shown in Figure 5 are the "Vertical Preventive Programs," "Clinic Based Services," and "Birth Planning Services." Much of preventive medicine in China is public and is vertically organized, with responsibility for controlling specific disorders centrally located. This point can, however, be overemphasized since the preventive, vertical programs heavily utilize the clinic-based services for

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/1 It will be important to ensure that additional curative responsibilities for barefoot doctors do not interfere with their essential preventive responsibilities.

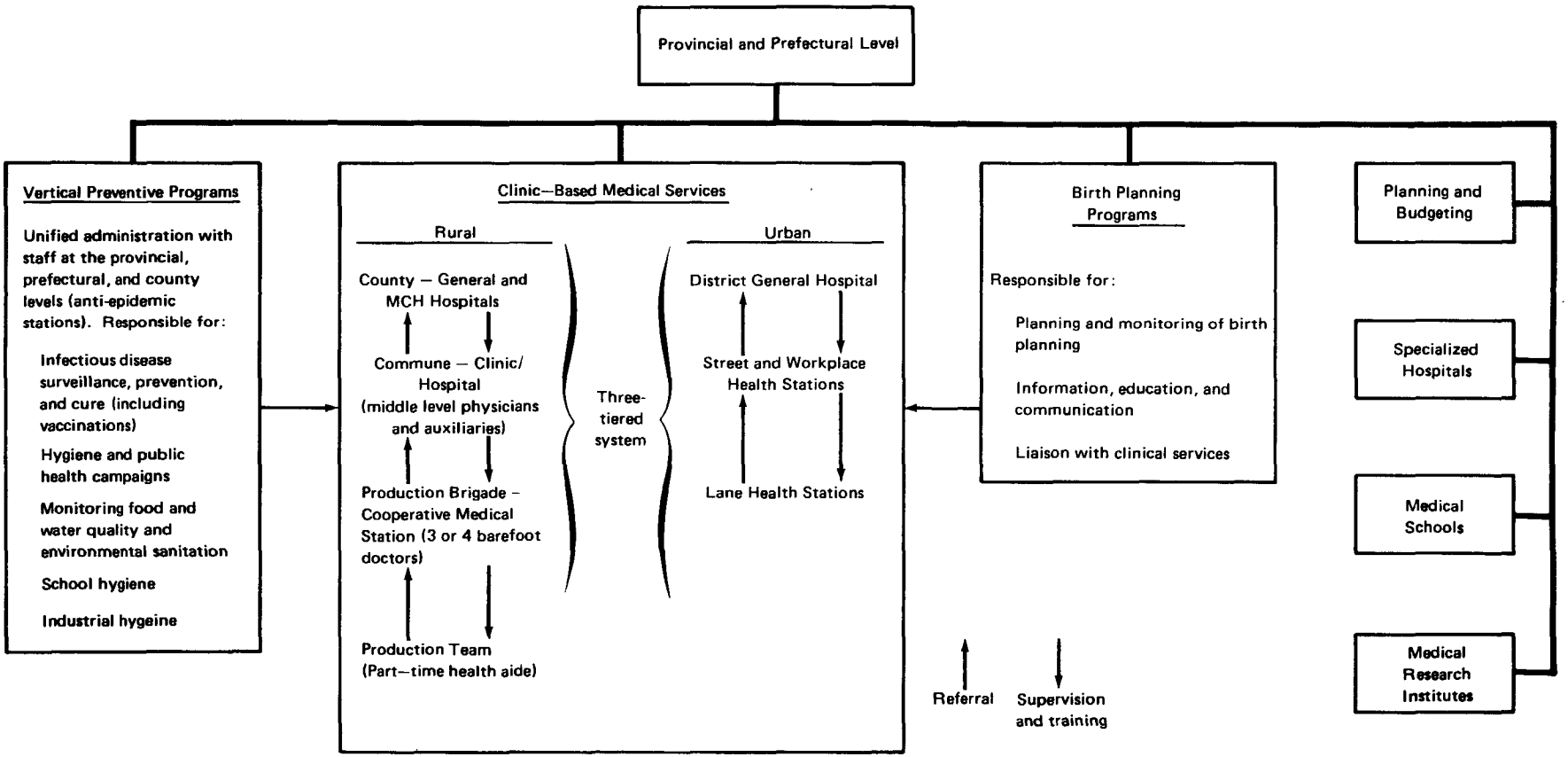
/2 The anti-epidemic stations of the MOPH monitor water quality and environmental hygiene standards, though MOPH has no responsibility for provision of those services. In rural areas the water conservancy units of the Agriculture Bureaus provide public support for provision of water; in urban areas, responsibility lies with the Urban Construction Bureau under the State Council.

/3 Subsequent to preparation of this report, a World Health Organization mission was informed that, nationwide, approximately 15% of urban dwellers lack access to safe water and that about 500 million rural people ".. have water which is not of good quality because it is inadequately treated or taken from inadequately protected shallow wells." See Report on the Mission to the People's Republic of China on the International Drinking Water Supply and Sanitation Decade, WHO, June 1981.

Table 2.10: HEALTH CARE WORKERS - EDUCATION AND ROLE

Position	Education	Typical role
Barefoot Doctor	Highly variable, primary education (or more) plus 3 to 6 month special course plus continuing education	Service in brigade health station
Assistant Doctors	Specialized senior secondary school	Play assisting roles in city hospitals, principally prior to cultural revolution
Jr. Western Doctor	Varied over time; currently 3 years post-secondary	Commune hospitals; comparable urban facilities
Sr. Western Doctor	Varied over time; currently 5 to 8 years post-secondary	County general hospitals
Doctor of Chinese Medicine	Currently 5 years post-secondary	County general hospitals
Public Health Doctors	Same as senior western doctors except for less clinical training and more public health	Staff and manage county and provincial anti-epidemic stations

Figure 5: ORGANIZATION OF HEALTH AND BIRTH PLANNING SERVICES



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their implementation and would certainly be far less effective without them./1 Nonetheless, the strong emphasis placed on the vertical programs (except during the Cultural Revolution) likely accounts for much of China's success in dramatically reducing mortality rates; other countries seeking to learn from China as they extend primary health care should thus pay particular attention to China's centrally initiated and directed vertical programs. An important feature of the organization of the vertical programs is that instead of having separately administered programs for malaria, smallpox, leprosy, etc., all vertical programs are the responsibility of the "anti-epidemic" stations of the provincial and county health bureaus. As will be discussed at greater length in Chapter 3, birth planning is also vertically organized, but similarly with the capacity to draw on the clinic-based system at every level.

2.29 Progress in many areas - reducing overpopulation, improving nutrition, improving environmental sanitation, and controlling communicable diseases - has led, then, to the dramatic reductions in morbidity and mortality that China has experienced in the past 30 years. Underlying each of these areas has been the political will and administrative capacity of the Chinese Government which have, despite occasional setbacks, been essential to success. Less obvious but perhaps almost as important has been the relatively high education level of the Chinese people. Evidence from many countries (exhaustively reviewed in the World Bank's World Development Report 1980) has shown that educational investments pay off handsomely in facilitating implementation of the policies required to improve nutrition and health and to reduce fertility./2

2.30 Nutrition Policy. While there is no central mechanism for coordinating nutrition policy in China, two aspects of policy bear directly on nutrition. One is the food rationing system; the second consists of nutrition-related policies of the MOPH.

2.31 In urban areas, staple foods have consistently been rationed in the usual way with monthly entitlements that vary with age, sex and occupation, but which appear to provide for an adequate (though spartan) level of consumption. These have to be purchased, but prices have been such in relation to incomes that the great majority of households (and by now virtually all of them) have been able to afford their full allotment.

2.32 In rural areas, the Government has guaranteed to sell enough grain to households to make up any gap between the amount of grain distributed as income in kind by their teams and a floor level of 200 kg (of unprocessed grain) per person per year in rice-growing areas and 150 kg

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/1 The anti-epidemic stations, which are responsible for the vertical programs, also have responsibility for professional supervision of the barefoot doctors at the brigade health stations; at the primary care level, then, the distinction between vertical preventive programs and curative services has little meaning.

/2 Analyses attempting to explain the inter-provincial variation in life expectancy shown in Table 2.9 showed, not surprisingly, that inter-provincial income variation was important; they also suggested the importance of interprovincial variation in education levels.

in other areas./1 Meat is also rationed in urban areas. Again, these rations have to be purchased, but attempts are made to make loans and social relief grants available where necessary. The floor level for grain, it should be emphasized, is low; but it is almost invariably supplemented by food grown on private plots or purchased with money income from collective or private sideline activities. In poor regions, government loans and grants allow the minimum consumption levels to be reached. Establishing an effective floor level of food consumption is the most important facet of nutrition policy in China.

2.33 The MOPH initiates important nutrition-related policies through campaigns to control the prevalence of micronutrient deficiencies (Table 2.8) and efforts to encourage breastfeeding and use of appropriate weaning foods. Little is known outside China concerning the success of these activities, which are essential components of nutrition policy.

C. Health Care Delivery Systems and their Cost

2.34 Provision of Health Care. Figure 5 provides a useful way to introduce a description of the institutions and workings of the health care system. The paragraphs that follow provide a summary description./2

2.35 The primary health care system that exists today in rural China has become known as the "three-tiered" system, relying as it does on three levels of the health care establishment: the brigade's cooperative medical center, the commune health center, and the county general hospital. The system rests upon the idea that it is impossible for a country with a vast and low income population to have a fully qualified medical doctor in each town or village, but that it is fully possible to have one or more paramedical workers within each community, providing walking-distance service to all its members no matter how poor or remote the community might be. China has made major gains in accomplishing this because it has avoided creating a separate bureaucracy for the health care system; instead, it has simply imposed the health care system upon the political-administrative structure that already exists. Thus the divisions of county, commune, brigade and production team have become the focal points for the operations of the various levels of China's health care programs.

/1 A rice ration of 200 kg (unmilled) per annum would provide 1,400 calories per day and 25 grams of protein - approximately 59% and 65%, respectively, of daily requirements in China. A wheat ration of 150 kg (unmilled) per annum would provide 1,250 calories per day and 35 grams of protein, 53% and 91% of requirements. These calculations are based on the same assumptions concerning nutrient content and the ratio of milled to unmilled weight as are made in Appendix Table A.28.

/2 For more detail, see P.C. Chen, "Population Policy and the Rural Health System in China," World Bank (draft), October 1980.

2.36 At the commune and county levels, and to some extent at the brigade level, the patient may choose between Western-oriented medical care and traditional care. Both are available, and both are components of the Government's health system. Despite an apparently easy coexistence of both systems of care, there appears to be relatively little attempt to substantially integrate Western and Chinese medicine, though there are exceptions of which acupuncture for anesthesia in Western surgery is perhaps the best example. Acupuncture anesthesia is now less common than it was, though it is still used when particular technical conditions mitigate against other anesthetics (e.g. for thyroidectomies).

2.37 The medical station (at the brigade level) is financed cooperatively, through payment of premiums by the members of the production brigade; it also receives contributions from the welfare fund of the brigade, receipts from the growing, preparation, and sale of medicinal herbs where this is done, fees from users of the service, and various subsidies from the commune, county, province, and state./1

2.38 Government subsidy for the brigade's cooperative medical service is limited and takes the following forms: (i) the price of Western drugs is set artificially low; (ii) vaccines and contraceptives are provided free; and (iii) most of the initial and continuing cost of training barefoot doctors is subsidized.

2.39 The commune health center, which is typically a small hospital, is likewise financed from various sources: contributions from the commune welfare fund, transfer of funds from the cooperative medical funds of the brigades under its jurisdiction, cost sharing with users, and subsidies from the county and provincial government. The variability of the financing sources is such that it also defies simple generalization. However, the commune health center, generally speaking, receives more subsidies from the state than its subordinate units at the brigade level. In Jiangsu province, for example, the mission was informed that 50% of staff salaries are covered. Administratively, the commune health center comes under the leadership of the local commune management committee and party committee. Technologically, it is supported by and under close supervision of the three county-level health care units (i.e. the general and MCH hospitals and the anti-epidemic station).

2.40 At the county level, there are three health care units - the county general hospital, the county anti-epidemic station, and the county MCH station. Under the overall administrative leadership of the county

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/1 There are some indications of growing dissatisfaction with the cooperative medical system at the brigade level; this stems in part from costs and cooperative finance, and in part from a desire for higher quality care. Steps are being taken to address these concerns; for example, barefoot doctors who fail qualification examinations are being dismissed.

health bureau, each of the three units supervises and provides technical support (including in-service training) to the commune health centers within the county in their respective area of specialization. Staffed by the college-graduate physician, the county hospital provides, to the extent it can, the general referral hospital for the entire county, receiving and treating cases referred to it by the commune health centers. Aside from this curative service, it has the responsibility of routinely providing training courses to upgrade the quality of the physicians serving at the commune level. The county anti-epidemic station, with three to ten staff members, is responsible for preventive health and disease control for the entire county. It provides technical support to and supervises the preventive health section of the commune health centers in performing the tasks of preventive measures, medical surveillance, and disease control.

2.41 Unlike the health care units at the lower levels, which must mobilize local resources, all three units at the county level are fully funded from the state's regular budget.

2.42 In today's rural China, then, each county contains a regionalized primary health care service that provides preventive, contraceptive and curative services to a large fraction of the people residing there./1 While the state subsidizes preventive health (including contraceptive service), the local people are required to share the cost of curative service - an arrangement that enables the government to achieve a widespread outreach of primary health service, in spite of its limited financial resources. However, the Government's insistence on local self-reliance has led to predictable results. The more affluent communities can afford to subsidize health care costs, invest more to increase the quantity and raise the quality of their health personnel, and enjoy easier access to better health care, relative to the less affluent communities. Table 2.9, for example, shows a ratio of almost three to one between the best- and worst-off provinces in terms of population per barefoot doctor; it also shows important regional disparities in hospital availability and life expectancy. Rural-urban differences are exemplified, though perhaps in extreme form, by Shanghai's having not only the best trained physicians but also three times as many per capita as the national average, though there is some indication that these disparities are decreasing over

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/1 China has paid relatively less attention to provision of dental care than of other medical services, though there exists a curative infrastructure that parallels that of the three-tiered system. Like that system, the dental care system makes heavy use of para-professional staff. Unlike other areas of medicine, however, relatively little emphasis has been placed on prevention (oral hygiene and fluoridation of water), and substantial improvements in preventive care seem possible. See "Dental Care Delivery in the People's Republic of China," by J.I. Ingle, Chapter 18 of J.I. Ingle and P. Blair (Eds.), International Dental Care Delivery Systems, Ballinger, 1978.

time./1 Further, the mission was informed by the MOPH that the Central Government plans to assist, over the next ten years, in financing the cooperative health service in poor areas.

2.43 In urban areas, places of employment provide a range of clinical services that, depending on the size of the employer, can include general hospital services. In addition to the employment-based system there exist "street" and "lane" health stations, staffed by carefully supervised paramedics, that provide preventive and simple curative services. Referrals from these stations go to county-level hospitals or specialized hospitals.

2.44 The Cost of Health Care. Table 2.11 provides an estimate of the total cost of providing health care in China in 1979 and of the costs per capita. The total annual cost is almost Y 10 billion per year or Y 9.9 per capita; this is approximately 2.5% of GNP. Actual expenditures by the State have been estimated at about 2% of total government expenditures, little changed from the early 1950s;/1 the remaining amount is presumably individually or cooperatively financed. The costs estimated are for direct health care services; water supply and sanitation measures are not included. Nor is any account taken of the opportunity cost of the time individuals spend participating in campaigns or pursuing the four pests, to take two examples. By far the most striking point in Table 2.11 is the extent to which the cost of medicines dominates health care costs, even though the table deliberately provides a high estimate for personnel costs. Two thirds of all costs are for drugs; over seven times as much is spent on Western medicine as is spent on all the nation's 1,575,000 barefoot doctors.

2.45 Table 2.12 compares China's public expenditures on health care to those of several other countries. While China's public expenditures are relatively high, they are not far out of line; China's successes probably result more from efficient resource use and a preventive emphasis than from major resource mobilization. Further, the relatively low wages paid to highly specialized medical personnel help keep total expenditures down. Given China's high coverage of primary health care, the relative cost per person reached would, no doubt, be much lower for China than the cost per capita figures that are indicated in Table 2.11.

2.46 To provide a better comparative sense of health input availability in China and other countries, Table 2.13 shows availability in China over time of hospital beds and health care personnel, and Table 2.14 makes the comparison of China with other countries. Even on a per capita basis, availability of health resources is comparatively high in China.

/1 See D. Perkins and S. Yusuf, Rural Development in the People's Republic of China, Chapter VI (Mimeo, The World Bank, January 1981).

Table 2.11: COSTS OF HEALTH CARE, 1979

Item	Unit cost (Y/year)	Number	Annual cost (million Y)	Annual cost (Y/capita)	% of total cost
Barefoot doctors	420	1,575,000	661.5	0.68	6.9
Senior Western physicians	1,440	395,000	568.8	0.59	6.0
Other health personnel /a	840	1,279,000	1,074.4	1.11	11.2
Hospital beds /b	456	1,932,000	881.5	0.91	9.2
Western medicine /c	-	/d	5,040.0	5.19	52.4
Chinese medicine /c	-	-	1,400.0	1.44	14.5
Total			9,626.2	9.91	100.0

/a This includes 435,000 middle-level physicians, 423,000 practitioners of Chinese medicine and 421,000 nurses.

/b The cost for construction and equipment of hospitals was estimated for the Mission by a hospital administrator in Jiangsu to be about Y 5,000 per bed. This capital cost is annualized here, assuming 20-year lifetime and 7.5% p.a. cost of capital.

/c The General Bureau of Medicine and Medical Equipment, which is responsible for pharmaceuticals production, provided the Mission with these estimates of their 1979 output: Western medicine, Y 5.6 billion; Chinese medicine, Y 0.7 billion; and medical equipment, Y 0.7 billion. Figures in the table assume that 10% of Western medicine production is for birth control materials or export and that only 50% of Chinese medicine is centrally produced. While the rate of production of medical equipment appears high relative to the annual cost of hospital beds, in which annualization of the value of the existing stock of equipment is theoretically included, this most likely reflects a rapid rate of addition to stock.

/d The 1979 Communique of the State Statistical Bureau (April 1980, p. 33) indicates that 41,700 tons of chemical pharmaceuticals were produced in 1979, a 2.5% increase over 1978. The 1980 figure was, however, declined by 3.8% to 40,100 tons (1980 Communique of the State Statistical Bureau).

Note: These figures probably do not include the cost of dental care.

Table 2.12: PUBLIC EXPENDITURES ON HEALTH CARE, CHINA AND OTHER COUNTRIES

Country	Per capita public expenditure	
	In $	As % of per capita income
China, 1979	$4.1 (6.4)/a	1.6 (2.5%)/a
India, 1976	2	1.2
Indonesia, 1976	1	0.7
Sri Lanka, 1975	4	1.9
Nepal, 1976	1	0.8
Korea, 1977	1	0.2
Thailand, 1976	2	0.7

/a Figures in parenthesis are for the total expenditures indicated in Table 2.3.

Sources: Figures for China come from Table 2.3 with yuan converted to dollars at the rate of 1.54 yuan/dollar and a per capita income of $260 assumed. Figures for other countries from the World Bank Health Sector Policy Paper, February 1980, pp. 75-78. Figures for China further assume that 50% of the cost of medicine is publicly (state or communally) borne and that 90% of other costs are communally borne.

Table 2.13: MEDICAL PERSONNEL AND FACILITIES

Year	Hospital beds /a		Physicians		Auxiliary health personnel (excl. barefoot doctors)	
	Number	Population per bed	Number	Population per physician	Number	Population per auxiliary
1952	180,000	3,043	52,000	10,417	988,000	548
1957	364,000	1,776	75,000	8,620	1,833,000	353
1979	1,932,000	503	395,000	2,458	1,114,000/b (2,689,000)	892 (365)

/a See Appendix Table A.21 for a detailed breakdown of hospital bed availability by type and province for 1979 and Table 12.1 of Annex B for a more detailed breakdown of numbers of medical personnel of different types available over time.

/b The figure of 1,114,000 consists of 258,000 doctors of traditional Chinese medicine, 435,000 junior doctors of Western medicine, and 421,000 nurses. In addition, there was a total of 1,575,000 barefoot doctors in the country; the figures in parenthesis show the total number of auxiliary health personnel in the country and the resulting population ratio, if one includes barefoot doctors.

Sources: (1) For 1952 and 1957, see D. Perkins and S. Yusuf, Rural Development in the People's Republic of China, Chapter VI (Mimeo, The World Bank, January 1981).

(2) For 1979, see 1979 Communique of the State Statistical Bureau (April 1980, p. 48).

Table 2.14: MEDICAL PERSONNEL AND FACILITIES, CHINA AND OTHER COUNTRIES

Country	Population per		
	Hospital bed	Physician	Nursing person
China, 1979	503	2,458	365/a
India	1,620	3,620	5,680
Indonesia	1,560	14,580	2,820
Sri Lanka	330	6,270	2,260
Nepal	6,630	35,120	51,220
Korea	1,510	1,960	510
Thailand	800	8,170	3,540
Low-income developing countries	-	9,900	8,790
Middle-income developing countries	-	4,310	1,860

/a The figure for China includes barefoot doctors and all health auxiliaries.

Sources: Annex B, Table 12.1 for China and World Development Report 1980 (pp. 152-153) for figures on physicians and nursing persons in other countries in 1977. Figures on hospital beds in other countries come from the World Bank Health Sector Policy Paper, February 1980, pp. 79-82.

3. POPULATION AND BIRTH PLANNING

3.01 Chinese birth rates have declined much more rapidly than in most other developing countries, to what are now much lower levels. Figure 6 illustrates China's current fertility relative to other developing countries;/1 it clearly shows the magnitude of China's success to date. With fertility already approaching replacement level, and well below that in countries at similar income levels, further declines will be increasingly difficult to extract. Success to date suggests that China has already reached a point where substantial and possibly new types of resource inputs may be required for further program efforts to have increased effect.

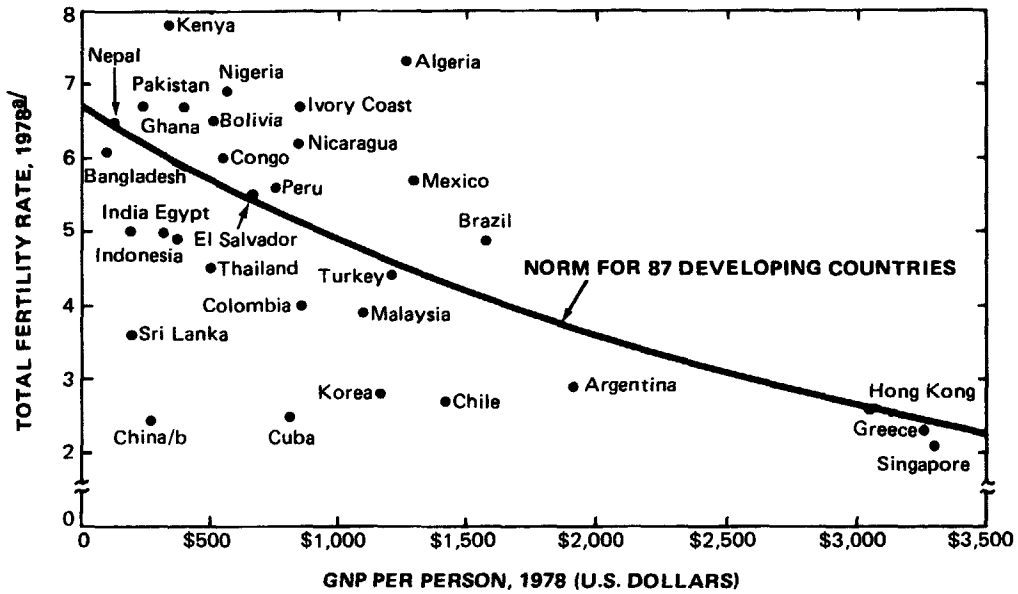
3.02 This section begins by reviewing the data available concerning the size, growth, and distribution of China's population. It then discusses the birth planning policy of the Chinese Government and other factors contributing to the rapid decline in fertility. Finally, some implications of the fertility decline for the future are considered.

A. Population Size, Growth, and Distribution

3.03 Population Size and Growth. Chinese official sources report that the population of China was 982.6 million at the end of 1980. It has thus increased by about 400 million since the census year of 1953, from the an estimated 588 million in that year; the average annual growth rate for 1953-80 period was, therefore, about 1.92%. For the period as a whole, this rate of growth is comparable to that of many other developing countries, and it has meant a near-doubling of the population in the last 30 years. The rapid growth has resulted in a population with a high proportion of people in the young, nonproductive ages; continued pressure on land; and the necessity to share the fruits of economic growth among a growing number of people. Table 3.1 shows how population growth has been related to changes in per capita income in the post-revolution period.

/1 Figure 6 is based on total fertility rates, rather than birth rates. Crude death and birth rates (that is, the number of births and deaths per thousand population per year) only partially reflect family and individual levels of mortality and fertility, as they are both affected by the age distribution of the population. For any given average number of children born to women who experience the prevailing age pattern of fertility in a specific period (the total fertility rate), crude birth rates are higher the greater the proportion of women of childbearing age in the population. Thus the total fertility measure is purged of age distribution effects, but of course it is less closely linked to the overall rate of population growth than is the crude birth rate.

Figure 6: FERTILITY IN RELATION TO INCOME: DEVELOPING COUNTRIES, 1978



a/ The total fertility rate indicates the average number of children that would be born to each women in a population if each were to live through her childbearing years (usually considered ages 15–49) bearing children at the same rate as women of those ages actually did in a given year.

b/ Estimated fertility and GNP for China are for 1979.

Source: See Figure 1.

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Table 3.1: POPULATION AND INCOME GROWTH, CHINA, 1949-80

	Population	Net material product in constant prices	Net material product per capita
	------- Average annual growth (%) ---------		
1949-52, Rehabilitation period	2.00	19.3	17.0
1952-57, First Five-Year Plan	2.38	8.9	6.4
1957-62, Second Five-Year Plan (including Great Leap Forward period of 1958-60)	0.62	-3.1	-3.7
1962-65, Adjustment period	2.85	14.7	11.5
1965-70, Third Five-Year Plan	2.63	8.3	5.5
1970-75, Fourth Five-Year Plan	2.17	5.6	3.4
1975-80, Adjustment period	1.33	6.2	4.8
1952-79	1.96	6.1	4.1
1957-79	1.87	5.4	3.5

Source: Main Report, Table 3.8.

3.04 Official recognition of overpopulation as a problem has led to vigorous efforts to encourage use of birth planning, particularly since the early 1970s. The evidence, discussed below, is that the program has been extraordinarily effective, and has contributed to one of the most rapid declines in fertility in the developing world.

3.05 Table 3.2 summarizes official Chinese data on population totals, birth, death and natural rates of increase for the period 1949 to 1979. (Appendix Table A.1 provides more detail.) These State Statistical Bureau figures are based on the vital registration system. Until very recently the Chinese had released relatively little population data, and estimates of population size and growth by non-Chinese demographers varied considerably. With the increased availability of data, however, outside estimates have been converging around the official totals. Birth and death rates are probably higher than the official rates based on the vital registration system, due to underregistration. But the estimates of population totals, and the growth rates based on those totals (column 6 of Table 3.2) are now considered realistic, if not exact, as is the notable downward trend in death and birth rates.

3.06 Throughout the 1950s and 1960s, the average levels and the changes in China's birth and death rates were similar to those of other developing countries. Figure 7 shows these rates for the post-revolution period in China and projects them into the future. As indicated in the figure and discussed in detail above, death rates fell rapidly in the period after the revolution, with the introduction and spread of preventive health. Birth rates, however, fluctuated around generally high levels, so that population growth accelerated. Official estimates of birth rates until 1958 are between 32 and 38 per thousand (Appendix Table A.1). There are no official nationwide data on vital rates for 1958-61, or for 1966-69 (the rates for those years in Figure 7 are estimates, as explained in the note to the figure), but available data do suggest that birth rates remained high throughout the 1950s and 1960s except, perhaps, during the economically difficult years of 1958-61.

3.07 However, in the 1970s the birth rate has declined considerably; as a result the population growth rate has dropped from a peak of over 3% in the mid-1960s to about 1.2% in 1980. The decline in the birth rate of as much as 50% since 1965 is greater than recorded in any other country, and exceeds considerably declines of about 19% in Indonesia, 14% in India, and 3% in Korea (see Appendix Table A.9). As indicated in Table 3.3, the current annual population growth rate of about 1.2% is well below the average of 2.4% for other low-income countries, though above the average of 0.5% for industrialized countries. Low growth is entirely due to the low birth rate, as the death rate is also low.

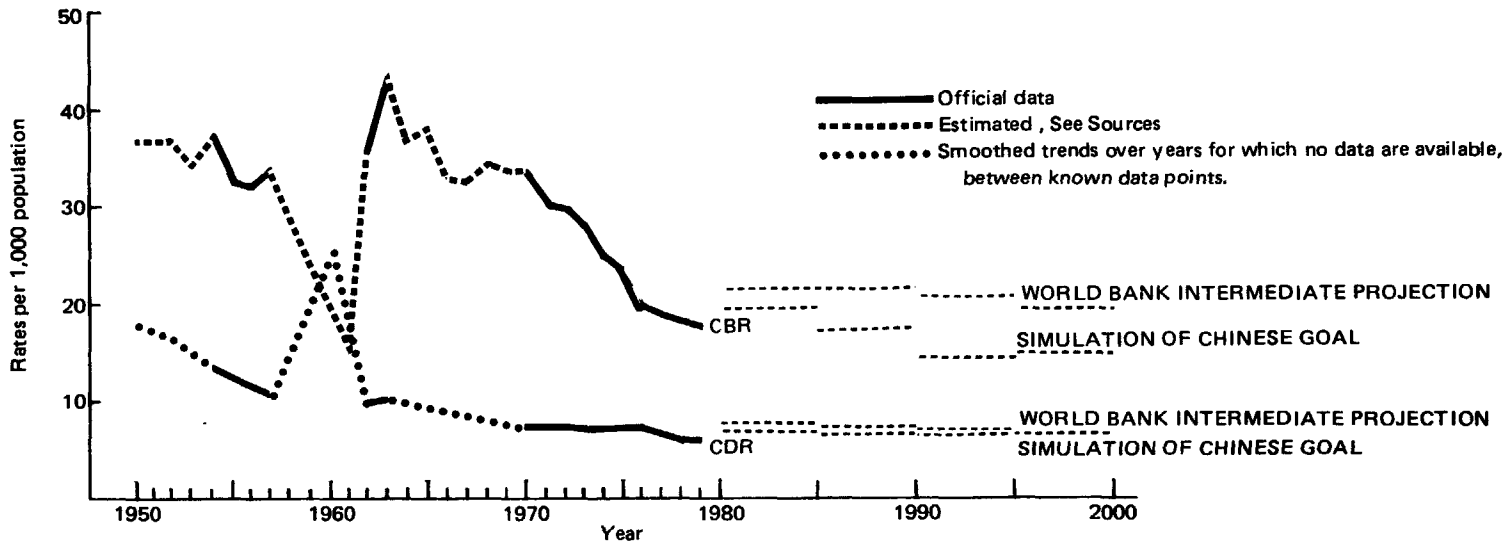
3.08 Official figures for crude birth and death rates shown in Table 3.2 were 17.90 per thousand and 6.20 per thousand in 1979, implying a net growth rate of 1.17%. Even if these are raised to take into account some under-

Table 3.2: OFFICIAL FIGURES ON POPULATION TOTALS, BIRTHS, DEATHS AND RATES OF INCREASE, SELECTED YEARS

(1) Year	(2) Year-end totals	(3) Crude birth rate	(4) Crude death rate	(5) Rate of natural increase (3)-(4)	(6) Rate of increase based on increase in population over previous year
1952	574,820	37.00	17.00	20.00	20.8
1957	646,530	34.03	10.80	23.23	29.4
1971	847,790	30.74	7.34	23.40	26.1
1975	917,700	23.10	7.30	15.80	17.1
1979	970,920	17.90	6.20	11.70	13.3
1980	982,550	n.a.	n.a.	n.a.	11.9

Source: Appendix Table A.1.

Figure 7: CRUDE BIRTH AND DEATH RATES, CHINA, 1950–2000



Sources: For 1950 to 1979: Appendix Tables A1 and A7 official data for the years 1951, 1953, 1958 – 1961, 1964, and 1966–1969 were unavailable. Rough estimates of crude birth rates for these years were obtained by using the number of births in these years as reported by Wang Nizong in "Solving China's Population Problem" China Reconstructs Vol. 29 No.4, 1980 and estimated midyear population totals.

For 1980 to 2000: Appendix Table A3. The 1980 estimates and beyond of the crude birth and death rates are above the official figures for 1979 rates because of assumtions explained the text.

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Table 3.3: VITAL RATES AND POPULATION GROWTH, CHINA AND OTHER COUNTRIES

	CBR	CDR	Rate of natural increase
China, 1979	17.9/a 21.1/b	6.2/a 7.8/b	1.17/a 1.33/b
India, 1978	35	14	2.1
Indonesia, 1978	37	17	2.0
Sri Lanka, 1978	26	6	2.0
Rep. of Korea, 1978	21	8	1.3
Mexico, 1978	38	8	3.0
Brazil, 1978	36	9	2.7
Kenya, 1978	51	14	3.7
Nigeria, 1978	50	18	3.2
Low-income developing countries, 1978	39	15	2.4
Middle-income developing countries, 1978	35	11	2.4
Industrialized countries, 1978	14	9	0.5

/a Official vital rates.

/b World Bank estimates, explained in text; the rate for 1980, based on year-end population totals, is 1.19.

Sources: Appendix Table A.1 for official rates for China; World Bank, World Development Report, 1980 for other countries and regions.

registration of births and deaths (to 21.1 and 7.8 respectively /1) thus yielding a growth rate of 1.33%, which is consistent with the official estimates of the increase in population totals between 1978 and 1979, they are still extraordinarily low in comparison to most developing countries. They are as low as those of Korea and Singapore, where per capita incomes are three to four times higher. In countries such as India, Pakistan, Kenya, and Indonesia, where per capita income is not too dissimilar to that of China, birth rates are much higher, between 37 and 50 per thousand.

3.09 Growth rates are expected to decline further in the next few decades, though at a somewhat slower pace. The projection being used by the World Bank of future population growth in China /2 assumes that the annual growth rate will fall to about 0.93% by the year 2000 and to 0.31% by 2030-35. The projection assumes a decline of the fertility rate to a level close to replacement between 2000 and 2005./3

3.10 Despite low and declining fertility rates, however, the absolute number of people will continue to grow rapidly, due to the large population base and because, as a result of past high fertility, a large number of people will be entering childbearing years in the next two decades. There are no official available data on age structure, but data from a large (but not nationwide) 1975 survey of the causes of death indicate that about 38% of the population was under age 15 and about 63% under age 29./4 The age

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/1 The 7.8 crude death rate is based on the assumption that 20% of deaths (mostly infant deaths) are not registered. The 21.1 crude birth rate is the rate required to obtain the natural increase rate of 1.33 (13.3 + 7.8 = 21.1).

/2 The World Bank has made three sets of projections of population growth (see para. 3.12 and Table 3.5). The intermediate projection is the one used for China in World Development Report 1981 (Washington, D.C.: The World Bank, August 1981, Tables 17 and 18).

/3 A recent careful analysis of relations among various sets of fertility data from China provides further evidence that fertility is indeed very low and likely not far above the official estimates. See Ansley J. Coale, "A Further Note on Chinese Population Statistics," Population and Development Review, September 1981. Coale concludes that "... the approximate consistency of the various figures (imperfect though we have noted them to be), including the age pattern of fertility, supports a belief that a remarkably low level of childbearing has been reached in China."

/4 Judith Banister and Samuel H. Preston, "Mortality in China," Population and Development Review 7:1 (March 1981), pp. 98-110, Table 1. For other data on age structure, see Song Jian, Tian Xueyuan, Li Guangyuan, and Yu Jingyuan, "The Problem of China's Population Growth Goals," People's Daily, March 15, 1980; and H. Yuan Tien, "Age-Sex Statistics for China: What do Recent National Disclosures and Local Figures Reveal?" Population and Development Review, December 1980.

Table 3.4: AGE DISTRIBUTION OF THE POPULATION, CHINA AND OTHER COUNTRIES

	0-4	5-14	15-64	65+
China				
1974 (sample survey) /a	12.41	25.87	57.09	4.62
1975 (World Bank estimates)/b	12.11	22.63	61.58	3.68
1980 (World Bank estimates)/b	10.63	21.63	63.66	4.08
India	15.13	25.75	56.19	2.92
Indonesia	14.98	25.11	56.85	3.05
Sri Lanka	12.06	24.19	59.58	4.16
Korea, Rep. of	11.54	22.83	61.72	3.91
Mexico	17.43	27.71	51.42	3.43
Egypt	15.26	24.55	56.70	3.49
USA	7.43	15.61	66.07	10.90
Sweden	6.13	13.66	64.30	15.90

/a Based on a 1975 survey of registered deaths and causes of deaths (survey of cancer epidemiology). For age distribution based on this survey by five-year age groups, see Judith Banister and Samuel H. Preston, "Mortality in China," Population and Development Review 7:1 (March 1981), pp. 98-110, Table 1.

/b World Bank estimates used in population projections for China.

distribution for 1980 used in the Bank projections has a smaller percent of the population (32.3%) under age 15, in part reflecting the assumption of continuing fertility decline in the late 1970s. As Table 3.4 shows, the proportion under age 15 of about 35% is below proportions of 40% to 45% in higher-fertility countries such as Mexico and India, but is above proportions between 20% and 25% in most industrialized countries.

3.11 The number of women between ages 20 and 34 was almost twice as great in 1980 as in 1950. In the later years of the 1980s, the number of women marrying and beginning to bear children will continue to rise rapidly - by as much as 50% in 1985 according to one projection of a Chinese demographer /1 as the large cohorts born in the mid-1960s enter their 20s. Partly due to this expansion of the population in childbearing ages, the Chinese population is likely to grow to about 1.24 billion in 2000.

3.12 The Chinese Government has announced the ambitious goal of reducing fertility even more, so as to limit population size to 1.2 billion in the year 2000. This would require that fertility fall below replacement level in the next two decades, and that during those years a substantial proportion of Chinese couples would have no more than one child. Table 3.5 summarizes the results of three projections of future population size and growth in China; the principal difference among the three is in the amount and rate of future fertility decline. The first, entitled the simulation of the Chinese goal, leads to a population of 1.2 billion in the year 2000; this projection assumes rapid fertility decline to below replacement level within the next decade. The second, entitled the intermediate projection, assumes less rapid fertility decline and leads to a population of 1.24 billion in the year 2000. For the third, entitled the pessimistic projection, fertility is held at its current rate for the next two decades; it leads to a population of 1.26 billion in the year 2000.

3.13 Population Distribution. The distribution of the population is very uneven; about 95% of the population lives in a thousand mile belt along the east coast. The high mountains and arid regions of the country comprise slightly more than 50% of the area but contain only about 5% of the total

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/1 Liu Zheng, "The Present Situation and the Development of China's Population," paper for the Beijing International Round Table Conference on Demography, October 1980, p. 10. Liu's projection indicates much greater fluctuations in the numbers of persons by single years of age, and is apparently based on a more specific age distribution than is available to us, one probably based on the information on annual numbers of births in the 1950s and 1960s shown in Appendix Table A.7.

Table 3.5: POPULATION TOTALS AND NATURAL INCREASE RATES, 1980 TO 2005, ALTERNATIVE PROJECTIONS

	Simulation of Chinese goal (rapid fertility decline to total fertility rate of 1.6 before year 2000)		Intermediate projection (fertility decline to total fertility rate of 2.1 by year 2000)		Pessimistic projection (fertility stable at current estimated total fertility rate of about 2.5)	
	Population total (millions)	Rate of natural increase	Population total (millions)	Rate of natural increase	Population total (millions)	Rate of natural increase
1980	977/a		977		977	
1980-85		1.32		1.26		1.26
1990	1,106		1,107		1,111	
1990-95		1.00		1.17		1.31
2000	1,202		1,239		1,264	
2000-05		0.10		0.93		1.16

/a Estimated mid-year population total, based on 1979 year-end figure.

Source: World Bank staff projections.

population, and large areas are uninhabited. The major ethnic group, the Han nationality, comprises 94% of the population, and nearly 60 minority groups constitute the remainder; the minority groups tend to inhabit the thinly-populated areas.

3.14 According to official Chinese data, a relatively small proportion of the population is urban - 13.2% in 1979./1 The reported percentage of the population living in urban areas is much smaller than that in most other countries (see Table 3.6). The cities in China grew rapidly in the 1950s, at as much as 7% annually./2 But the State has limited rural-urban migration in the last two decades, and urban growth rates have probably been lower than in the 1950s.

Table 3.6: PERCENT OF POPULATION IN URBAN AREAS, CHINA AND OTHER COUNTRIES

Country	% Urban
China, 1979	13.2
India, 1980	22
Indonesia, 1980	20
Low-income countries, 1980	21
Middle-income countries, 1980	51
Industrialized countries, 1980	77

Sources: For China, see Appendix Table A.12. For other countries, World Development Report, 1980.

/1 Appendix Table A.12 provides estimates derived from various sources of official data on the percent of the population in urban areas for the years 1953 to 1979. For the years 1977 to 1979, at least three sources point to a figure in the range of 10%-14%.

/2 Leo Orleans, in Every Fifth Child: The Population of China (Stanford University Press), 1972, cites SSB, Statistical Work.

3.15 The estimate of the urban population proportion from the 1953 census was 13.3%. It is unlikely that the urban proportion has not increased somewhat; the apparently constant share is probably a statistical artifact, due to a change to a more restrictive definition of urban. Even a constant share implies an average urban growth rate of 1.9% annually in the last three decades, about the same rate as for the population as a whole. Since annual rates of natural increase have been lower in urban than in rural areas, at least in the 1970s (e.g., about 0.88% in 1979 in urban areas, compared to 1.21% in rural areas; see Appendix Table A.2), these growth rates mean there has been some migration to cities, though little compared to other developing countries in the same years.

3.16 The low proportion of the population reportedly living in urban areas and the low apparent growth rates of urban areas do not imply, however, that changes broadly classified under the rubric of "urbanization" have not been taking place in China. It is possible, for example, that the 1979 definition of urban areas only includes areas already classified as urban in 1953,/1 and that it therefore fails to reflect increases in the density of "rural" areas that would, under a different definition, alter their classification to urban. Similarly, the small percent of the population living in officially designated urban areas must be interpreted bearing in mind the growing importance of rural industries in China. Nonfarming activities accounted for about 25% of total rural sector output in 1979, and included production of steel, cement, and agricultural machinery as well as the processing of agricultural products. The nonfarm population was reportedly 200 million in 1978, or about 20% of the total population./2

/1 The mission was informed that the current (October, 1980) definition is that the urban population includes the residents of 203 cities defined as cities by the State Council, with a reported population of 85.87 million, plus about 42.75 million residents of county "towns." (There are about 2,300 counties in the 29 provincial-level units of China. How county towns are defined is not known; the definition could vary among provinces.) See Appendix A.13 for the provincial breakdown of the urban population. UN estimates of the population of 105 cities in China with at least 200,000 residents add up to 116 million. These include suburban area populations (Patterns of Urban and Rural Population Growth, United Nations, 1980, pp. 130-131). The official criterion for the 1953 demarcation of urban was different. It was that an area would be defined as urban if it met any one of these criteria: (a) seat of municipal peoples' committee above the county level; (b) a minimum resident population of 2,000, at least 50% of which is nonagricultural; and (c) a resident population of between 1,000 and 2,000, 75% of which is nonagricultural.

/2 See Annex C (Agricultural Development), Table 1.1. The 25% estimate is based on the ratio of commune- and brigade-managed enterprises' output to total rural output, the latter being the sum of commune enterprise output and gross agricultural output (1979).

3.17 At the same time, it is clear that the agricultural sector has borne the burden of absorbing new persons into useful jobs. Despite growth of nonagricultural employment in rural areas, the annual growth rate of the agricultural labor force over the past two decades was 2%, compared to about 1% between 1950 and 1970 in South Asia, causing continued population pressure on land. In the mid-1970s, cultivated area per rural person was lower in China than in Japan, Egypt or Bangladesh (Table 3.7).

Table 3.7: CULTIVATED AREA PER CAPITA OF AGRICULTURAL POPULATION IN THE MID-1970s: AN INTERNATIONAL COMPARISON

Country	Cultivated land (ha per capita)
Japan	0.25
Netherlands	0.78
Egypt	0.15
Korea, Rep. of	0.14
Indonesia	0.16
Bangladesh	0.15
India	0.42
China	0.12

Source: Main Report, Table 1.1.

B. Birth Planning and Other Factors Explaining China's Fertility Decline

3.18 No single factor explains the recent fertility decline in China to its current low level. In this section, we begin with a description of one input to the low fertility level, the Government's birth planning policy. We then consider how other changes in post-revolution China - particularly reductions in infant mortality and increases in education - have helped to provide a setting within which the birth planning policy could operate more effectively./1

/1 A comprehensive treatment of many of the issues discussed in this section may be found in "Fertility Decline in China," by John S. Aird, in N. Eberstadt (editor), Fertility Decline in the Less Developed Countries (New York, Praeger, 1981). Aird's discussion of the limitations that data quality places on outside analyses of population issues in China is of particular interest.

3.19 Birth Planning. With birth planning as with other policies, there have been changes in the direction and intensity of policy. In 1956, following the 1953 census, the Government announced a policy of promoting late marriage and birth limitation. This was replaced by ideological polemics against population control during the Great Leap Forward, which started in 1958. Attempts were made to reintroduce the birth planning program in the early 1960s, but contraceptive services were disrupted during the early years of the Cultural Revolution (1966-69). Throughout this period, the program was justified principally in terms of its contribution to maternal and child health./1

3.20 In the early 1970s, however, a new birth control campaign began in earnest. Birth planning was more closely linked to the national objectives of economic development and modernization. The Government endorsed a specific set of norms with respect to childbearing, embodied in the slogan of "later, longer, fewer" - late marriage and childbirth, spacing (of at least four years) between children, and a smaller total number of children per couple. With its adoption the notion that reproduction is a concern not only of the family, but also of the society, was specifically endorsed for the first time in China. The current goal of population policy is to limit total population to 1.2 billion in the year 2000.

3.21 The administrative responsibility for birth planning activities was placed under a reorganized Birth Planning Leading Group of the State Council./2 Planned birth offices were set up at every level down to the commune in rural areas and the street committees (between 15 and 40 households) in urban areas. Committees on Planned Births were also established in large enterprises and institutions.

3.22 The vertical administrative structure embodied in the Birth Planning Group at the level of the State Council distinguishes China from most other developing countries, in which the administration and responsibility for birth planning services is integrated with the administration of other health services. (The vertical approach also is used for important aspects of the preventive health service; see Figure 5 above for illustration of the relation of the vertical programs, including birth planning, to the clinical health services.) Close ties to the top leadership provide a vehicle for applying political force to a goal, population limitation, that is viewed as a means to

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/1 Leo Orleans, "China's Population Growth: Another Perspective," Current Scene, XVI:283 (February/March, 1978) p.5.

/2 For more detail on how the birth planning program is organized and administered, see Pi-Chao Chen, "Population Policy and the Rural Health System in China," World Bank (draft), October, 1980. Unless otherwise noted, the discussion that follows is based on his paper. (As of early March 1981, it appears that the Birth Planning Leading Group has been superseded by a Family Planning State Commission, reporting to the same Vice Premier.)

more rapid economic development, and not only as an input to better health or improved family welfare.

3.23 At the same time, the vertical control of the planned birth campaign is complemented by horizontal leadership and control at the local level, through both the supreme local government organization and the local party organization.

3.24 As a result, there is room for, and encouragement of, local initiatives. However, the system of local control also has a cost: it creates an environment in which the line between persuasion and coercion may be overstepped by local cadres. There have been reports of local cadres using coercive measures during sterilization campaigns, for example.

3.25 At the local level, the actual provision of birth planning services is apparently quite easily integrated with the provision of health services. Many health workers provide birth planning services. Most birth planning workers are locally paid and part-time. There is by one estimate an average of one part-time birth planning worker for every 20-40 households throughout most of rural China; most of these are female barefoot doctors who combine delivery of contraceptives with other health care at the brigade level.

3.26 Throughout the 1970s, the Government's objective of reducing fertility has been backed up in a variety of ways - free contraceptives, delayed marriage, quotas and peer pressure, and economic incentives and disincentives.

3.27 First, free contraceptives are universally available. It is estimated that of the 115 million women at risk, 70% are practicing contraception. In the few apparently high-performance provinces for which data are available, the contraceptive use rate is above 80% (Appendix Table A.14).[1] As shown in Figure 8, these rates are comparable to and even above those in developed countries, such as 68% in the United States (1976) and 79% in France (1978). They are well above rates such as 23% in India, 40% in Sri Lanka, and 46% in Colombia.

3.28 Of married couples using contraceptives in China, about 50% use the intrauterine device (IUD), 30% sterilization (17% female, 12% male), 12% oral contraceptives, and 7% condoms (see Appendix Table A.14). Compared to other countries, as is clear in Figure 8, the Chinese have relied much more on the IUD and much less on the pill (oral contraceptives). Insertion and monitoring of IUDs requires an adequate health delivery system, which is available in most of China. At the same time, to be effective, the IUD does not require on the part of the individual user the series of daily decisions required for effective use of the pill.

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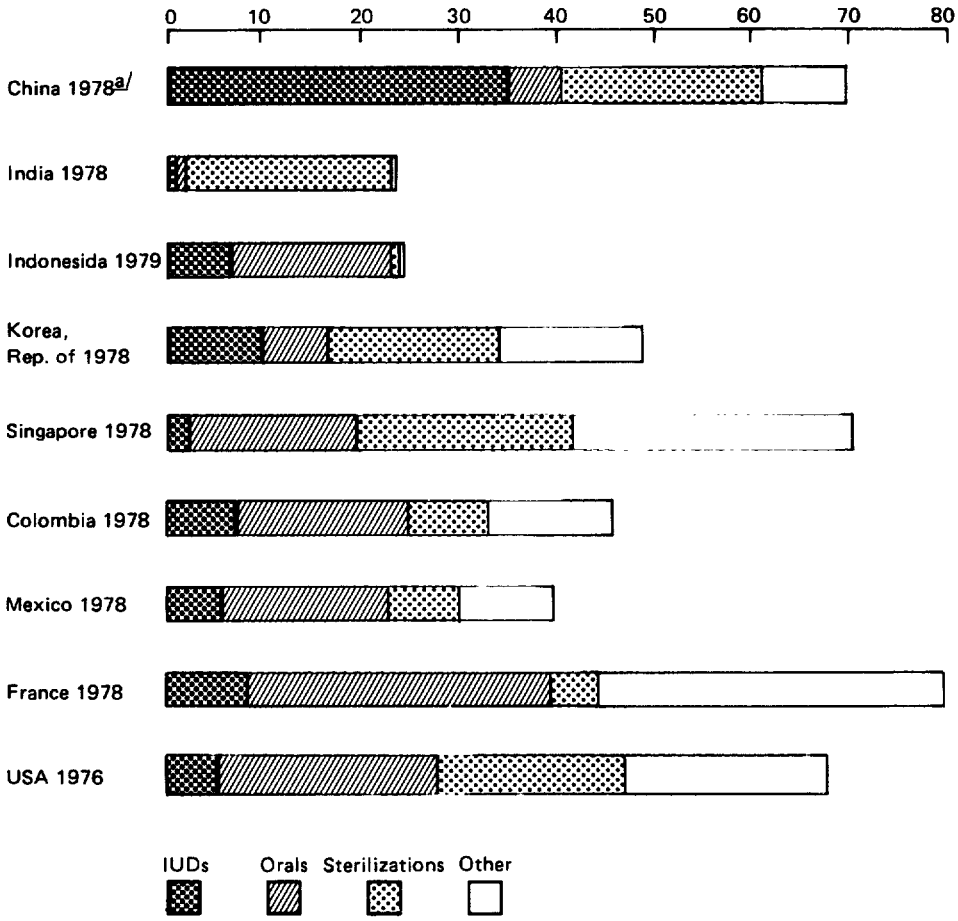
[1] In the two provinces where the mission obtained data, the reported 1979 contraceptive use rate was 89% (Jiangsu) and 84% (Gansu).

Figure 8: PERCENT OF MARRIED WOMEN OF REPRODUCTIVE AGE USING SPECIFIED CONTRACEPTIVE METHODS



a/ Sterilizations for males are included in figure. They make up 8.4% of China's total contraceptive use.

Source: For China: A.14.

For rest of the countries: Nortman, Dorothy, "Empirical Patterns of Contraceptive Use: A Review of the Nature and Sources of Data and Recent Findings." New York: Population Council, 1980. p. 13.

World Bank — 22596

3.29 Abortion provides a back-up to contraception, and it was legalized in 1956. The mission was informed that in 1979 there were about 5 million abortions and about 17 million live births, or an abortion rate of about 290 per thousand. Abortion rates are much higher in cities, partly because rural women go to the cities, where hospital services are available, for abortions. The reported rate for the city of Tianjin was 1114 abortions per 1000 live births in 1978; for Chengdu Municipality in Sichuan Province, it was 580 in 1979, compared to 371 in 1971./1 Comparable data on abortion rates in other countries are difficult to obtain, but the Chinese rate is probably as high as anywhere in the developing world.

3.30 Second, the Government mounted a major campaign to raise the age of marriage of males to 28 and females to 25 in urban areas, and to 25 and 23 years, respectively, in rural areas./2 There are no nationwide data on trends in age at marriage, but the high proportion of couples reported to have conformed to the "late marriage rate" suggests some increase. Table 3.8 shows the late marriage rate in areas for which data are available. In the provinces of Guangdong, Jiangsu and Hebei and in the municipality of Shanghai, more than three-quarters of all husbands and wives in 1977-78 (more than 90% in Hebei and Shanghai city) had been married at or above the recommended ages of 25 for men and 23 for women. In Singapore, for comparison, about one third of couples were married above those ages /3 (Appendix Table A.17).

3.31 Data based on a small sample indicate marriage age has probably risen more in urban areas, probably due not only to the new norms but to housing shortages, the former practice of "sending down" school graduates to rural areas for several years, and the difficulties of setting up new households due to shortages of consumption goods viewed as essential for

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/1 H. Yuan Tien, "Wan, Xi, Shao: How China Meets Its Population Problem," International Family Planning Perspectives, VI: 2 (June, 1980), 980, p.73, based on data provided by the Planned Reproduction Committee of Chengdu.

/2 The legal minimum age at marriage had been 20 for men and 18 for women. A new law has just raised these ages to 22 and 20, respectively. Debate preceding the change in the legal minimum suggests it could be interpreted as a relaxation of the existing norms, in that pressures to marry at ages well above the legal minimum are being relaxed. The change in regulations has reportedly led to a recent spate of marriage registrations.

/3 Mean age at marriage is between 23 and 25 in Hong Kong and Singapore. The higher late marriage rate in China need not mean that age at marriage is very different, as long as there is more concentration of marriage at the ages deemed acceptable.

Table 3.8: REPORTED LATE MARRIAGE RATE AND PLANNED BIRTH RATE, SELECTED AREAS OF CHINA

	Late marriage rate	Planned birth rate
Guangdong	75.0	61.0
Jiangsu	88.5	60.8
Hebei	93.0	77.0
Shanghai		
City proper	90.0	85.0
Periurban counties	80.0	75.0
Zinghui /a (Guangdong)	95.85	62.0
Hengxien /a (Guangxi)	98.0	N/A
Taoyuan /a (Hunan)	-	70.0
Changsha /a (Hunan)	97.0	70.9
Xian /a (Shaanxi)	94.4	67.0

/a Refers to 1977.

$$\text{Late marriage rate (couple)} = \frac{\text{Number of women married at 23 years or older in a calendar year}}{\text{Total number of married men and women married in a calendar year}} \times 100$$

$$\text{Planned birth rate} = \frac{\text{Number of first live-births to mothers conforming to the late marriage norm + number of second live-births to couples conforming to the longer spacing norm}}{\text{Total number of births}} \times 100$$

Source: Appendix Table A.16

newlyweds./1 In 1978, only 1.1% of all births in the city of Tianjin were to women aged less than 25, indicating either that few women marry before age 24, or that if they do, the first birth is delayed./2

3.32 Despite these successes in raising age of marriage and despite the recent increase in the minimum age, birth planning officials in China anticipate that age of marriage will decline in the next few years. This is because with increased emphasis on economic incentives and the decentralization of decision-making, the communes' capacity to establish disincentives (e.g. reduced work points) for early marriage will be weakened. As a consequence, policy efforts will increasingly focus on delaying the birth of the first child rather than delaying marriage.

3.33 Third, study groups at the brigade and commune levels have been set up to set birth quotas and allocate births to couples in a particular order: first to newlywed couples who conform to the norm of late marriage, and to married but childless couples, and then to couples with one child aged 4 or above. In addition to setting goals and monitoring progress, these study groups provide a forum for intense social pressure. The local branches of the State Council's Planned Reproduction Group are charged with maintaining for every married woman of reproductive age a Planned Reproduction Card, which shows the number of her previous births, by sex, the date of her last birth and the type of contraception she uses. These cards are the basis for compilation by each group of the "planned birth rate," which indicates what percentage of births was to couples conforming to the late marriage norm and to the 4-year spacing norm./3 As indicated in Table 3.8 above, the planned birth rate is at least 60% in provinces for which data are available. It is 85% in Shanghai city proper. Only 10% of all births represented a third child in Shanghai municipality as a whole, and only 2% in Shanghai city proper (Appendix Table A.16).

3.34 In 1979, the Government initiated a campaign to promote the one-child family. Its purpose is to reduce family size in the next two decades enough to bring the birth rate down still further, even in the face of the

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/1 William Parish, "Marriage and Family in the People's Republic of China," paper presented at the Hawaii Conference on Population in China, May, 1980, reports an increase in age at marriage by 1977 to almost 25 for women and almost 28 for men, from 21 and 24 respectively in 1949, among a small sample. His data are from a 1977/78 study of emigres from 133 urban neighborhoods scattered throughout China, collected in Hong Kong, and may not be representative of the urban population of China as a whole.

/2 Katherine Chiu Lyle, Sheldon J. Segal, Chih-Cheng Chang and Li-chuan Chien, "Perinatal Study in Tientsin: 1978," International Journal of Gynaecology and Obstetrics 18 (1980).

/3 The individual cards are also the basis for compilation of the "late marriage rate."

continuing increase in the proportion of the population entering childbearing years. This is a sacrifice expected of parents - because there will be so many of them - over at least the next two decades, though not necessarily of parents in the indefinite future. By the end of 1979, 29% of one-child couples had applied for a one-child certificate, issued to one-child couples who pledge to have no more children.

3.35 Finally, there are economic incentives and disincentives to discourage births, and more recently in particular to promote the one-child family. Incentives have existed since the early 1970s when the Central Government instituted a schedule of benefits, in the form of vacation days, for women undergoing various types of planned birth operations. In urban areas, these are 14 days for induced abortion, 10 days for tubal ligation, 2-3 days for insertion or removal of IUD, and in the case of post-partum sterilization, 7 extra days over the normal 56 days of paid maternity leave. In rural areas women are generally allocated work points equivalent to this schedule of benefits.

3.36 The possibility of additional incentives specifically to promote the one-child family was raised in August 1979./1 There is no uniform national set of incentives to date, but the Central Government has been encouraging, even requiring, each area and province to draw up its own measures. Sichuan's, for example, provide for a five-yuan monthly subsidy to one-child families (8% of the average worker's wage) until the child is 14 years old. The child will have priority in admission to schools and in obtaining a factory job. In rural areas in Hunan, one-child parents are to receive an annual bonus of 400 workpoints until their child is 14 years old, and private plots and housing lots of a two-child standard. Disincentives apply to the birth of a third child; they include deductions of wages or workpoints (amounting to 5% in Hunan and 10% in Tianjin and Shanghai), payment by parents of all medical expenses for a third child and the exclusion of that child from cooperative medical schemes (Anhui). The mission found similar incentive mechanisms implemented in Gansu and Jiangsu. Appendix Table A.19 summarizes available information on incentives and disincentives by location.

/1 People's Daily (August 11, 1979), translated in Population and Development Review, Vol. 5, No. 4, pp. 723-729.

3.37 In a February 1980 radio broadcast and an editorial in the People's Daily, the Chinese called attention to the role of education and persuasion in inducing couples to have only one child, rather than any direct financial incentives. Perhaps the motivation was the financial burden demographic success would impose; in particular if the current arrangement (under which incentives are designed, financed, and carried out at the local level) were continued, it is not clear how areas which did not have enough couples to penalize could finance rewards to those who agreed to a single child. Provincial officials in Gansu expressed their concerns on this point to the mission. Clearly a more easily financed route, particularly for poorer provinces, would be to make the single child a norm to be expected of all, rather than an exceptional contribution to be rewarded; the question is whether this is a feasible alternative.

3.38 The incorporation into birth planning policy of such a wide array of financial and other incentives and disincentives, whether eventually systematized at the national level, or whether left to local areas, has no precedent elsewhere. It reflects both the extraordinary concern of Chinese planners that continued rapid population growth will undermine development efforts, and a willingness and apparent capacity of the government to shift childbearing decisions from the family unit to the social arena, in the interests of long-term community objectives. It may also be the only effective way to reduce fertility below what is, given China's level of socioeconomic development, already a very low level.

3.39 Explaining China's Fertility Decline. Without data for different parts of China on actual birth planning inputs in recent years (e.g. expenditures per woman on birth planning services, person-days of health staff devoted to birth planning activities, amount and types of local incentives to reduce births), it is impossible to quantify the contribution of the government policy and programs to fertility decline. Separating the effect of the policy from effects of other factors - such as declining infant mortality, increasing female education and employment, rising wages, and the difficulty of obtaining housing in urban areas - is difficult in the absence of better data. However, there are several indications that the policy itself has been critical.

3.40 One is the comparison of China's current low fertility to that of other low-income countries. For most of the world, birth and death rates are closely associated with per capita income. In general, the higher a country's per capita income, the lower its birth and death rates. Among developing countries, those of sub-Saharan Africa and the Indian subcontinent (Bangladesh, India, Pakistan) have the highest levels of fertility and mortality and the lowest incomes; the developed countries have the lowest levels of fertility and mortality and the highest incomes.

3.41 China is a striking exception to this rule. Its very low fertility given its income was illustrated in Figure 6, in which the expected relationship between per capita income and total fertility rate was shown for 88 developing countries; China's fertility lies well below the value expected for its

income. There are other low-income countries with relatively low fertility - including India and Sri Lanka - but India's total fertility rate is 5.0 compared to China's estimated 2.75 (1979), and even Sri Lanka has a total fertility rate of 3.7. Korea's TFR is 2.8, little different from China's, but Korea is of course much richer than China. Indeed, except for Singapore and Yugoslavia, not one of the countries classified as "developing" by the World Bank has a lower fertility rate than China. Of course, China is different from other developing countries in a number of ways that contribute to low fertility - not only with respect to its strong birth planning policy. It has lower infant mortality rates than most, and higher rates of female education. These we discuss below. But even when life expectancy and literacy are taken into account, China still has unusually low fertility compared to other countries./1

3.42 The second indicator of policy success is the extent and speed of China's fertility decline. Fertility has declined farther and faster than income gains and other changes alone could explain. According to official estimates, the crude birth rate fell by 19% between 1965 and 1971, from 38 to 30.7 per thousand. This in itself is impressive, but much of it may be attributable to the shifts in population and dislocation of family life associated with the Cultural Revolution. The birth planning campaign began in earnest in 1972. Between 1972 and 1979 came further declines of birth rates in the more difficult to obtain range below 30 per thousand, by 67%, from 29.9 per thousand in 1972 to 17.9 in 1979./2 In a limited number of communes for which data are available, the number of women of different ages sterilized also suggests the impact of the intensification of the government effort in the 1970s. Among women aged 25-29 in one area, only 19% of those sterilized had three or more children. Among women in age groups 30-34 and 35-39, the figures were 56% and 61% respectively./3 More generally,

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/1 For example, if we apply regression coefficients obtained by estimating the crude birth rates of 70 developing countries, to 1979 estimates of China's per capita income, crude death rate and the literacy rate, the resulting "expected" crude birth rate of China is 35, well above its reported CBR.

/2 That fertility decline accelerated in the 1970s is suggested by a variety of sources at the local level. Pi-Chao Chen (correspondence, October 1980) cites the age pyramid of Nanchuang commune, a rural commune in which the number of children aged 0-4 in 1977 appears to be only about 65% of the number 5-9 (data source unknown), and time series data of vital rates for Guangdong Province, which indicate crude birth rates of 36.3 in 1965, 29.2 in 1970 and 18.6 in 1977. (Data provided to Pi-Chao Chen by Guangdong Provincial Planned Birth Staff Office in 1978.)

/3 H. Yuan Tien, "Wan, Xi, Shao: How China Meets Its Population Problem," International Family Planning Perspectives VI:2 (June 1980).

contraceptive prevalence rates are as high in China as in most developed countries, presumably in large part due to government provision of services and pressure on couples to use those services.

3.43 The third line of evidence indicating the importance of policy in promoting fertility decline comes from analysis of data provided to the mission on rural collective income per capita and rates of natural increase in 1979 in the 29 provincial-level units; and on 1979 income and 1975 and 1979 crude birth rates for the 68 counties of Jiangsu province. Analysis of the data indicates that income, though always negatively associated with birth rates, explains a lower proportion of the variation in natural increase rates and birth rates in more recent years than in the past, presumably because the relative contribution of the government initiatives has increased. For example, the income variable alone explains about 50% of the variation in rates of natural increase among provinces in 1965 - but only about 20% in 1979.

3.44 Finally, the Government and local birth planning cadres clearly associate dramatic declines in fertility in local areas with the inputs of the birth planning program. This is evident in the manner in which local data on the "late marriage rate" and "planned birth rate" are compiled, and in the recent promulgation of various financial incentives and disincentives to encourage couples to have only one child.

3.45 On the other hand, it would be incorrect to believe that the birth planning policy has operated in a vacuum. Analysis indicates that there is a clear negative relationship between rates of population growth and income across regions of China. This negative relationship existed in 1965, and has persisted throughout the entire period of fertility decline. As is the case among countries and within other countries, fertility is lower in China in regions that have higher average per capita income, a larger proportion of production teams above a low-income cutoff and, presumably, more education, better employment opportunities, and better access to health services. Within the single province of Jiangsu, a county's income was also associated negatively with its birth rates and explained almost 50% of the variation among counties in crude birth rates in 1975. Other data also point to a negative relationship between socioeconomic status and fertility. A 1963 survey in Shanghai indicated a positive association between age at marriage and economic level (measured by occupation, income and housing conditions) and a negative association with family size./1 Fertility is clearly lower in urban areas, where income is higher, than in rural areas

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/1 Gu Xing-Yuan, "Analyses of Fertility Trends in China," n.d.

(Appendix Table A.2) and probably lower in large cities than in county towns./1

3.46 Several other factors associated with low fertility across countries undoubtedly helped set the stage for the rapid fertility decline of the 1970s in China. The first is the significant gains in life expectancy achieved in the 1950s and 1960s (Table 2.1 above) and the probable drops in infant mortality that occurred throughout this period and that contributed to increased life expectancy. Infant mortality for China as a whole in 1973-75 ranged between 53 and 63 per thousand (Table 2.2 above), which compares favorably with a rate of 37 per thousand in Korea, 68 in Thailand, and 62 in Brazil./2 A point related to that of general health improvement is that the creation of an extensive health care delivery system in the 1960s provided the structure within which intensification of birth planning programs could be implemented in the 1970s. Few other developing countries could so easily launch a birth planning program of the magnitude of China's, simply because comparable health service delivery systems are not in place.

3.47 A second factor is the current relatively widespread access to basic education, and in particular the increases in female enrollment rates in the post-revolution period. The enrollment ratio in primary schools has risen from 25% to 93%./3 Of primary school-age girls, 84% are now enrolled, compared to an average among all developing countries of 56%. Girls educated in the 1950s and 1960s are now in their childbearing years. Secondary and higher education encourage reduced fertility because they broaden female opportunities beyond family and childbearing; but very few adult women in China have received more than primary education. However, even a few years of schooling are likely to improve the effectiveness of contraceptive use; it is in this regard that China is probably now reaping the benefits, in terms of reduced fertility, of widespread basic education. In China, a higher proportion of women now in their twenties has received some primary education than in most other low-income developing countries.

3.48 Other effects of education on fertility are probably also important, though they are indirect and difficult to measure. Education has undoubtedly contributed to lower infant mortality, and through reduced mortality, to reductions in fertility. And for adults who have not been

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/1 William Parish, "Marriage and Family in the People's Republic of China," paper presented at the Hawaii Conference on Population in China, May 1980, Table 9, shows number of children per woman by residence to women aged 35-44 who had emigrated to Hong Kong. Women from county seats had 2.8 children on average; women from one of the three national municipalities (Beijing, Shanghai, Tianjin) had 2.2 children on average.

/2 1978 data for other countries are from World Development Report, 1980.

/3 See Annex I (Education).

educated, even the fact of access to schooling for their own children is likely to reduce their demand for many children; one or two skilled children may well substitute for many unskilled in providing support in old age.

3.49 Also associated with low fertility across countries is the distribution of income. In China, the nutritional evidence (Chapter 2, Section B) indicates substantial success in achieving a floor below which relatively few households fall with respect to consumption of food (and probably health services). Similarly, data from a few urban and semi-urban areas on heights and weights of Chinese school children show there has been improvement over time in the nutritional status of Chinese children, and suggest they are better off than children in countries with similar per capita incomes. This factor, too, has probably facilitated acceptance of fertility limitation in China.

C. Implications of Population Change for the Future

3.50 The idea that a reduction in the rate of population growth will raise per capita consumption rests on two economic assumptions: first, that a slowdown in the rate of labor force growth will reduce pressure on the scarce factors of production, land and capital, and prevent ever diminishing returns to labor; and second, that as the ratio of dependents to workers declines, total savings can increase, providing for new investments in education and in physical capital. Whether these assumptions are valid, however, depends on other circumstances that can offset the benefits of a declining population growth rate: technological stagnation; low substitution elasticities between capital and labor and between educated and uneducated labor; changes in the political climate or in the international trade environment. As a result, it is difficult to isolate the macroeconomic consequences of a decline in population growth in China, independent of other changes. We can, however, describe changes in age structure and consider how they are likely to be related to changes in labor productivity and in investment potential over time.

3.51 Table 3.9 indicates the estimates of the current age distribution of China used in World Bank population projections for China, and shows estimates of the future population using two different projections of the population: the World Bank projection (which assumes a fertility decline to a fertility rate of 2.1 by the year 2000); and a projection that simulates the Chinese goal of restricting future population size to 1.2 billion in the year 2000 (which assumes a fertility decline to a fertility rate of 1.6 by the year 2000).

3.52 In both projections, but more markedly in the simulation of the Chinese goal, the proportion of children declines and the proportion of old people increases.

Table 3.9: CURRENT AND PROJECTED AGE DISTRIBUTION OF CHINA

Country	0-14	15-64	65+
China, 1980	32.26	63.66	4.08
Projection of Intermediate Fertility Decline			
China, 2000	25.04	68.19	6.77
China, 2030	20.51	65.19	14.29
Simulation of Official Goal			
China, 2000	21.91	70.89	7.21
China, 2030	12.11	68.46	19.43

Source: World Bank population projections.

3.53 Most notable is that there is a projected decline in the absolute size of the school-age population (Appendix Table A.5). This group increased in size by more than 15% between 1960 and 1980; in the scenario based on the simulation of the official Chinese goal, its size will decline to about 90% of its 1980 level by 2000. In the intermediate scenario, the decline would be less - to about 95% of the 1980 level in 2000. In both cases, of course, there will be greater scope than in the past for improving the coverage and quality of education. Over the next 50 years, the school-age population will decline substantially as a proportion of the total, from 21% today to 13% in the intermediate projection, and to 8% in the simulation of the Chinese goal (Appendix Table A.5).

3.54 Another positive aspect of the future changes in the age structure of the population will be a temporary decline in the dependency ratio. Even in the less optimistic scenario, the proportion of children will, for the next 20 years, decline faster than the proportion of old people rises, causing an increase in the proportion of people of prime working age. After about 2000, the situation will be reversed for the next several decades.

3.55 The medium-term decline in the dependency ratio, however, will not prove an economic or social blessing unless this relatively large (and numerically gigantic) increase in the labor force can be productively employed. This will be made easier by the increased emphasis on personal

services and light manufacturing industry - though in fact the heavy manufacturing subsector that is contracting most rapidly (engineering) is relatively labor-intensive. But job creation will require substantial investment, and will thus conflict with the Government's objective of raising the share of consumption.

3.56 Of particular concern are the prospects of workers under 30 years of age, whose numbers will rise by over 30 million in the next decade (Appendix Table A.4). Unemployment in most other countries, as in China, is concentrated in this age group - partly because of social pressures that prevent young workers from displacing older (but less well-educated) workers, but also because there appear to be economic limits to the rate at which inexperienced workers (however well-educated) can be absorbed. In China, this problem could be aggravated by the fact that many young workers in the next decade will have been less well-educated than their seniors, as a result of the educational disruptions of the Cultural Revolution. On the other hand, however, the difficulty of absorbing and training inexperienced workers will undoubtedly be eased in China by the fact that (under either of the scenarios mentioned) from now on they will be a declining proportion of the labor force.

3.57 It is notable that even given the substantial fertility declines projected, the working-age group as a whole does not decline as a proportion of the total population over the next 50 years. Indeed, as shown in Table 3.9, in the projection of intermediate fertility decline, it increases to 65% from the current 64%, and in the simulation it increases to 68%.

3.58 Nor will there be a problem of too large a proportion of old people, at least until well into the 21st century. Table 3.9 indicates that though the proportion of old persons will increase in China, it will, under the intermediate projection set of assumptions, still constitute less than 15% of the total population in the year 2030; this is comparable to about 16% in Sweden and 11% in the USA today. The projection simulating the Chinese goal, with its more rapid fertility decline, leads to almost 20% of the population being over age 65 by 2030. But even then, as noted above, the working age population will still constitute more than 65% of the total population, compared to 64% today. There would be, of course, relatively fewer children - 12% compared to 33% today.

3.59 From a societal point of view, this would be a different world, but not necessarily an unmanageable one. The proportion of persons in the productive ages would not fall and the dependency burden not increase; the working group would simply be supporting the dependent old rather than the dependent young. The obvious alterations in the nature and structure of social services would have to be implemented beginning in the early years of the next century.

Table A.1: POPULATION TOTALS, BIRTH, DEATH AND INCREASE RATES, 1949-79: OFFICIAL AND SEMI-OFFICIAL DATA

(1) Year	(2) Year-end totals ('000)	(3) Crude birth rates	(4) Crude death rates	(5) Rate of natural increase (3)-(4)	(6) Rate of increase [Based on (2)]/a	(7) Census totals ('000)
1949	541,670					
1950	551,960	37.00	18.00	19.00	18.82	
1951	563,000				19.80	
1952	574,820	37.00	17.00	20.00	20.78	
1953	587,960				22.60	582,603
1954	601,720	37.79	13.18	24.79	23.13	
1955	614,650	32.60	12.28	20.32	21.25	
1956	627,800	31.90	11.40	20.50	21.17	
1957	646,530	34.03	10.80	23.23	29.40	
1960			25.40			
1962		37.00	10.00	27.00		
1963		43.60	10.10	33.50		691,220
1964						
1965	725,380	38.10	9.60	28.50		
1970	825,920	33.60	7.6	26.0		
1971	847,790	30.74	7.34	23.40	26.1	
1972	867,270	29.9	7.60	22.3	22.7	
1973	886,610	28.1	7.1	21.0	23.2	
1974	904,090	25.0	7.4	17.6	18.4	
1975	919,700	23.1	7.3	15.80	17.1	
1976	932,670	20.0	7.3	12.7	14.0	
1977	945,240	19.03	6.91	12.12	13.4	
1978	958,090	13.34	6.29	12.05	13.5	
1979	970,920	17.90	6.20	11.70	13.3	
1980	982,550	n.a.	n.a.	n.a.	11.9	

/a These rates are calculated on the basis of exponential, or continuous compounding.

Sources: Year-End Population Totals

1949-56: Statistical Work, June 1957.
1957 : Ten Great Years, September 1959.
1965; 1970-79: Provided to the mission by the SSB.
1980: "Communique on the Fulfillment of China's 1980 National Economic Plan," NCNA Broadcast, April 29, 1981.

Crude Birth and Death Rates

1960: Sun Yefang, "Consolidate Statistics Work, Reform the Statistics System," Jungji Guanli No. 2, February 13, 1981 (Foreign Broadcast Information Service, March 26, 1981).
1950, 1962: Liu Zheng, "The Present Situation and the Development of China's Population." Beijing International Round Table Conference on Demography, October 1980.
1952, 1954-57, 1971, 1977: Provided to Pi-Chao Chen in 1979 by SSB official.
1963: Wang Jianmin, "Earnestly Control the Growth of Population," Wenhuibao, Shanghai, July 12, 1979, p. 3; and Song Jian, "On the Problem of the Targets for China's Population Development," Renmin ribao, Beijing, March 7, 1980, p. 5.
1970, 1972-76: Provided to the mission by the SSB.
1978: Chen Muhua, "For the Realization of the Four Modernizations, There Must be Planned Control of Population Growth," Renmin ribao, Beijing, August 11, 1979, p. 2.
1979: SSB, " Communique on the Fulfillment of China's 1979 National Economic Plan," Xinhua - English, Beijing, April 30, 1980, Foreign Broadcast Information Service, No. 85, April 30, 1980, p. L10.

Census Totals

1953: "Communique of Results of Census and Registration of China's Population." Xinhua, Beijing, Nov. 1, 1954. American Consulate General, Hong Kong, Current Background, No. 301, Nov. 30, 1954.
1964: China Atlas, Beijing, 1972, cited in John Aird, "Recent Provincial Population Figures," The China Quarterly, No. 73, March 1978, p. 16.

Table A.2: BIRTH AND DEATH RATES FOR URBAN AND RURAL AREAS, 1954-79: OFFICIAL AND SEMI-OFFICIAL DATA

	Urban		Rural		Total	
	CBR/a	CDR/b	CBR/a	CDR/b	CBR/a	CDR/b
1954	42.45	8.07	37.51	13.71	37.39	13.18
1957	44.48	8.47	32.81	11.07	34.03	10.80
1962	35.93	8.39	37.43	10.37	37.00	10.00
1963	45.00	7.19	43.38	10.55	43.60	10.10
1964	33.02	7.42	40.27	12.17	39.40	11.60
1966	21.70	5.80	36.71	9.47	35.00	9.10
1970					33.6	7.6
1971	21.9	5.5	31.9	7.6	30.7	7.3
1972	20.1	5.5	31.2	7.9	29.9	7.6
1973	18.1	5.2	29.3	7.3	28.1	7.1
1974	15.1	5.5	26.2	7.6	25.0	7.4
1975	15.2	5.6	24.2	7.6	23.1	7.3
1976	13.7	6.9	20.9	7.4	20.0	7.3
1977	13.9	5.7	19.7	7.1	19.0	6.9
1978	14.1	5.3	18.9	6.4	18.3	6.3
1979	13.9	5.1	18.5	6.4	17.9	6.2

/a Crude birth rate (per thousand).
/b Crude death rate (per thousand).

Notes: (i) All figures exclude Taiwan.
(ii) Urban areas are the 203 population centers denoted as "urban" by the State Council, plus county towns, of which there are about 2,300.

Sources: 1954-66: Liu Zheng. "The Present Situation and the Development of China's Population." Beijing International Round Table Conference on Demography, October 1980, p. 6. 1970-79: Data provided to mission by the State Statistical Bureau.

Table A.3: POPULATION TOTALS, BIRTH, DEATH AND NATURAL INCREASE RATES, 1980-2030, UNDER TWO ALTERNATIVE PROJECTIONS

Year	Crude birth rates		Crude death rates		Rate of natural increase		Population totals ('000) /a	
	Official goal projection	World Bank projection	Official goal projection	World Bank projection	Official goal projection	World Bank projection	Official goal projection	World Bank projection
1980-85	19.9	20.1	6.7	7.6	1.32	1.26	977,420	977,420
1985-90	18.2	19.8	6.7	7.4	1.16	1.24	1,044,238	1,040,848
1990-95	16.7	19.1	6.7	7.3	1.00	1.17	1,106,388	1,107,261
1995-2000	13.6	18.1	6.9	7.4	0.67	1.08	1,163,118	1,174,168
2000-05	8.3	16.8	7.3	7.5	0.10	0.93	1,202,485	1,239,109
2005-10	8.1	15.6	8.1	7.8	0.00	0.78	1,208,565	1,298,059
2010-15	7.8	14.8	9.1	8.3	-0.12	0.65	1,208,655	1,349,643
2015-20	7.7	14.5	10.2	8.8	-0.25	0.57	1,201,374	1,394,047
2020-25	7.3	14.4	11.5	9.5	-0.42	0.49	1,186,225	1,434,112
2025-30	8.9	14.2	13.1	10.1	-0.42	0.41	1,161,290	1,470,010

/a Population totals are for the initial years indicated.

Table A.4: ALTERNATIVE PROJECTIONS OF CHINESE WORKING-AGE POPULATION BY AGE GROUP, 1980-2030 (in thousands)

	Young working age (15-30)			Older working age (31-64)			Total working age (15-64)			
	Absolute size	Percent of 1980	Proportion of total population	Absolute size	Percent of 1980	Proportion of total population	Absolute size	Percent of 1980	Proportion of total population	Total population
				Simulation of Official Chinese Goal						
1980	293,921	100	30.07	328,317	100	33.59	622.238	100	63.66	977,420
1990	326,571	111	29.52	428,249	130	38.71	754,820	121	68.22	1,106,443
2000	323,334	110	26.89	529,106	161	44.00	852,440	137	70.89	1,202,538
2010	298,441	102	24.69	609,240	186	50.40	907,681	146	75.10	1,208,707
2020	235,751	80	19.87	635,730	194	53.59	871,481	140	73.46	1,186,278
2030	156,080	53	13.72	622,570	190	54.74	778,650	125	68.46	1,137,371
				Projection of Intermediate Fertility Decline						
1980	293,921	100	30.07	328,317	100	33.59	622,238	100	63.66	977,420
1990	325,566	111	29.40	425,471	130	38.43	751,037	121	67.83	1,107,261
2000	321,262	109	25.93	523,706	160	42.26	844,968	136	68.19	1,239,109
2010	316,065	108	23.42	602,232	183	44.62	918,297	148	68.04	1,349,643
2020	331,168	113	23.09	633,268	193	44.16	964,436	155	67.25	1,434,112
2030	322,809	110	21.52	655,286	200	43.68	978,095	157	65.19	1,500,289

Table A.5: ALTERNATIVE PROJECTIONS OF CHINESE SCHOOL-AGE POPULATION BY AGE GROUP, 1980-2030 (in thousands)

	Aged 7-11			Aged 12-14			Aged 15-16			Total school age (7-16)			
	Absolute size	Percent of 1980	Proportion of total population	Absolute size	Percent of 1980	Proportion of total population	Absolute size	Percent of 1980	Proportion of total population	Absolute size	Percent of 1980	Proportion of total population	Total population
						Simulation of Official Chinese Goal							
1980	106,590	100	10.90	61,719	100	6.31	40,545	100	4.15	208,854	100	21.37	977,420
1990	98,302	92	8.88	62,379	101	5.64	42,657	105	3.86	203,338	97	18.38	1,106,443
2000	93,113	87	7.74	56,191	91	4.67	37,619	93	3.13	186,922	89	15.54	1,202,538
2010	60,073	56	4.97	49,911	81	4.13	35,674	88	2.95	145,658	70	12.05	1,208,707
2020	47,351	44	3.99	28,759	47	2.42	17,984	44	1.52	94,094	45	7.93	1,186,278
2030	42,701	40	3.75	27,432	44	2.41	18,390	45	1.62	88,523	42	7.78	1,137,371
						Projection of Intermediate Fertility Decline							
1980	106,590	100	10.90	61,719	100	6.31	40,545	100	4.15	208,854	100	21.37	977,420
1990	97,294	91	8.79	62,218	101	5.62	42,540	105	3.84	202,052	97	18.25	1,107,261
2000	102,915	97	8.31	59,446	96	4.80	37,847	93	3.05	200,209	96	16.16	1,239,109
2010	104,576	98	7.75	63,237	102	4.69	41,791	103	3.10	209,605	100	15.53	1,349,643
2020	99,519	93	6.94	60,764	98	4.24	41,013	101	2.86	201,296	96	14.04	1,434,112
2030	102,104	96	6.81	60,065	98	4.00	39,584	98	2.64	201,753	97	13.45	1,500,289

Table A.6: WOMEN REACHING MARRIAGE AGE (AGE 23), 1980-95, AS A PERCENT OF 1980

Year	World Bank projection	Liu Zheng /a
1980	100	100
1981	101	87
1982	103	70
1983	104	79
1984	106	130
1985	107	158
1986	108	135
1987	109	132
1988	110	123
1989	111	120
1990	111	136
1991	112	130
1992	113	134
1993	114	126
1994	115	118
1995	116	108

/a Liu Zheng, "The Present Situation and the Development of China's Population," paper for the Beijing International Round Table Conference on Demography, October 1980, p. 10.

Table A.7: NUMBER OF BIRTHS IN CHINA AND IN HUNAN PROVINCE, 1953-78
(in millions)

Year	Birth		Year	Births	
	China	Hunan		China	Hunan
1953	20	1.3	1966	25	1.5
1954	22	1.3	1967	25	1.7
1955	20	1.1	1968	27.1	1.6
1956	20.6	1.0	1969	26.8	1.6
1957	21.2	1.2	1970	27.4	1.4
1958	18.6	1.1	1971	24.8	1.3
1959	16	0.9	1972	24.8	1.4
1960	12.5	0.7	1973	24.3	1.4
1961	11	0.4	1974	23.5	1.3
1962	24	1.5	1975	21	1.3
1963	29	1.7	1976	18.2	1.0
1964	27.1	1.6	1977	16.0	0.9
1965	27.9	1.6	1978	-	0.9

Sources: Hunan: Zhou Guang-fu, 1980, p. 45, cited by Chen, Pi-chao. "Population Policy and the Rural Health System in China." Prepared for the World Bank, October 1980.

China: Wang, Nizong. "Solving China's Population Problem: China Reconstructs, Vol. 29, No. 4., April 1980.

Table A.8: BIRTH AND DEATH RATES IN GANSU PROVINCE, SELECTED YEARS, 1949-79

Year	CBR /a	CDR /b
1949	3.0	1.1
1950	3.2	1.1
1952	3.3	1.1
1953	3.4	1.1
1955	2.9	1.2
1956	2.8	1.1
1958	3.1	2.1
1962	4.1	0.8
1964	4.7	1.6
1965	4.5	1.2
1966	4.3	1.2
1967	4.4	0.8
1968	4.2	0.8
1969	4.2	0.9
1970	3.95	0.79
1971	3.71	0.79
1972	3.78	0.81
1973	3.53	0.81
1974	2.74	0.71
1975	2.90	0.79
1976	1.77	0.67
1977	1.74	0.60
1978	1.77	0.59
1979	1.65	0.57

/a Crude birth rate (per hundred).

/b Crude death rate (per hundred).

Source: Data provided to mission by the Family Planning Office, Gansu Province.

Table A.9: PERCENT DECLINES IN CRUDE BIRTH AND DEATH RATES, SELECTED COUNTRIES

Country	Crude birth rates 1975-80	Crude birth rates Decline 1960-65 to 1975-80	Crude death rates 1975-80	Crude death rates Decline 1960-65 to 1975-80
China /a	18.8	52.4	6.7	32.3
India	36.9	13.6	14.0	28.6
Indonesia	37.9	19.2	14.6	33.3
Brazil	33.8	7.2	7.9	22.5
Bangladesh	47.0	7.5	17.6	17.4
Nigeria	49.8	3.9	17.8	26.1
Mexico	41.7	6.7	7.6	28.3
Philippines	39.2	11.3	9.0	36.6
Republic of Korea	26.4	31.8	8.2	51.2
Malaysia	34.6	21.9	8.7	37.8
All developing countries	33.6	16.0	12.0	28.6
All developed countries	15.6	23.1	9.4	+4.4

/a 1975-79 averages, and average of 1962, 1963 and 1965, in Table A.1.

Sources: United Nations, Department of Economic and Social Affairs. World Population Trends and Prospects by Country, 1950-2000: Summary Report of 1978 Assessment, New York, 1979, except for China. For China, sources shown in Table A.1.

Table A.10: PROVINCIAL DEMOGRAPHIC DATA: POPULATION TOTALS AND RATES OF NATURAL INCREASE - 1964, 1978, 1979

Province	1964 Population totals (in mln)	1964 RNI	1978 Population totals (in mln)	1978 RNI	1979 Population totals (in mln)	1979 RNI
NATIONAL TOTAL	691.22		958.06/a	1.21	970.89	1.16
Southwest Region						
Sichuan	67.96	3.09	97.07	0.61	97.74	0.67
Guizhou	17.14	3.48	26.86	1.60	27.31	1.51
Yunnan	20.51	3.11	30.92	1.92	31.35	1.46
Xizang (autonomous region)	1.25		1.79	1.42	1.83	1.42
Northwest Region						
Shaanxi	20.77	2.17	27.79	1.03	28.07	1.01
Gansu	12.65	3.30	18.73	1.22	18.94	1.08
Qinghai	2.14	3.96	3.65	1.95	3.72	1.20
Ningxia (autonomous region)	2.16	3.88	3.66	2.30	3.64	2.20
Xinjiang (autonomous region)	7.27	3.06	12.33	1.49	12.56	1.42
Central South Region						
Henan	50.32	2.76	70.66	1.34	71.89	1.29
Hubei	33.71	2.51	45.75	1.05	46.33	1.14
Hunan	37.18	3.11	51.66	1.04	52.23	1.07
Guangxi (autonomous region)	20.84	3.34	34.02	1.83	34.70	1.84
Guangdong	42.80	3.95	55.93	1.48	56.81	1.70
East Region						
Shanghai (municipality)	10.82	1.13	10.98	0.51	11.32	0.62
Jiangsu	44.50	2.74	58.34	0.95	58.92	0.88
Zhejiang	28.32	2.84	37.51	1.11	37.92	0.99
Anhui	31.24	3.46	47.13	1.38	48.03	1.37
Fujian	16.76	3.38	24.50	1.79	24.88	1.30
Jiangxi	21.07	2.95	31.83	1.96	32.29	1.38
Shandong	55.52	2.53	71.60	1.03	72.32	1.08
North Region						
Beijing (municipality)	7.57	1.64	8.50	0.68	8.71	0.78
Tienjin (municipality)	6.28	-	7.21	0.92	7.41	0.86
Hebei	39.41	2.34	50.57	0.97	51.05	0.97
Shanxi	18.01	2.36	24.24	0.91	24.47	0.92
Nei Monggol (autonomous region)	6.24	2.84	8.90/b	1.20	18.52/b	1.32
Northeast Region						
Liaoning	29.50	2.91	37.43	1.26	34.43	1.20
Jilin	17.89	3.08	24.74	1.43	21.84	1.39
Heilongjiang	21.39	3.24	33.76	1.22	31.69	1.15

/a 1978 and 1979 figures are the sums of the provincial totals. The official totals for the years are 958.09 and 970.92 (Table A.1). The differences could be due to rounding of provincial totals.

/b The boundaries of Nei Monggol were redrawn in 1979 with new boundaries including what had been portions of five adjoining provinces; hence the dramatic population increase. The same boundary adjustment accounts, of course, for population declines in the nearby provinces.

Sources: 1964: China Atlas, reported in Aird, John, "Recent Provincial Population Figures," The China Quarterly, March 1978, No. 73, p. 3.
1978: United Nations, Economic and Social Commision for Asia and the Pacific (ESCAP). Population Headliners, No. 63, June 1980.
1979: Data supplied to mission by the State Statistical Bureau.

Table A.11: LIFE EXPECTANCY BY PROVINCE, 1973-75

Province	Male	Female	Total
NATIONAL TOTAL	63.62	66.31	64.93
Southwest Region			
Sichuan	59.16	61.08	60.10
Guizhou	59.03	59.48	59.25
Yunnan	59.80	61.35	60.56
Xizang (autonomous region)	59.47	63.22	61.30
Northwest Region			
Shaanxi	63.96	65.18	64.56
Gansu	n.a.	n.a.	n.a.
Qinghai	60.55	62.04	61.28
Ningxia (autonomous region)	61.86	62.66	62.25
Xinjiang (autonomous region)	61.77	63.29	62.51
Central South Region			
Henan	65.06	68.82	66.89
Hubei	n.a.	n.a.	n.a.
Hunan	61.39	63.63	62.48
Guangxi (autonomous region)	n.a.	n.a.	n.a.
Guangdong	n.a.	n.a.	n.a.
East Region			
Shanghai (municipality)	69.24	74.84	71.97
Jiangsu	65.10	69.34	67.17
Zhejiang	66.44	70.52	68.43
Anhui	64.50	66.88	65.66
Fujian	65.23	69.37	67.25
Jiangxi	62.08	64.34	63.18
Shandong	n.a.	n.a.	n.a.
North Region			
Beijing (municipality)	68.34	70.77	69.53
Tienjin (municipality)	69.93	71.96	70.92
Hebei	67.11	70.17	68.60
Shanxi	65.33	68.00	66.63
Nei Monggol (autonomous region)	65.25	67.31	66.25
Northeast Region			
Liaoning	68.64	70.78	69.68
Jilin	65.00	66.73	65.84
Heilongjiang	69.25	71.53	70.36

/a Total life expectancy was calculated by applying the following formula:

$$\frac{\text{Male life expectancy (1.05) + female life expectancy}}{2.05}.$$

Sources: Yung Shou-De, et al. "Analysis of Life Expectancy in China, 1973-75," Journal of Population and Economics (Beijing), 1981-1, Tables 3 and 4.

Table A.12: PERCENT URBAN POPULATION, VARIOUS SOURCES

	Derived from official crude birth rates for urban and rural areas (Table A.2)	Derived from official crude death rates for urban and rural areas (Table A.2)	Official urban population total as % of official population total
1949			10.6
1950			11.2
1951			11.8
1952			12.5
1953			13.2
1954			13.6
1955			13.5
1956			14.2
1957			15.4
1971	12.0	14.3	
1972	11.7	10.4	
1973	10.7	10.5	
1974	10.8	10.5	
1975	12.2	12.0	
1976	12.5		
1977	12.1	13.6	12.2
1978	12.5	10.0	12.5
1979	13.0	14.3	13.2

Note: Figures for different years are not necessarily comparable as they are probably not all based on the same definition of urban or the same reporting procedures. This is particularly true for the 1950s data compared to the 1970s data. See text.

Sources: 1949-56: SSB, "Data on China's Population from 1949-56," Statistical Bulletin Issue No. 11, June 14, 1957.

1957: Based on percentage increase in population urban, 1953-57, mentioned by Xue Zhengxiu, Guangming Daily, October 1973.

1977-79: Provided to the mission by the State Statistical Bureau.

Table A.13: PERCENT OF POPULATION IN CITIES, BY PROVINCE, 1979 /a

Province	Population totals (in million)	% population in cities	Urban population (in millions)
NATIONAL TOTAL	970.92	13.2	128.62/b
Southwest Region			
Sichuan	97.74	9.4	9.19
Guizhou	27.31	14.1	3.85
Yunnan	31.35	6.5	2.04
Xizang (autonomous region)	1.83	6.5	0.12
Northwest Region			
Shaanxi	28.07	12.0	3.37
Gansu	18.94	9.4	1.78
Qinghai	3.72	14.6	0.54
Ningxia (autonomous region)	3.64	16.9	0.62
Xinjiang (autonomous region)	12.56	19.8	2.49
Central South Region			
Henan	71.89	8.3	5.97
Hubei	46.33	9.7	4.49
Hunan	52.23	7.0	3.66
Guangxi (autonomous region)	34.70	5.7	1.98
Guangdong	56.81	12.0	6.82
East Region			
Shanghai (municipality)	11.32	52.2	5.91
Jiangsu	58.92	10.5	6.19
Zhejiang	37.92	6.5	2.46
Anhui	48.03	8.5	4.08
Fujian	24.88	11.2	2.79
Jiangxi	32.29	11.0	3.55
Shandong	72.32	9.5	6.87
North Region			
Beijing (municipality)	8.71	58.5	5.10
Tienjin (municipality)	7.41	65.6	4.86
Hebei	51.05	10.2	5.21
Shanxi	24.47	15.6	3.82
Nei Monggol (autonomous region)	18.52	15.2	2.82
Northeast Region			
Liaoning	34.43	34.7	11.95
Jilin	21.84	21.7	4.74
Heilongjiang	31.69	24.5	7.76

/a There are 203 cities recognized as such by the State Council in October, 1980; this shows the percent of the population in each province resident in such cities, or in one of about 2,300 county towns.

/b The sum of the provincial totals is 125.03, which is 12.9% of the total population figure. The total national urban population figure of 128.62 million (13.2% of population) was also provided to the mission, and that figure (rather than the sum of the calculated urban populations of each province) is used in this report as the urban population.

Source: Data on percent population in cities provided to mission by the State Statistical Bureau.

Table A.14: THE CONTRACEPTIVE PREVALENCE RATE AND INDUCED ABORTION, 1978
(%)

	Unit	Population (mln)	Birth rate	Contraceptive prevalence rate	Distribution by method of contraceptive users: Sterilization: Female	Male	Both	Pill	IUDs	Barriers, including condoms	Others including injectibles, postcoital pill	Induced abortion (per 1,000 live births)
China	Country	958	18.34	70.0/a	17.0	12.0	30.0	8.0	50.0	6.0	6.0	290/d
Jiangsu	Province	56	15.99	84.0	32.0	7.0	39.0	7.0	52.0	-	3.0	-
Hebei /b		47	15.00	83.0	-	-	-	-	-	-	-	-
Shanghai	City with status of provinces	11	11.30	83.0	40.0	7.0	47.0	17.0	25.0	-	11.0	-
Tienjin	City with status of province	7	15.42	81.0	16.0	-	16.0	26.0	37.0	15.0	6.0	653 1,114/c
Guangdong	Province	55	18.60	76.0	20.0	10.0	30.0	5.0	60.0	5.0	-	230
Gansu	Province	19	-	84.0	39.5	0.8	40.3	5.6	54.1	-	-	-
Evergreen	Urban commune	-	-	-	26.0	0.5	-	18.7	22.6	-	9.4	-
Qianjin	Suburban commune	-	-	-	18.1	9.3	-	16.5	28.7	-	23.0	-
Cuqiao	Rural commune	-	-	-	9.5	34.0	-	9.3	26.3	-	9.3	-
Jiangjin	Rural commune	-	-	-	24.3	8.9	-	15.8	29.9	-	14.5	-
Nanjing		-	-	-	-	-	-	-	-	-	-	c.333
Xian /b	Municipality	-	-	-	-	-	-	-	-	-	-	1,213
Changsha /b	Municipality	-	-	-	-	-	-	-	-	-	-	818
Chengdu	City in Sichuan Province	-	-	-	-	-	-	-	-	-	-	580/d

/a Estimated from 2 regression equations: Y = 45.4 - 0.038 (x), the coefficients of which are based on cross-country data; and Y = 41.7 - 0.335 (x), based on data from 40 administrative units in China were Y = CBR and x = contraceptive prevalence rate. See Chen, 1980 (reference under sources) for further details.
/b Data refer to 1977.
/c Second figure is reported in PIACT Product News (see sources) and refers to city only.
/d Data refer to 1979.

Sources: China totals: Estimates obtained from the Birth Planning Leading Groups of the State Council in November 1979 and April 1980 by missions of the Program for the Introduction and Adaptation of Contraceptive Technology (PIACT), reported in PIACT Product News 2:1 (Autumn 1980), except for the overall contraceptive prevalence rate, which was estimated by Chen, as explained in footnote /a, and the abortion rate, which was provided to the mission by family planning officials. Estimates for Jiangsu, Hebei, Shanghai, Tianjin and Guangdong reported in Chen, Pi-Chao, "Population Policy and the Rural Health System in China," prepared for the World Bank, October 1980 (Table 3), based on data from provincial Birth Planning Staff Offices.
Data for Evergreen, Qianjin, Cuqiao and Jiangjin communes reported in Tien, H. Yuan, "Wan, Xi, Shao: How China Meets its Population Problem," International Family Planning Perspectives, Vol. 6, No. 2, 1980, based on compilation of users' planned reproduction cards. Data for Changsha and Xian obtained by P. Chen from local birth planning administrators. Data for Nanjing reported by Chen, 1980, (above) based on trip notes of other visitors. Data for Chengdu provided by Planned Reproduction Committee of Chengdu, reported in Tien, 1980, (above) p. 73. Data for Gansu were provided to the mission by the Birth Planning Staff of Gansu Province.

Table A.15: COUPLES HOLDING ONE-CHILD CERTIFICATES, SELECTED AREAS OF CHINA, 1979/80

Area	Date	Number of one-child certificates	As percent of all couples with one child
China	Dec 1979	5,000,000	29
Guangdong	Apr 1980		45
Jiangsu	Feb 1980	930,000	68
Harbin	Dec 1979	39,081	85
Liaoning	Dec 1979		68
Shanghai			
City	Late 1979		90
Periurban Counties	Late 1979		75
Sichuan	Late 1979	1,250,000	70
	Apr 1980	1,400,000	79
	Dec 1980	1,700,000	n.a.
Chongqing	Apr 1980	158,000	91
Tianjin			
Total	Jan 1980	88,500	52
City	Jan 1980		80
Periurban Counties	Jan 1980		30
Zhejiang	Dec 1979	120,000	

Source: Compiled in Chen, Pi-Chao, "Population Policy and the Rural Health System in China," prepared for the World Bank, October 1980, except for Sichuan. Sources for Sichuan are for 1979, Foreign Broadcast Information Services, December 12, 1979; for April 1980, Li chen-ying, "Controlling Population Increase in the Interest of Accelerating Agricultural Modernization," A Compendium of Research Report on Sichuan Population, No. 1, 1980; for December 1980, U.P. wires reported in Far Eastern Times (San Francisco), February 15, 1981.

Table A.16: COMPLIANCE WITH BIRTH PLANNING
(%)

	MWRA/a	LMR/a	BLR/a	PBR/a
China			70.0	
Guangdong	11.6	75.0	76.0	61.0
Jiangsu	N/A	88.5	83.7	60.8
Hebei	N/A	93.0	83.0	77.0
Shanghai				
City proper	11.7	90.0	85.0	85.0
Periurban counties		80.0	80.0	75.0
Zinghui (Guangdong)	11.9	95.85	78.9	62.0
Hengxien (Guangxi)	11.2	98.0	70.0	N/A
Taoyuan (Hunan)	12.0		80.2	70.0
Changsha (Hunan)	13.0	97.0	81.7	70.9
Xian (Shaanxi)	14.6	94.4	82.0	67.0

/a This table shows the married couples of reproductive age (MWRA) as percent of total population, late marriage rate (LMR), birth limitation rate (BLR), and planned birth rate (BPR), for four provinces, three rural counties and two provincial capitals, 1977/78.

$$\text{Late marriage rate (couple)} = \frac{\text{Number of men married at 25 years or older + number of women married at 23 years or older married in a calendar year}}{\text{Total number of men and women married in a calendar year}} \times 100$$

$$\text{Birth limitation rate} = \frac{\text{Number of married women of reproductive age practicing contraception}}{\text{Total number of married women of reproductive age}} \times 100$$

$$\text{Planned birth rate} = \frac{\text{Number of first live-births to mothers conforming to the late marriage norm + number of second live-births to couples conforming to the longer spacing norm}}{\text{Total number of births}} \times 100$$

Source: Compiled by Pi-Chao Chen and reported in "Population Policy and the Rural Health System in China," prepared for the World Bank, October 1980.

Table A.17: THE LATE MARRIAGE RATE /a (LMR) IN SELECTED EAST ASIAN COUNTRIES AND IN CHINA
(%)

	Hong Kong	Singapore	Japan	China		
				Guangdong province	Shanghai city proper	Shanghai suburban counties
1966		39	39			
1967		38	40			
1968	31	35	41			
1969	30	34	40			
1970	32	32	37			
1971	33	31	33			
1972	33	34	35			
1973	35	35	36			
1974	37	36	42			
1975	40	34	45			
1976						
1977						
1978				75	90	80

/a Late marriage rate = $\frac{\text{Number of men married at 25 years or older plus number of women married at 23 years or older married in a calendar year}}{\text{Total the number of men and women married in a calendar year}} \times 100$

Sources: Except China: Department of International Economic and Social Affairs, Statistical Office, Demographic Yearbook, 1976, New York.
China: Table A.16.

Table A.18: PERCENT DISTRIBUTION OF LIVE BIRTHS BY BIRTH-ORDER (%)

	1st birth-order	2nd birth-order	1st & 2nd birth-order	3rd & higher birth-order	CBR (per 1,000)
China			70	30/a	17.9
Changsha (1977)	80	15	95	5	12.6
Chengdu (1977)	50	35	85	15	14.0
Guangdong (1978)			60	40	20.7
Shanghai (1978)	70	20	90	10/b	7.4

/a Mentioned as approximate percent of births of third or higher order by Chen Mu-hua, in "For the realization of the four modernizations, there must be planned control of population growth," People's Daily, August 11, 1979.

/b In the city proper, 3rd and higher birth-orders account for less than 2% of total births.

Source: Data for other than China as a whole are compiled in Chen, Pi-Chao, "Population Policy and the Rural Health System in China," prepared for the World Bank, October 1980.

Table A.19: EXAMPLES OF INCENTIVES AND DISINCENTIVES TO DISCOURAGE MORE THAN ONE BIRTH PER COUPLE, VARIOUS PROVINCES AND CITIES OF CHINA

Incentives	Disincentives
Sichuan Province	
1. For "working" parents (probably wage-earners):	
(a) Child welfare subsidies: 5 yuan/month, until only-child is 14 years old.	
(b) Housing benefits for one-child families: Same living space as family of four.	
(c) Education/employment guarantees for only-child: Priority in admission to schools and factories, provided entrance requirements are met.	
2. For peasant families:	
(a) Income supplement: Equivalent to 3 work days per month until only-child is 14 years old.	
(b) Food benefits: Adult's grain ration for only-child.	
(c) Housing/land benefits: Only-child counts as 1.5 persons in distribution of land plots for private use.	
(d) Old-age guarantee: When parents of an only-child become elderly widows and widowers, their living standard will be higher than that of other commune peasants in locality.	
3. Parents may have another child and receive above benefits if first child dies or becomes disabled.	

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Incentives	Disincentives
Hunan Province	
1. For officials and wage-earning workers: (a) Income supplement: 30-40 yuan annual bonus until only-child is 14 years old. (b) Education/employment/medical treatment guarantees for only-child: Priority in admission to nursery and kindergarten, in hospital treatment, in employment. (c) Housing benefits for one-child families: Priority in urban housing; same living space as for a 2-child family. (d) Retirement benefits: 5% extra allowance for both husband and wife.	1. Return of benefits: For couples who have second child after being rewarded for only having one, they must return all rewards and bonuses already received.
2. For rural peasants: (a) Income supplement: 400 work points annual bonus, until only-child is 14 years old. (b) Housing benefits for one-child families: Private plots; housing lots the same size as for a 2-child family. (c) Old-age guarantee: Living standard of only-child parents, when old and unable to work, must not be lower than local average.	2. For having third child: (a) Income deductions: 5% of husband's and wife's monthly wages or couple's total workpoints deducted until third child is 14 years old. (b) Medical costs (for third child born after January 1, 1980): Child not eligible to participate in medical schemes; no medical benefits during pregnancy/birth of third child; no pay during maternity leave. (c) Food costs (for third child born after January 1, 1980): Grain for third child must be obtained at higher price. (d) Housing costs (for parents of a third child born after January 1, 1980); no increase in housing space (urban) or lots (rural). (e) No hardship assistance (for parents of a third child born after January 1, 1980): no subsidies for difficulties resulting from having extra child.
3. For couples who have had a sterilization operation, a reverse operation may be carried out at couple's request free of charge, if only-child dies or is seriously crippled.	3. Certain cadre and worker parents are excluded for consideration as progressives and award-winners for one year after third child's birth.

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Incentives	Disincentives
Anhui Province	
1. Education guarantees for child: Priority in admission to nursery and kindergarten.	1. Return of benefits: For couples who have second child after being rewarded for only having one, they must return all first child's health expenses or supplementary workpoints already received.
2. Housing benefits for one-child families: Priority in allocation; same urban housing as for a 2-child family.	2. Income deductions for parents with third child born within six months after the promulgation of regulation.
3. Food benefits: Adult's grain ration for only-child.	(a) For officers and workers: 5% of total combined income of husband and wife deducted each month for welfare expenses from time when child is 2 weeks to 14 years old.
4. Medical benefits:	(b) For peasant families: 5% of total annual workpoints of husband and wife deducted at year's end as welfare expenses from time when child is 2 weeks to 14 years old; 6% deducted for fourth child; 7% deducted for fifth child.
(a) Priority in medical treatment and hospitalization for only-child.	3. Medical cost: For officers and workers with third or additional child and who have received a reward in the form of health expenses paid for by public funds: All medical expenses of confinement, except emergency cases, must be paid by parents; child not eligible to participate in medical scheme.
(b) Monthly health expenses for only-child of state workers or collective enterprise workers during child's 4th to 14th year; - if son: 5 yuan/month - if daughter: 6 yuan/month	4. Food costs: Grain for third or additional child must be obtained at higher price, until child is 14 years old.
(c) Health expense supplementary workpoints for only-child of peasants, during child's 4th to 14th year: - if son: 30 wkpts/month - if daughter: 40 wkpts/month	
5. Labor recruitment priority for households with one child or two daughters.	
6. Economic and other rewards for couples undergoing sterilizations and for medical personnel performing sterilizations well.	
7. Parents may have another child and receive above benefits if first child dies or is seriously crippled.	

Incentives	Disincentives
Anhui Province (continued)	
	5. No hardship/living assistance:
	(a) No coupons for commodities or subsidiary foodstuffs, except cloth coupons, for third or additional child before age 14.
	(b) No subsidies for difficulties resulting from having extra children.
	6. Housing costs: No extra housing space (urban) or lots (rural).
	7. Parents may not be deemed progressive producers or workers for a year after birth of third or additional child.
Tianjin Municipality	
	1. Income deductions:
	(a) For officers and workers with third child: 10% of husband's and wife's monthly wages deducted until child is 14 years old.
	(b) For peasants with third child: 10% of annual income deducted until child is 14 years old.
	(c) For couples with second child before first child is 4 years old: 10% income deductions until first child reaches 4th year.
	(d) For unmarried women with a child: 10% wage deductions until woman reaches marriage

Incentives	Disincentives
Tianjin Municipality (continued)	
	age (23 rural, 25 urban) and gets married.
	2. Officers, workers and office employees, who do not observe the planned birth norms, are not eligible for promotion for two years.
Beijing Municipality	
1. Income supplement for one-child families: 30 yuan awarded annually on June 1 (Children's day).	1. Income deductions for couples with third child: 10% of combined annual income deducted until child reaches 14th year; 15% deducted for fourth child; 20% deducted for fifth child. (Same applies to peasants in communes under municipal jurisdiction.)
2. Maternity leave: Six months' leave with full pay, instead of current 9 weeks, for birth of first child.	2. Maternity leave: Woman with third child receives 9 weeks of maternity leave and must return full amount of 6-month maternity leave pay given her after her first birth.
(For couples who have two children - no penalty or reward.)	
Shanghai Municipality	
1. Usual incentives for one-child families.	1. Income deductions for more than 2 children: 10% of both husband's and wife's monthly wage or work-points deducted, until third child is 16 years old.
Guangdong Province	
1. Income supplement:	1. Return of benefits: For couples who have second child after being rewarded for only having one,
(a) For cadre, staff or workers	

Incentives	Disincentives
Guangdong Province (continued)	
or urban unemployed parents: 5 yuan per month, until only-child is 14 years old. (b) For rural commune members: Monthly workpoints equivalent to 6 workdays until only-child is 14 years old. 2. Education/medical benefits for one-child families: Free nursery and kindergarten up to age 7; free primary to high school education; free medical service for child until 14th year; 3 month's maternity leave for birth of first child. 3. Housing benefits: (a) For urban areas: Priority in living quarters allotments; same housing space as for a 2-child family. (b) For rural areas: Double quota of private plots; precedence in receiving building foundations; allowance for construction material needs. 4. Food benefits: (a) For urban areas: Ration of fuel and nonstaple foods same as for a 2-child family. (b) For rural areas: Only-child's grain ration same as per capita average of basic accounting unit in rural areas. 5. Employment in rural areas: Priority in assignments of industrial and sideline jobs for one-child parents; preferential recruitment in industrial employment and army enlistment for only-child.	they must return all rewards and bonuses already received. 2. Income deductions: (a) 10% of husband's and wife's monthly wages or workpoints deducted. (b) For 4 or more births: 5% additional charge imposed for every additional birth. (c) Duration of charges (a + b): i. For 3 or more children, including fostering or adoption of others: 4th month of pregnancy to child's 14th year. ii. Where birth interval between first and second child is less than 4 years: 4th month of second pregnancy to first child's 4th year. iii. For births outside marriage: 4th month of pregnancy to 9th month after marriage license has been obtained. 3. Food costs: Grain for third or additional child must be obtained at higher price, until child is 14 years old. 4. No hardship/living assistance: (a) No subsidies for difficulties resulting from excessive procreation. (b) No allotted planned supply ration coupons for sundry commodities and nonstaple

Incentives	Disincentives
Guangdong Province (continued)	
6. Retirement/old age benefits: (a) For cadres, staff, workers: 5% more than normal pension, but no additional payment if 100% pension is paid. (b) For rural commune members: Monthly allowance of work-points equivalent to 5 work-days. (c) For couples childless for entire life: i. Cadres, staff and workers: 100% pension. ii. Rural commune members: Allowance as "5-guaranteed families." 7. Possibly a suitable lump sum award from the production unit. 8. Rewards for late procreation after late marriage for each year of postponement. 9. Rewards to units and to cadres, scientific and technical workers, medical workers, barefoot doctors, rural activists with outstanding results in planned birth. 10. Leaves of absence for those who have undergone birth control operations with doctor's certification and payments for periods of rest for those having operations. 11. Sterilized couples receive anastomosis free of charge upon application, if only-child dies or becomes seriously disabled.	foods, except cloth ration, from birth to 14th year of child (urban areas). (c) No allotted agricultural and nonstaple foods in kind (rural areas). 5. No medical benefits: (a) No maternity leave with full pay or workpoint allowance. (b) No medical treatment scheme for third or additional children. (c) No medical assistance in pregnancy/birth expenses of additional children. 6. Employment for parents: (a) For cadres, staff, workers and mothers of illegitimate children: No promotion or awards for 3 years. (b) For commune members: No appointment in industry and sideline jobs that belong to the commune, production brigade or team. 7. Housing costs: No addition to accommodate births. 8. For enterprise units that exceed assigned planned birth quota, 2% of profits will be deducted.

Table A.20: ORGANIZATION OF THE MINISTRY OF PUBLIC HEALTH, 1981

Bureau	Divisions
General Office	Secretariat Duty Office Political Research Office Visitors' Department Administration
Financial Planning Bureau	Capital Construction Subordinate Capital Affairs Planning Statistics
Medical Management Bureau	Urban Health Rural Health Chronic Disease Control MOPH Staff Health Care
Epidemic Prevention Bureau	Communicable Disease Control Parasitic Disease Control Quarantine Services Biological Products (vaccine, serum)
Sanitary Inspection Bureau	Industrial Hygiene Radiation Protection Environmental Health Food Hygiene School Hygiene
Chinese Medical Bureau	Chinese Medical Education Hospital Management Science and Technology
Medical Science and Technical Bureau	Planning Achievements Technological Exchange Family Planning Research
Personnel Bureau	Cadre No. 1 Cadre No. 2 Labor and Wages
Medical Education Bureau	Western Pharmaceutical Education Chinese Pharmaceutical Education Staff Education Teaching Materials
Maternal and Child Health Bureau	Maternal Health Child Health
Medicinal Management Bureau	Medicinal Management Drug Quality and Standards
Foreign Affairs Bureau	Liaison International Foreign Technological Cooperation Administration
Hygiene Propaganda	-

Source: Information provided to mission by Ministry of Public Health.

Table A.21: NUMBERS OF HOSPITALS AND BEDS IN 1979, BY PROVINCE

Region	Total			Comprehensive hospitals		Chinese hospitals		Hospitals attached to medical schools		Hospitals for mental diseases		Hospitals for tuberculosis		Commune clinics		Other hospitals /b	
	No. of hospitals	No. of beds	Population per bed /a	No. of hospitals	No. of beds	No. of hospitals	No. of beds	No. of hospitals	No. of beds	No. of hospitals	No. of beds	No. of hospitals	No. of beds	No. of hospitals	No. of beds	No. of hospitals	No. of beds
NATIONAL TOTAL	65,009	1,932,083	503	7,737	907,998	582	42,861	140	59,775	254	46,918	111	25,744	55,263	771,231	922	77,556
Southwest Region																	
Sichuan	10,375	175,577	557	667	71,458	52	3,051	10	3,780	14	2,558	2	300	9,568	90,264	62	4,166
Guizhou	14,516	40,001	683	208	19,642	6	403	3	1,482	1	260	1	300	4,283	16,918	15	996
Yunnan	1,859	58,505	536	348	33,557	6	339	3	1,100	2	350	1	200	1,482	21,026	16	1,933
Xizang (autonomous region)	528	4,125	443	93	3,332	1	30	-	-	-	-	-	-	433	403	1	360
Northwest Region																	
Shaanxi	3,078	53,220	527	288	29,457	21	1,092	3	1,870	1	250	2	650	2,752	17,698	11	2,203
Gansu	1,626	33,531	565	234	21,143	3	309	2	1,180	1	217	1	118	1,375	8,917	10	1,647
Qinghai	506	10,666	349	93	7,691	1	273	1	670	1	-	-	-	403	1,307	7	725
Ningxia (autonomous region)	302	7,110	512	56	4,553	1	152	1	430	1	130	-	-	243	1,845	-	-
Xinjiang (autonomous region)	817	42,301	297	195	24,343	4	650	3	1,860	2	300	3	370	607	14,358	3	420
Central South Region																	
Henan	2,501	106,293	676	338	46,950	24	1,957	5	1,630	11	2,075	2	490	2,075	49,771	46	3,420
Hubei	1,809	109,859	426	315	43,936	23	1,425	7	3,284	9	1,580	6	1,039	1,375	55,018	74	2,577
Hunan	4,387	115,565	452	390	44,518	95	7,723	5	2,182	24	2,423	2	480	3,832	55,400	39	2,839
Guangxi (autonomous region)	1,217	45,358	765	157	22,030	17	823	4	1,362	6	715	1	250	1,017	16,908	15	3,270
Guangdong	2,442	103,793	547	389	46,214	36	2,703	11	3,479	12	2,712	4	808	1,925	42,009	65	5,868
East Region																	
Shanghai (municipality)	394	47,774	237	111	24,071	2	135	13	6,253	13	3,031	5	1,516	201	7,454	49	5,314
Jiangsu	2,453	114,004	517	243	36,496	45	3,453	7	2,677	30	3,505	5	795	2,050	60,515	73	6,563
Zhejiang	3,535	59,892	633	154	25,083	24	1,570	5	1,830	11	1,708	1	87	3,303	25,927	37	3,687
Anhui	3,039	72,786	660	214	29,907	11	841	4	1,856	6	1,360	-	-	2,791	37,693	13	1,129
Fujian	1,117	45,821	543	145	21,629	15	1,950	2	410	6	1,153	1	500	918	18,845	30	1,334
Jiangxi	2,157	67,398	479	388	35,484	32	1,505	4	1,356	7	1,484	-	-	1,704	25,414	22	2,155
Shandong	2,541	115,501	626	390	48,357	19	2,084	6	2,091	21	3,262	16	2,396	2,060	54,001	29	3,310
North Region																	
Beijing (municipality)	387	26,788	325	82	13,523	6	745	8	3,630	3	2,674	2	853	263	2,696	23	2,667
Tienjin (municipality)	327	17,929	413	55	10,100	2	318	3	1,259	1	785	2	750	213	2,086	51	2,631
Hebei	4,343	86,990	587	421	44,816	8	840	6	2,801	9	1,312	4	648	3,871	34,606	24	1,967
Shanxi	2,330	66,519	368	359	35,366	10	659	2	961	7	1,110	1	150	1,904	25,830	47	2,443
Nei Monggol (autonomous region)	1,743	46,495	398	278	23,712	25	1,250	3	978	8	780	6	1,120	1,400	17,862	23	793
Northeast Region																	
Liaoning	1,686	107,696	320	360	54,398	27	2,500	6	3,130	24	5,412	18	6,300	1,186	28,698	65	7,058
Jiling	1,233	59,687	366	231	29,095	24	1,435	7	3,018	11	2,351	9	1,884	926	18,868	25	3,036
Heilongjiang	1,761	91,899	345	535	56,937	42	2,646	6	3,216	12	3,421	16	3,740	1,103	18,894	47	3 045

/a These figures were computed using the 1979 end-of-year provincial population totals provided to the mission by the State Statistical Bureau.
/b This heading includes hospitals for infectious diseases (116 with 17,650 beds), hospitals for maternal and child health (128 with 10,309 beds), and children's hospitals (24 with 4,956 beds).

Source: Data provided to the mission by the Ministry of Public Health.

Table A.22: MAJOR CAUSES OF DEATH, 1973-75

Disorder	Males		Females		Total	
	Rate/a	%/b	Rate/a	%/b	Rate/a	%/b
Respiratory diseases	117.5	15.3	118.2	16.11	117.9	15.7
Malignant tumors	87.8	11.5	66.0	9.0	77.1	10.3
Other circulatory diseases	94.3	12.3	114.6	15.6	104.2	13.9
Trauma, toxicosis & accidents	82.0	10.7	65.6	8.9	70.6	9.4
Digestive system diseases	72.6	9.5	63.4	8.6	66.8	8.9
Infectious diseases	64.1	8.4	60.6	8.3	63.8	8.5
Thoracic circulatory diseases	59.7	7.8	58.6	8.0	62.6	8.3
Newborn infant diseases	51.0	6.7	41.5	5.7	46.4	6.2
Tuberculosis	46.0	6.0	40.4	5.5	43.3	5.8
Arteriosclerotic heart disease	23.4	3.1	25.5	3.6	24.9	3.3

/a Rates are per 100,000 population per year.

/b This column indicates the percent of total deaths due to the indicated disorder; total come to less than 100% because the list does not include all disorders.

Source: "Analysis of Life Expectancy in China," by Yung Shou-De, et al., Journal of Population and Economics (Beijing), 1981, Table 5, p. 28.

Table A.23: MAJOR CAUSES OF DEATH AT DIFFERENT AGES, BEIJING, 1979

Age	Cause	% of total deaths
Under 1 year	Respiratory disease	23.5
	Genetic deformity	19.1
	Premature birth	15.0
	Heart disease	10.6
	Trauma or asphyxia at birth	8.2
1 to 4 years	Malignant tumors	20.4
	Respiratory disease	16.3
	Nervous system disease	14.3
	Heart disease	12.2
	Digestive system disease	8.2
5 to 14 years	Nervous system disease	15.3
	Malignant tumors	14.1
	Accidents, trauma	10.6
	Heart disease	9.4
	Respiratory disease	7.1
15 to 59 years	Malignant tumors	24.6
	Heart disease	20.5
	Cerebrovascular disease	18.4
	Digestive system disease	6.5
	Toxicosis	5.9
Over 60 years	Cerebrovascular disease	31.9
	Heart disease	27.9
	Malignant tumors	17.1
	Respiratory disease	8.2
	Digestive system disease	3.4
All age groups	Cerebrovascular disease	27.3
	Heart disease	25.4
	Malignant tumors	18.7
	Respiratory disease	7.0
	Digestive system disease	4.3

Source: Data provided to mission by the Ministry of Public Health.

Table A.24: MORTALITY RATES FROM MAJOR DISEASES, CITIES AND COUNTIES, 1954-78

Cause of death	Death Rates (per thousand per year) Cities 1954-59	Cities 1960-63	Cities 1974-78	Counties 1974-78
Respiratory diseases	14.0-16.9	12.0-12.8	9.0-11.4	11.4-13.0
Pulmonary tuberculosis	5.7- 9.5	5.9- 7.1	2.6- 3.7	3.7- 4.9
Digestive system diseases	6.4- 9.1	5.5- 6.4	4.1- 4.9	5.9- 7.0
Acute infectious diseases	4.2-10.6	3.8- 5.5	1.6- 2.0	2.9- 3.4
Subtotal	34.4-39.6	28.6-29.9	17.3-21.8	24.4-27.7
Heart disease	5.6- 8.7	6.4- 6.7	18.3-20.8	17.2-22.3
Cerebrovascular disease	5.2- 7.0	4.8- 6.9	21.5-23.5	13.5-16.1
Malignant tumors	4.4- 5.9	4.4- 8.6	17.8-19.6	15.9-17.5
Subtotal	15.3-19.7	15.6-22.2	58.0-63.8	47.7-54.3
Total	50.7-58.8	45.4-50.8	76.9-81.3	75.4-78.7

Note: The mission was not provided information on the sources for the data in the table, but the increase in city death rates recorded in 1974-78 over the two preceding periods (due to the dramatic increase in reported cardiovascular disease and tumors) presumably results in substantial part from improved reporting.

Source: Data provided to the mission by the Ministry of Public Health.

Table A.25: INCIDENCE AND DEATH RATES FROM COMMUNICABLE DISEASE, NATIONWIDE, 1979

Disease	Incidence of disease (per 100,000 population)	Case fatality rate (%)
Plague	0.0008	75.00
Cholera	0.009	2.35
Diphtheria	1.74	7.64
Epidemic cerebrospinal meningitis	11.26	4.49
Pertussis (whooping cough)	41.34	0.18
Scarlet fever	15.25	0.07
Measles	92.70	0.66
Influenza	273.41	0.01
Dysentery	299.49	0.22
Typhoid fever and paratyphoid fever	6.30	0.45
Viral hepatitis	48.57	0.23
Poliomyelitis	0.56	2.63
Encephalitis (Japanese B)	1.80	11.65
Malaria	245.59	0.004
Kala-azar	0.005	-
Forest cerebritis	0.06	9.90
Tsutsugamushi	0.07	-
Hemorrhage fever	2.19	6.87
Leptospirosis	2.83	2.93

Source: Data provided to mission by the Ministry of Public Health.

Table A.26: COMMUNICABLE DISEASES IN GANSU PROVINCE, 1979

Disease /a	Cases		Deaths	
	Number	Incidence per 100,000	Number	Percent
Diphtheria	12	0.06	0	0.00
Epidemic cerebrospinal meningitis	1,400	7.47	25	1.78
Pertussis (whooping cough)	5,000	26.70	6	0.12
Scarlet fever	1,800	9.61	2	0.11
Measles	11,000	58.73	81	0.74
Influenza	38,000	202.88	3	0.01
Dysentery	58,000	309.66	127	0.22
Viral hepatitis	200	1.07	2	1.00
Poliomyelitis	44	0.23	0	0.00
Encephalitis (Japanese B)	93	0.50	9	9.68
Malaria	27	0.14	0	0.00
Kala-azar	5	0.03	0	0.00

/a There are 25 communicable diseases that the national Ministry of Public Health has made the antiepidemic service responsible for; the 13 listed here are those known to have occurred in Gansu in 1979.

Note: The population of Gansu at the end of 1978 was 18.73 million.

Source: Data provided to mission by Antiepidemic Station, Bureau of Health, Gansu Province.

Table A.27: INFANT MORTALITY RATES, VARIOUS SOURCES

Place	Estimated infant mortality rate (per ´000) Male	Both sexes	Female
Panel I - Pre-Liberation China			
Health Areas			
Beijing, 1934	138.6		113.1
Hsiao-Chi			
1931/32	184.8		223.8
1932/33	201.2		284.8
1933/34	378.5		402.4
1934/35	153.8		154.5
1931-35	220.7		263.6
Ting Hsien			
1931		-	
1933		199.0	
1934		163.1	
1935		185.2	
1936		145.0	
Farm Areas			
22 Provinces, 1929-31			
All areas	160.0		152.0
North China	152.0		159.0
South China	166.0		147.0
Four provinces, 1924/25		129.4+	
Chen-Kung			
Feb 1940-June 1944	212.1		211.1
China, Overall			
1949		250-300	
Panel II - Post-Liberation China			
24 Provinces, Rural Areas			
1955		>110	
Beijing, City Proper			
1960		29.8	
1979		12.8	
Beijing Municipality			
1973		30.0	
1979		17.0	
China, Most of the Country			
1973-75		53-63	
1978-79		56	

Sources:

1. Data for specific places in Pre-Liberation China are presented in Table VS-1 of "Selected Indicators of Current Health Status and Major Causes of Death in the People´s Republic of China," by H. King and F.B. Locke, US National Cancer Institute, 1980. The estimate for China as a whole comes from Banister; see following note.
2. Data concerning Beijing and the rural areas of 24 provinces come from a draft of Chapter 4 of China´s Pattern of Population Growth, by Judith Banister, forthcoming from Stanford University Press.
3. The figures 1972-74 for China as a whole were calculated by J. Banister and S. Preston using data from the China Cancer Epidemiology Survey; ("Mortality in China," Population and Development Review, March 1981); they are also reported in the book referenced in note 2.
4. The 1978-79 figure for China as a whole comes from "The Economic Development of China," by Ding Chen, Scientific American, September 1980, p. 159.

Table A.28: FOOD BALANCE SHEET FOR CHINA, 1979
(National level data are in millions of metric tons per year)

	Production	Imports	Exports	Domestic supply	Domestic use: Nonfood & waste	Domestic use: Food/a	Per capita supply: Kilograms per year	Per capita supply: Daily Energy (KCal)	Per capita supply: Daily Protein (gm)	Per capita supply: Daily Fat (gm)
Vegetable Products							331.6	2,262	54.1	14.4
Food Grains							224.2	2,008	42.8	6.2
Rice	143.61	0	1.60	142.01	47.28	93.73	97.1	974	17.0	2.1
Wheat	68.83	9.50	0	78.33	21.15	57.18	59.3	576	16.4	2.3
Corn	59.99	2.28	0	62.27	31.13	31.14	32.3	322	6.9	1.2
Sorghum	7.64	0	0	7.64	4.43	3.21	3.3	33	0.8	0.2
Millet	6.13	0	0	6.13	3.56	2.57	2.7	27	0.7	0.2
Tubers /b	28.47	0	0	28.47	0	28.47	29.5	76	1.0	0.2
Soybeans	7.47	0.58	0.31	7.74	4.10	3.64	3.8	39	3.6	1.4
Pulses	9.96	0	0.07	9.89	2.96	6.93	7.2	67	4.4	0.3
Vegetable oils	2.62	0.19	0.01	2.80	0.60	2.22	2.3	53	0	6.0
Sugar	2.50	1.10	0	3.60	0	3.60	3.7	39	0	0
Fruits	7.01	0	0.55	6.46	0.80	5.66	5.9	4	0.1	0
Vegetables	89.63	0	0	89.63	8.10	81.56	84.5	52	3.2	0.5
Animal Products							26.8	179	8.5	15.3
Pork, beef and mutton	10.62	0	0.04	10.58	0	10.58	10.9	101	3.4	9.4
Poultry	2.81	0	0	2.81	0	2.81	2.9	10	1.0	0.6
Other meat	1.56	0	0.04	1.56	0	1.52	1.6	3	0.5	0.2
Fish	4.30	0	0.10	4.20	1.01	3.19	3.3	12	1.9	0.4
Eggs	3.36	0	0.05	3.31	0	3.31	3.4	14	1.1	0.9
Milk	6.40	0	0	6.40	3.00	3.40	3.5	9	0.6	0.5
Animal fats	1.24	0.11	0	1.35	0.15	1.20	1.2	30	0	3.3
Total							346.3	2,441	62.6	29.7

/a Food utilization rates applied here are based on the FAO's (Provisional Food Balance Sheets, FAO, Rome, 1977) estimates of nonfood use and extraction rates. For the principal grains - rice, wheat and corn - estimates of extraction rates provided to the mission are applied instead. These estimates are 70% for rice, 85% for wheat and 91% for corn. All are higher than the FAO's estimates of 67%, 75% and 80% respectively.

/b Expressed as grain equivalent at one fifth the wet weight.

Sources: Ministry of Agriculture, State Statistical Bureau and mission estimates.

Table A.29: FOOD ENERGY REQUIREMENTS, CHINA, 1979

Age group (years)	Average body weight (kg) /a	Requirement per kg body weight at moderate activity levels (Kcal/day) /b	Requirement per capita adjusted for activity level (Kcal) /c	Mid-year population (millions)	Total daily energy requirement (10^9 Kcal)
Children					
<1	8		1,090	21.8	23.8
1-3	11		1,360	63.4	86.2
4-6	16		1,830	63.9	116.9
7-9	21		2,190	63.3	138.6
Males					
10-12	28		2,600	31.2	81.1
13-15	39	44.65	1,888	30.4	57.4
16-19	52	46.92	2,647	38.7	102.4
20-39		46.00	2,695	163.6	440.9
40-49		43.70	2,560	53.8	137.7
50-59	54	41.40	2,426	35.5	86.1
60-69		36.80	1,987	20.3	40.3
70+		32.20	1,739	10.0	17.4
Females					
10-12	28		2,350	30.4	71.4
13-15	40	45.20	1,962	29.6	58.1
16-19	48	42.00	2,187	37.8	82.7
20-39		40.00	2,127	154.7	329.0
40-49		38.00	2,020	49.6	100.2
50-59	49	36.00	1,914	33.9	64.9
60-69		32.00	1,568	20.9	32.8
70+		28.00	1,372	12.0	16.5
Total				964.8	2,084.4

Total daily per capita energy requirement: 2,160 Kcal /d

/a Average body weights are estimated on the basis of weight data collected on children aged 0 to 18 years in the periurban areas of 9 cities in 1975. To estimate adult male and female Chinese weights, the ratios of adult weight to 16-19 year-old weight in the FAO/WHO standard population (FAO/WHO Energy and Protein Requirements, FAO, 1973, page 35) are applied to the male and female 16-19 year-old weights observed in the Chinese sample. Average weights in China are then assumed to have increased by 1% between 1975 and 1979.

These weight data are likely to overestimate national averages and hence total energy requirements since they are taken from a suburban sample; however, they are roughly 15 to 25% lower than the weights used in the standard FAO/WHO estimates of caloric requirements and roughly 10 to 15% lower than the weights assumed by Smil in his various estimates of caloric requirement for the Chinese population.

/b These are computed according to WHO/FAO recommendations for moderate activity levels. Recommended per capita requirements for children and adolescents aged 0-12 are not adjusted for weights as are requirements for other ages but are instead set equal to the requirements for children of standard weight. The rationale for this is that children who weigh less than standard can use the extra calories for catch-up growth given that they are likely to be growing below the genetic potential rate.

/c Half of the male and female population aged 13 to 59 are assumed to be "very active," and half "moderately active." Very active members of the population require 17% more calories than the moderately active population. Moderate activity levels are assumed for those aged 60 and up. Requirements for ages 0-12 are explained in footnote /b.

/d The 1977 FAO estimate of requirements is 2360 Kcal per capita per day.

Table A.30: FOOD PROTEIN REQUIREMENTS, CHINA, 1979

Age group (years)	Average body weight (kg) /a	Requirement per kg body weight per day (g) /b	Requirement per capita per day (g)	Population (millions)	Total daily protein requirement (10^3 kg)
Children					
<1	8			21.8	/c
1-3	11	1.19	13.09	63.4	839.9
4-6	16	1.01	16.16	63.9	1,032.6
7-9	21	0.88	18.48	63.3	1,169.8
Male adolescents					
10-12	28	0.81	22.68	31.2	707.6
13-15	39	0.72	28.08	30.4	853.6
16-19	52	0.60	31.20	38.7	1,207.4
Female adolescents					
10-12	28	0.76	21.28	30.4	646.9
13-15	40	0.63	25.20	29.6	745.9
16-19	48	0.35	16.80	37.8	635.0
Adults: men	54	0.57	30.78	283.2	8,716.9
women	49	0.52	25.48	271.1	6,907.6
Allowance for pregnancy			5.5	(24.0)/d	132.0
Allowance for lactation			17.0/c	(21.8)/c	370.6
Total				964.8	23,965.8

Total daily per capita protein requirement in milk or egg equivalents: 24.8 gm

Total daily per capita protein requirement in a diet of protein quality 70% relative to milk or eggs: 35.4 gm /e

/a See footnote /a, Table A.29, for an explanation of average body weight estimates for China.

/b See p. 87 of FAO/WHO Energy and Protein Requirements (FAO, 1973).

/c The FAO/WHO expert committee suggests that in the absence of information on number of lactating women and duration of lactation, the allowance for all infants whether breastfed or not can be approximated by the requirement for lactation (17.0 grams) multiplied by the total number of infants. See FAO (1973), footnote b above, p. 85.

/d The number of pregnant women is estimated to be 10% more than the number of infants below 12 months of age.

/e The 1977 FAO estimate of requirements is 38.4 grams per capita per day.

Annex I

Education

Contents

TABLES IN TEXT

APPENDICES

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

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/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

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/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
Primary				
Schools ('000)	347	777	682	924
Enrollment (millions)	24.4	86.4	116.2	146.6
Enrollment ratio (%)	25	67	70	93
Secondary				
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
Higher				
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 /b education
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 compaigns 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	-	-
Labor Force	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 Mln.	Educational output 1949-79 %	Labor force participation %	Labor force participation Mln.	Adjustment /a (mln.)	Attrition /b (mln.)	Trained labor force Mln.	Trained labor force % 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
Total	506.4	100.0	-	378.3	+42.1	-151.1	269.3 /c	66.3

/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
A. By Occupation		
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
Total	4.7	100
B. By Sector		
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
Total	4.7	100

/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
Total	4,020	637	16.0

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

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/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

	Stock		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

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/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

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/1 The net ratio exludes, 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,

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/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

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/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

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/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

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/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 orginally 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	Number of institutions Central	Provincial	Total
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
Total	241	392	633

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
Total	633	97

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 ('000)
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	-
Total	1,020	85

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/a 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
Total	11,620	146,110	78,910	236,640	1,020.0	4.3

/a Academic titles have been reinstituted 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).

Year	Enrollment
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

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/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

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/1 Alternative Routes to Formal Education, Distance Teaching for School Equivalency; Perrata, 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

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/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
Total	13.1	8.4	3.7	1.0
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
Total	+ 13.2

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.
Total	5.30	6.56	7.70	8.80

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. ISSUES

Strengths 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

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/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

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/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

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/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

overage 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 /a 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

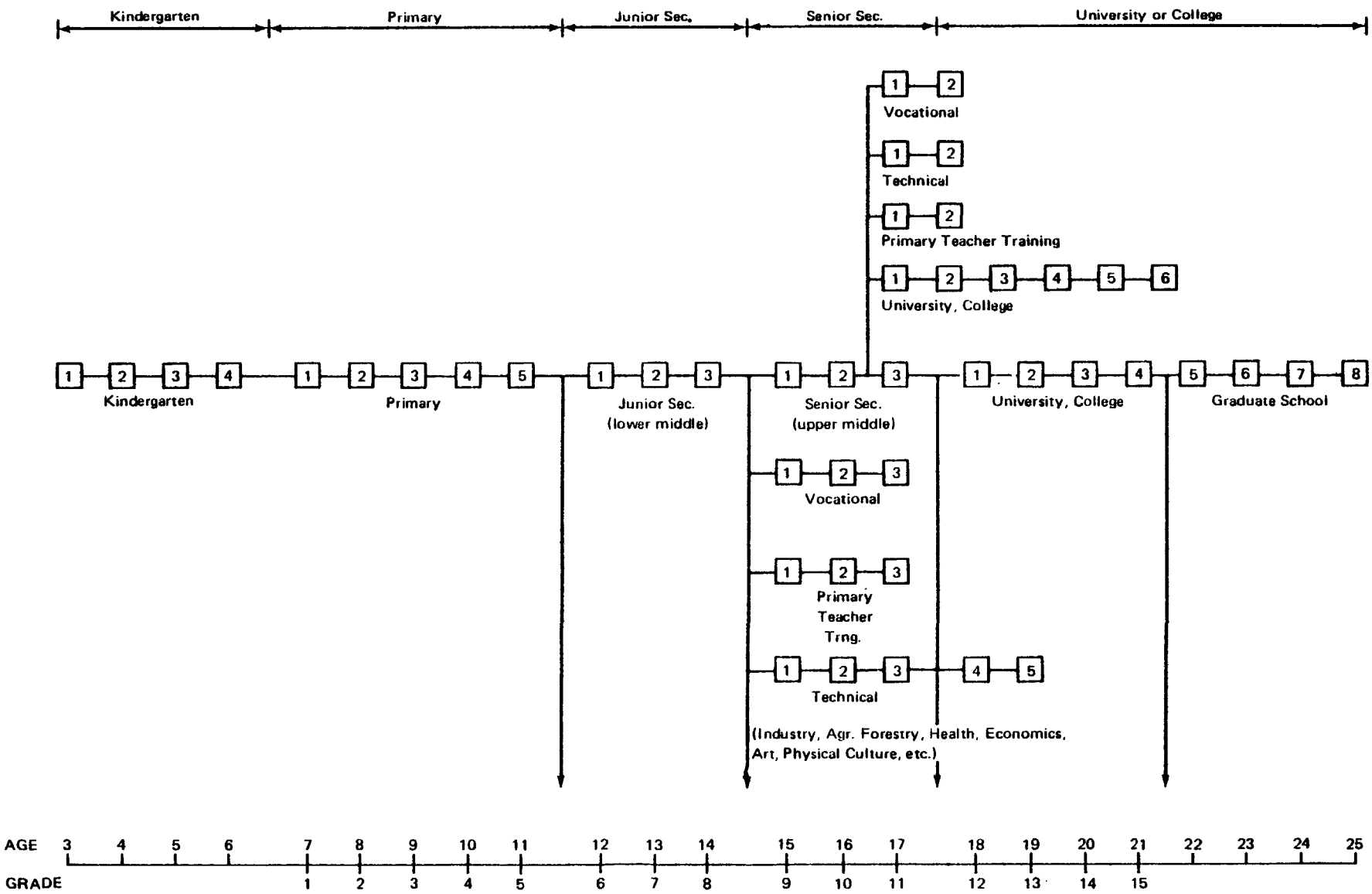
provide. The Government should keep junior secondary enrollment reasonably constant during this period and provide nonformal educational opportunities for students who cannot enter regular junior secondary schools. The Government has paid insufficient attention to the quality of learning in its primary 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.

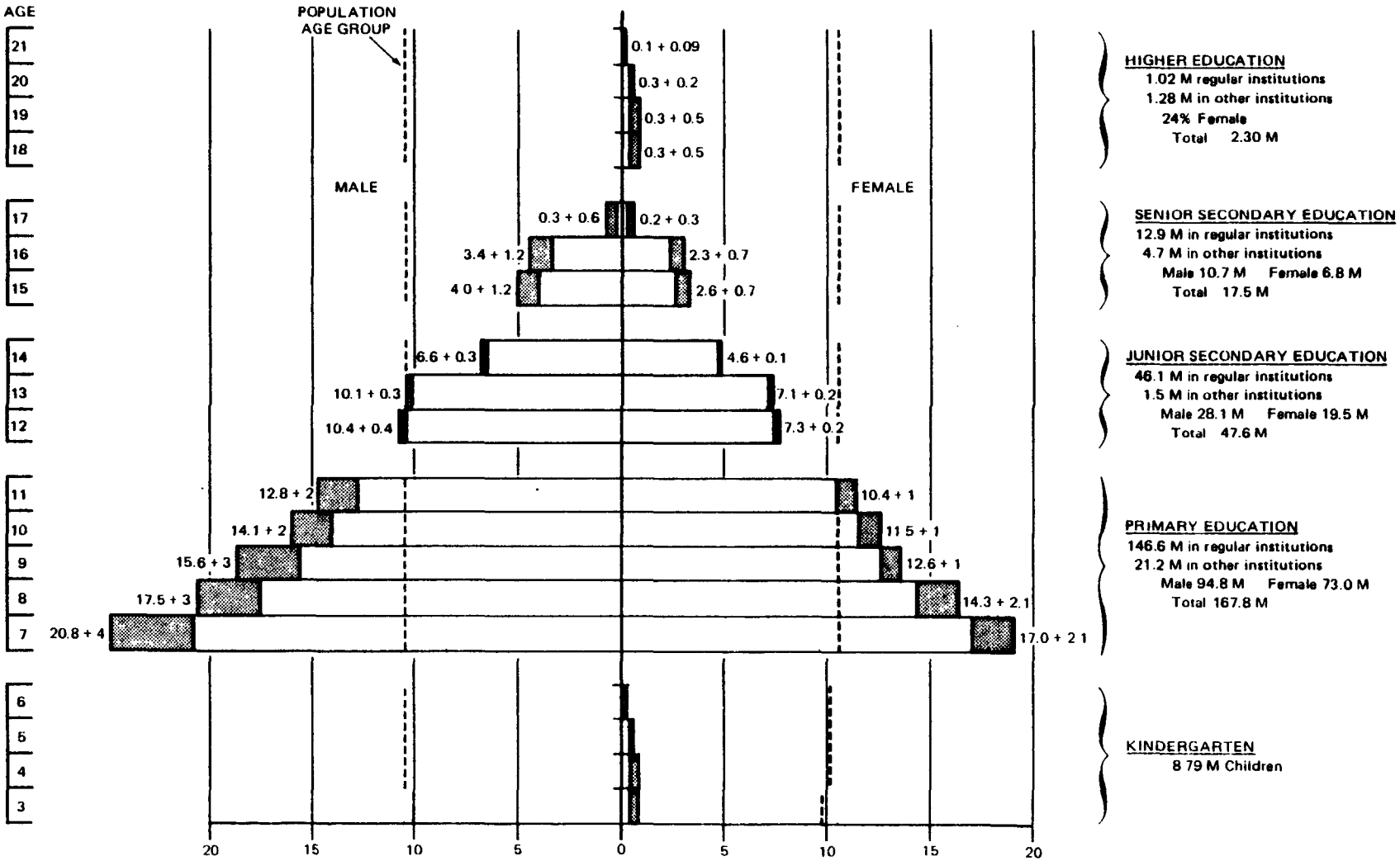
STRUCTURE OF EDUCATION IN CHINA



Source: Ministry of Education

World Bank – 22431

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



Regular institutions

OTHER (Spare-time Students, Adults, etc.)

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

World Bank - 22430

EDUCATION IN CHINA

Formal 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)	-	-	-
Total	146.63	46.13	12.92 /a	

/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 CHINA

Students, 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

Skilled Worker Training Schools (at senior secondary and postsecondary levels)

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							
	Total	Comprehensive univ.	Inst. of science & engin.	Inst. of agr. & forestry	Inst. of teacher training	Inst. of med. & pharmacy	Others	Total	Comprehensive univ.	Inst. of science & engin.	Inst. of agr. & forestry	Inst. of teacher training	Inst. of med. & pharmacy	Others	Students per 10,000 of pop.
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	3,750	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	1,225	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	3,733	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	4,356	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	3,289	11,693	3,768	764	9
Anhui	20	2	6	1	6	4	1	33,290	3,533	10,095	2,295	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	2,139	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	2,246	7,898	3,268	1,377	11
Nei Monggol	13	1	2	3	4	3	-	15,674	1,289	2,309	1,549	8,107	2,204	216	18
Liaoning	34	1	15	2	5	6	5	58,007	2,965	32,582	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	15,992	4,276	11,532	5,090	1,489	12
	633	33	191	61	161	107	80	1,019,950	99,268	353,540	74,622	310,174	126,633	55,713	11

/a Universities that recruit on a national basis.

Source: Ministry of Education.

APPENDIX C.4

EDUCATION IN CHINA

Number of Graduates from Higher Education, by Discipline, 1978 and 1979

Classification	1978	1979
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
Total	164,581	85,085

Source: Ministry of Education.

APPENDIX C.5

EDUCATION IN CHINA

Higher 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.

APPENDIX C.6

EDUCATION IN CHINA

Students, Schools and Teachers in Nonformal Education, 1979

Kindergarten

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

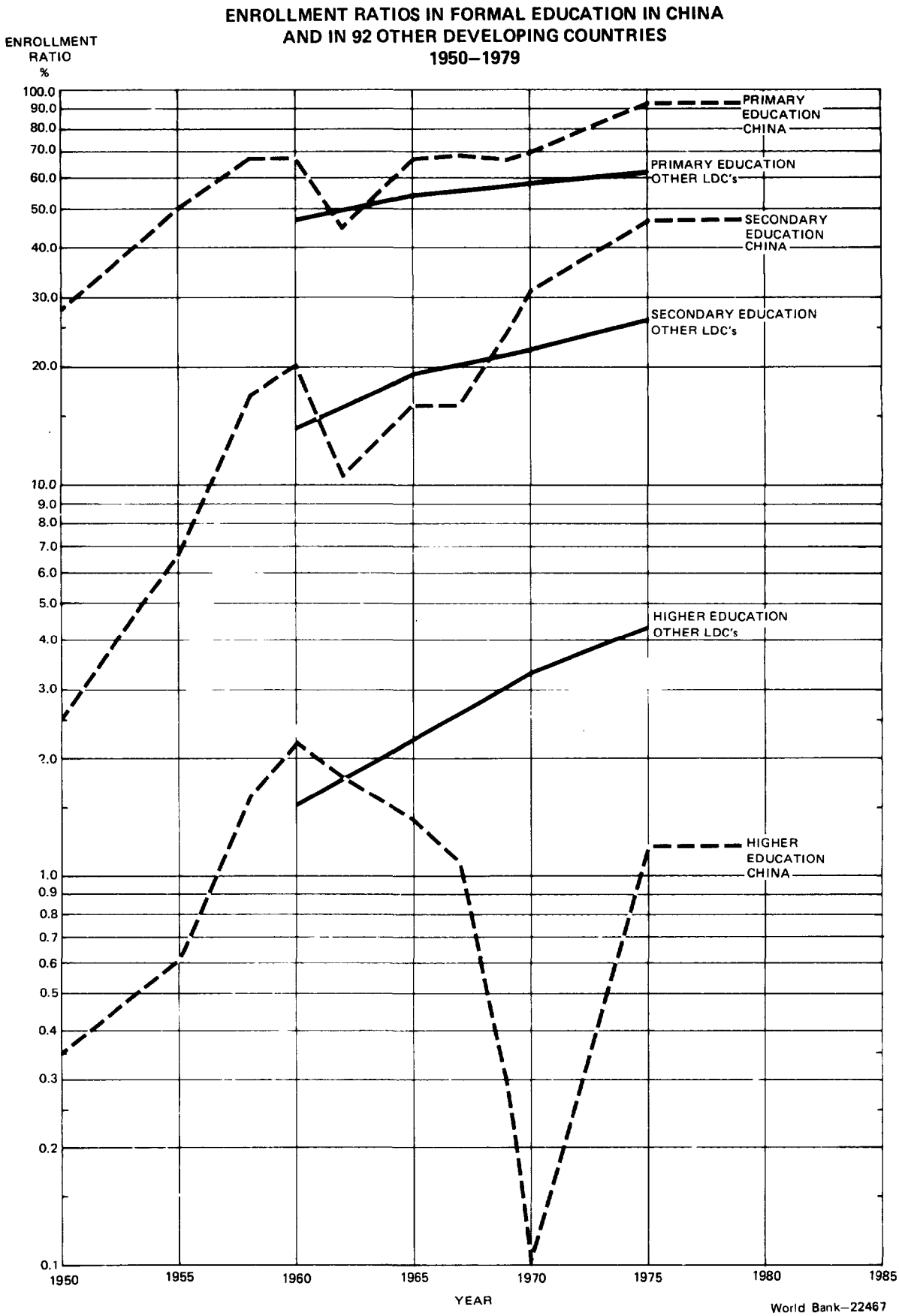
4.7 million students, of whom 1.5 million are estimated to be in junior secondary education, 0.6 million in general senior secondary education, 2.2 million in technical secondary education and 0.4 million in technical postsecondary education. Full-time students are estimated at 0.6 million, while the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

Full-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
ENROLLMENT RATIO %
100.0
90.0
80.0
70.0
60.0
50.0
40.0
30.0
20.0
10.0
9.0
8.0
7.0
6.0
5.0
4.0
3.0
2.0
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
1950
1955
1960
1965
1970
1975
1980
1985
YEAR
PRIMARY EDUCATION CHINA
PRIMARY EDUCATION OTHER LDC's
SECONDARY EDUCATION CHINA
SECONDARY EDUCATION OTHER LDC's
HIGHER EDUCATION OTHER LDC's
HIGHER EDUCATION CHINA
World Bank—22467

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.

APPENDIX F

EDUCATION IN CHINA

Indicative Weekly School Program in Primary and Secondary Education (1981)

Subject	Primary 1	Primary 2	Primary 3	Primary 4	Primary 5	Junior secondary 1	Junior secondary 2	Junior secondary 3	Senior secondary 1	Senior secondary 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	-	-	-	-	-
Total Activities	31	32	33	34	34					

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.

Distribution of Faculty, by Rank, Qualifications and Experience

	Rank						Qualifications				Experience				
	Prof.	Assoc. prof.	Lect.	Asst.	Other	Total	1-3 (years of third level study)	4-5	6+	Total	1-5	6-15 (years)	16-30	31+	Total
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 Giaotong 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 Giaotong 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

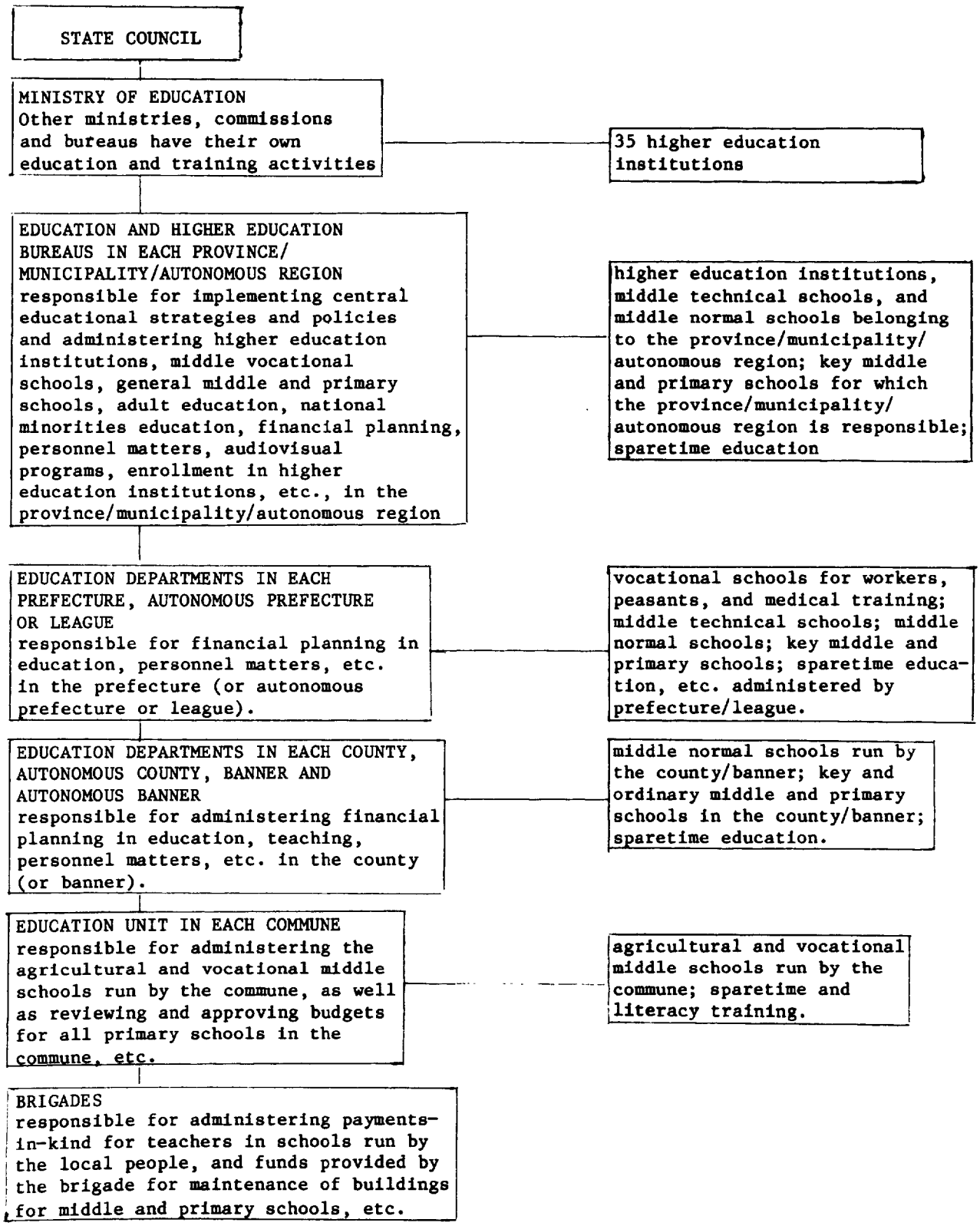
Organogram of the Ministry of Education

Ministry of Education

- **Depts. and Bureaus under Education Ministry**
  - General Office
  - Office of Policy Study
  - First Department of Higher Education (responsible for comprehensive universities, normal universities, and social science institutes)
  - Second Department of Higher Education (responsible for engineering, agriculture and medical universities and institutes)
  - Bureau of Science and Technology (responsible for scientific research in higher learning institutions which are under the direct supervision of the MOE)
  - Department of Political Theory Education (responsible for education in political theory)
  - Department of Student Affairs (responsible for the enrollment, school roll and distribution of graduates of higher learning institutions)
  - Department of Secondary Technical Education (responsible for secondary technical education)
  - Department of Teacher Training (responsible for middle normal schools)
  - First Department of General Education (responsible for general, agricultural and vocational middle schools)
  - Second Department of General Education (responsible for primary and preschool education and education for the blind and the deaf-mute)
  - Department of Education for Minority Nationalities (responsible for education in minority regions)
  - Department of Physical Education (responsible for physical education work in all levels and types of schools)
  - Bureau of Education for Workers and Peasants (responsible for adult sparetime education)
  - Department of Planning (responsible for planning, financial affairs, statistics, employment and salaries in all levels and types of schools)
  - Bureau of Capital Construction (responsible for the examination and approval of investments and architectural designs for capital construction)
  - Bureau of Production and Supplies (responsible for the production, research and manufacture of instructional instruments and equipment)
    - Instructional Instruments and Equipment company
      - Shenyang Instructional Instrument Plant
      - Xian Instructional Instrument Plant
      - Wuhan Instructional Instrument Plant
    - Instructional Instruments and Equipment Research
  - Bureau of Foreign Affairs (responsible for educational exchange and cooperation with foreign countries)
  - Bureau of Personnel (responsible for personnel affairs)
- **Enterprises and Institutions under Education Ministry**
  - The People's Education Publishing House (responsible for editing and publishing teaching materials)
    - Printing House
  - Central Education Science Research (responsible for scientific research in education)
  - Central TV University
    - Central Educational Films Developing and Printing Plant
  - Central Audiovisual Education Institute (responsible for audiovisual education)
  - Editorial Department of the People's Education
  - Institute of Educational Administration

APPENDIX I

ADMINISTRATION OF EDUCATION IN CHINA



EDUCATION IN CHINA

Major 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%)	-	-	-	-	-	-	-	-
Total	60.90	(100%)	26.32	2.59	1.20	2.40	5.08	2.00	5.25	7.15

EDUCATION IN CHINA

Major 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%)	-	-	-	-	-	-	-	-
Total	70.00	(100%)	28.15	4.12	2.02	3.16	5.77	2.58	6.69	7.98

EDUCATION IN CHINA

Education Indicators, 1979

1. Population in millions	971
2. GNP per capita ($)	256
3. Literacy rate of adults (literate people aged 15 and over, divided by the population aged 15 and over)	66%
4. Total expenditure on education as a percentage of GNP /a	3.3%
5. Per capita expenditure on education ($)	8.8
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	69%
8. Central government expenditure on education as a percentage of central government expenditures	6.6%
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	9.2%
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	36%
14. Expenditures on higher education as a percentage of total costs of education	30%
15. Recurrent unit costs of primary education as a percentage of GNP per capita	8%
16. Recurrent unit costs of secondary education as a percentage of GNP per capita	19%
17. Recurrent unit costs of higher education as a percentage of GNP per capita	442%
18. Salaries as a percentage of recurrent costs in primary education	60%
19. Salaries as a percentage of recurrent costs in secondary education	51%
20. Salaries as a percentage of recurrent costs of higher education	25%
21. Enrollment ratio in primary education /b	93% net, 158% gross
22. Enrollment ratio in secondary education /b	51% gross
23. Enrollment ratio in higher education /b	2.8% 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	n.a.
31. Transition rate from primary to lower secondary education	83%
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: Y 1.5303 = $1.00
GNP : Y 391.3 billion

EDUCATION IN CHINA

Vocational/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 CHINA

Vocational/Technical School Teachers' Stock and Demand, 1980-89
('000)

Year	Stock /c	Teachers /a required per year	Surplus (+) or deficit (-)	Teachers /b 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 CHINA

Senior Secondary Enrollment Projection, 1980-89
(Million students)

	Two-year system				Three-year system					
Year	Intake /a	1	2	Sub-total /b	Intake /a	1	2	3	Sub-total /b	Total
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.

APPENDIX O

EDUCATION IN CHINA

Senior Secondary Teachers' Stock and Demand, 1980-89
('000)

Year	Stock /c	Teachers /a required per year	Surplus (+) or deficit (-)	Teachers /b 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 CHINA

Junior Secondary Enrollment Projection, 1980-90
(Million students)

Year	Intake /a	Grade 1	Grade 2	Grade 3	Total /b
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.

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

Note: Mission projections.

APPENDIX Q

EDUCATION IN CHINA

Junior Secondary Teachers' Stock and Demand, 1980-90
(million)

Year	Stock /c	Teachers /a required per year	Surplus (+) or deficit (-)	Teachers /b 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.

APPENDIX R

EDUCATION IN CHINA

Primary School Enrollment Projection, 1980-90
(Million students)

Year	Intake /a	Grade 1	Grade 2	Grade 3	Grade 4	Grade 5	Total /b
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.

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

Note: Mission projections.

APPENDIX S

EDUCATION IN CHINA

Primary 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.

APPENDIX T

EDUCATION IN CHINA

Enrollment 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.

APPENDIX U

EDUCATION IN CHINA

Population (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 (IV), 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.	
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).	

REFERENCES

Barendsen, Robert D. The Educational Revolution in China. Washington, D.C.: US Government Printing Office, 1973.

Committee of Concerned Asian Scholars. China: Inside the People's Republic. Bantam Books, 1972.

Duiker, William J. Ts'ai Yuan-p'ei: Educator of Modern China. University Park: Pennsylvania State University Press, 1977.

"Educational Policy after the Gang of Four." Chinese Education, Spring-Summer, 1979.

Fraser, Stewart E., and Hsu, Kang-liang. Chinese Education and Society: A Bibliographic Guide. White Plains, New York: International Arts and Sciences Press, 1972.

Gamberg, Ruth. Red and Expert: Education in the People's Republic of China, New York: Schocken, 1977.

Hinton, Harold C., ed. The People's Republic of China: A Handbook. Boulder, Colorado: Westview, 1979.

Hookham, Hilda. A Short History of China. New American Library, 1972.

Kessen, William, ed. Childhood in China. New Haven: Yale University Press, 1975.

Kraft, R. "Experimental Learning in Revolutionary and Post-Revolutionary China." Paper presented to American Educational Research Association, April 1979.

Lofstedt, Jan-Ingvar. Chinese Educational Policy. Stockholm: Almqvist and Wiksell, 1980.

_____. Enrollment Developments in China. Institute of International Education, University of Stockholm, February 1980.

Montaperto, Ronald N., and Henderson, Jay, eds. China's Schools in Flux. White Plains, New York: M.E. Sharpe, 1979.

Myrdal, Jan. Report from a Chinese Village. New York: Mentor, 1965.

Orleans, L. Manpower for Science and Engineering in the People's Republic of China. Background Study No. 4. Washington, D.C., 1980.

Parker, F. "China Since Mao." Paper presented at Annual Meeting of Southwestern Philosophy of Education Society, November 1978.

Pepper, S. "Chinese Education After Mao: Two Steps Forward, Two Steps Back and Begin Again."

_____. "Education and Revolution: The 'Chinese Model' Revisited." Asian Survey 18, 9 (September 1978): 847-90.

Price, R.F. Education in Communist China. New York: Praeger, 1970.

Prybyla, Jan S. The Chinese Economy: Problems and Policies. Columbia: University of South Carolina, 1978.

Rawski, Evelyn Sakakida. Education and Popular Literacy in Ch'ing China. Ann Arbor: University of Michigan Press, 1979.

Shirk, S. "Educational Reform and Political Backlash: Recent Changes in Chinese Educational Policy." Comparative Education Review, June 1979.

Sigurdsson, Jan. Technology & Science in the People's Republic of China. Lund, Sweden, 1980.

Tyler, R.W. "Chinese Education." Phi Delta Kappa, September 1978.

US-China Education Clearinghouse. An Introduction to Education in the People's Republic of China and U.S.-China Educational Exchanges. Committee on Scholarly Communication with the PRC and National Association for Foreign Student Affairs, Washington, D.C., January 1980.

US-House of Representatives, Committee on Science and Technology. Annotated Bibliography on Science and Technology in China. Washington, D.C.: GPO, 1976.

Zuo, H. "China's Education: The Type of People It Brings Up." Beijing Review, January 1980.

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Traces the development of the Chilean economy since the Great Depression of the 1930s and emphasizes economic policies and events of the 1970s and their effects on Chile's economic prospects. Finds that the ultimate success of the government's policies depends on its ability to demonstrate that efficient resource allocation and accelerated growth can be made consistent with an equitable distribution of income and the relief of absolute poverty.

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This report outlines a basic needs strategy designed to guide the Gambian government and the World Bank in making policy decisions that will increase the chances of base survival

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underlying both the 1978–80 Development Plan and those plans to be implemented subsequently. Points out that the overall performance of the economy has been disappointing in recent years, but that the government has been able to focus on certain important social objectives: the satisfaction of basic needs, reduction of urban-rural income disparities, and the protection of living standards of low-income urban groups. Proposes a policy framework characterized by increased reliance on external assistance, vigorous export promotion, and a general relaxation of economic controls, and considers the feasibility and appropriateness of this strategy in relation to the resources of the economy and long-term development goals of the country.

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Alexander G. Nowicki, chief of mission, and others

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Christian Merat, coordinating author, and others

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George B. Baldwin and others

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LC 77-17242. ISBN 0-8018-2091-X, $6.50 (£4.50) paperback.

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Alice Galenson, chief of mission, and others

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Manmohan Agarwal and others

Reviews Paraguay's high economic growth rate generated by expanded agricultural production and the construction of two huge hydroelectric plants. Highlights the need to improve support services in the countryside, promote industrial development, increase expenditures on education, health, and rural development, and improve the tax base.

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Alfredo Gutierrez, chief of mission, and others

Reviews recent economic developments and provides a framework for policy actions and investment projects designed to make maximum use of development possibilities, and suggests the need to coordinate public-sector activities in a geographic and sectoral dimension to exploit the eastern region's natural resources.

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Ulrich Thumm, chief of mission, and others

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Barend A. de Vries, chief of mission, and others

Outlines the country's industrial development strategy, its major objectives, and industrial investment priorities and determines that the nontraditional manufactured export drive should continue with increased participation by industries, firms, and regions and that policies for the home industries should be reoriented toward better use of capital and domestic resources and more employment creation.

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The Solomon Islands: An Introductory Economic Report
Edward K. Hawkins, chief of mission, Nizar Jetha, deputy chief, and others

States that the country faces four main development issues: (1) creating sufficient jobs for a fast-growing work force; (2) increasing the opportunities for earning cash incomes in rural areas; (3) balancing regional disparities; and (4) improving educational and training facilities at all levels to raise the supply of administrators, managers, and professionals.

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1982. v + 161 pages (including statistical appendix).

ISBN 0-8213-0027-X. $5.00 paperback.

Uruguay: Economic Memorandum
Alfredo Gutierrez, chief of mission, and others

Examines the government's liberalization policies designed to improve resource allocation and emphasizes that these will need to be molded into a policy framework conducive to rapid development.

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Yemen Arab Republic: Development of a Traditional Economy
Otto Maiss, chief of mission, and others

Outlines the far-reaching changes in the socioeconomic and political structure of the Yemen Arab Republic since the 1962 revolution and discusses major development issues of the late 1970s and the 1980s.

January 1979. 2, xxviii + 303 pages (including 3 maps, 7 annexes, statistical appendix, selected bibliography).

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People's Democratic Republic of Yemen: A Review of Economic and Social Development
Shahid A. Chaudhry, chief of mission, and others

Reviews the government's economic policies and the socialization of the economy between 1971 and 1978 and concludes that the absence of significant natural resources will inevitably influence the country's development, which must concentrate on solving urban/rural disparity, increasing productivity, and using manpower efficiently.

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Yugoslavia: Development with Decentralization
Vinod Dubey and others

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