



Regional Population Projections for China

Toth, F.L., Cao, G.-Y. and Hizsnyik, E.

**IIASA Interim Report
December 2003**



Toth, F.L., Cao, G.-Y. and Hizsnyik, E. (2003) Regional Population Projections for China. IIASA Interim Report. IR-03-042
Copyright © 2003 by the author(s). <http://pure.iiasa.ac.at/7041/>

Interim Report on work of the International Institute for Applied Systems Analysis receive only limited review. Views or opinions expressed herein do not necessarily represent those of the Institute, its National Member Organizations, or other organizations supporting the work. All rights reserved. Permission to make digital or hard copies of all or part of this work for personal or classroom use is granted without fee provided that copies are not made or distributed for profit or commercial advantage. All copies must bear this notice and the full citation on the first page. For other purposes, to republish, to post on servers or to redistribute to lists, permission must be sought by contacting repository@iiasa.ac.at

Interim Report

IR-03-042

Regional population projections for China

Ferenc L. Toth: (toth@iiasa.ac.at)
Gui-Ying Cao: (cao@iiasa.ac.at)
Eva Hizsnyik: (hizsnyik@iiasa.ac.at)

Approved by

Günther Fischer, Leader,
Land Use Change Project

December, 2003

Contents

1. Introduction
 - 1.1 Background, context, and objectives
 - 1.2 Conceptual foundations and key assumptions
 2. Data sources
 - 2.1 National multi-state population projections
 - 2.2 Regional and rural-urban population distribution: the 2000 census data
 - 2.3 Provincial birth rate projections
 - 2.4 Provincial death rate projections
 - 2.5 Provincial urbanization rate projections
 - 2.6 Interprovincial migration projection
 3. Method: Concept and procedure
 - 3.1 Conceptual framework
 - 3.2 The decomposition procedure
 4. Results
 - 4.1 Scenario C
 - 4.2 Scenario L1
 - 4.3 Scenario L2
 - 4.4 Scenario H1
 - 4.5 Scenario H2
 5. Discussion
 6. Summary and conclusions: Potential uses of the regional projections
- References
- Appendix

List of Figures

- Figure 2.1 The historical evolution of birth rates in the 31 provinces and the national level.
- Figure 2.2 The historical evolution of death rates in selected provinces and at the national level from 1965 to 1999

List of Tables

- Table 2.1 Projections of rural, urban, and total population for China under different scenario assumptions
- Table 2.2 Rural, urban, and total population in China's 31 provinces and in the 8 LUC-regions according to the year 2000 census

- Table 2.3 Projected provincial reference birth rates used for the regional population projections
- Table 2.4 Projected provincial reference death rates used for the regional population projections
- Table 2.5 Projections of China's urbanization level at provincial level 2000-2030
- Table 2.6 Provincial share in inter-provincial migration
- Table 4.1 Main characteristics of the Central-C scenario assumptions
- Table 4.2 Population projection for China and the LUC-regions under the Central scenario assumptions for the period 2000-2030
- Table 4.3 Main characteristics of the Low-L1 scenario assumptions
- Table 4.4 Population projection for China and the LUC-regions under the Low- L1 scenario assumptions for the period 2000-2030
- Table 4.5 Main characteristics of the Low-L2 scenario assumptions
- Table 4.6 Population projection for China and the LUC-regions under the Low-L2 scenario assumptions for the period 2000-2030
- Table 4.7 Main characteristics of the High-H1 scenario assumptions
- Table 4.8 Population projection for China and the LUC-regions under the High-H1 scenario assumptions for the period 2000-2030
- Table 4.9 Main characteristics of the High-H2 scenario assumptions
- Table 4.10 Population projection for China and the LUC-regions under the High-H2 scenario assumptions for the period 2000-2030

Abstract

Considering the size and the regional diversity of China, a prudent analysis of many economic and policy issues needs to consider the regional differences in climate, soil, water, and other natural resource endowments, population density, and social and economic development. Future-oriented multi-regional assessments require regionally detailed scenarios. A key component of such scenarios is the evolution of the population in different regions. For studies of land-use change and agriculture, such regionally disaggregated population projections are needed for estimating regional food demand and regional labor supply. These scenarios can also serve as background information for modeling development-induced migration, if migration processes are explicitly modeled.

With China's increasing integration in the world economy, the number of studies analyzing different features of this process has been booming recently. An increasing number of studies undertake their assessments at some level of regional detail and need regional scenarios to provide background information about the geographical distribution of people. The regional population projections presented in this report are developed for use in such studies.

The report combines national-level demographic scenarios for the period 2000 through 2030 with information about the provincial population distribution from the year 2000 census and projections of provincial birth-rate, death-rate, urbanization, and inter-provincial migration based on historical data. Results are available at three levels of regional resolution and age-group aggregation. This report presents the regional population projections at two levels. At the first level, the provinces are merged into eight economic-geographical regions. This level of aggregation makes modeling activities more tractable, but it still preserves a reasonable degree of spatial homogeneity. At the more detailed level, we consider the 31 provinces as the officially defined jurisdictions delineate them (as of 2000). The present report contains tables of urban, rural, and total population aggregated to three main age groups: 0-14, 15-64, and 65 and above for the provinces and for the eight regions. At the third and most detailed level, comprehensive tables covering 17 five-year age groups, 31 provinces and the 8 regions, rural, urban, and total population are also available.

Acknowledgments

The authors thank Günther Fischer, leader of the Land Use Change Project at IIASA for his encouragement and support. We also thank Brian O'Neill for his thorough reading of and detailed comments on an earlier version of this report; and we thank Shenghe Liu and Jikun Huang for comments and inputs regarding rural-urban migration patterns.

Regional population projections for China

Ferenc L. Toth, Gui-Ying Cao, and Eva Hizsnyik

1. INTRODUCTION

1.1 Background, context, and objectives

The general objective of the project on “Policy Decision Support for Sustainable Adaptation of China’s Agriculture to Globalization” (hence the CHINAGRO project) is to undertake policy analysis to support decisions guiding China’s integration in the world food system. An essential tool to support policy analysis is a multi-regional applied general equilibrium (AGE) model of the Chinese agricultural sector based on detailed models of the land and water resources as well as the agronomic processes. Both the policy analysis and the AGE modelling activities require a clear portrayal of the broader social and economic context and factors that will decisively shape the future of the food and agricultural sectors. The broader context and the crucial external factors need to be summarized in a harmonized set of 7 assumptions and clearly presented in the form of scenarios. The set of scenarios to be used in the CHINAGRO modelling and policy analysis covers plausible future trends of all important social, economic, and political processes that are not modelled endogenously in the project.

Given the size and the regional diversity of China, any sensible analysis must consider the regional differences in climate, soil and water resource endowments, population density, and social and economic development. Multi-regional assessments require regionally detailed scenarios. A key component of such scenarios is the evolution of the population in the different regions. Such regionally disaggregated population projections are needed for estimating regional food demand and regional labour supply. They can also serve as background information for modelling development-induced migration, if migration processes are explicitly modelled.

The regional population projections presented in this report are developed primarily for use in the CHINAGRO project. Yet, with China’s increasing integration in the world economy, the number of studies analysing different features of this process has been booming recently. An increasing number of studies undertake their assessments at some level of regional detail and need regional scenarios to provide the background information. Therefore it is hoped that other research groups will also find useful these regional projections.

Notwithstanding the expectation that our results might be of potential interest to other users, the method and data aggregation level reported here are tailored to the objectives and requirements of the CHINAGRO project. This requires a solid, methodologically consistent and transparent procedure results of which can be considered a good approximation of provincial population characteristics. The main uses of the results in CHINAGRO include

food demand and labour supply as input to the multi-regional integrated land-economy applied general equilibrium model. For these purposes, a broad-brushed picture of the main characteristics of the population (numbers in different age-groups in rural and urban areas across the provinces) is sufficient, high-precision demographic details are not required.

This report presents the regional population projections at two levels. At the more detailed level we consider the 31 provinces as the officially defined jurisdictions delineate them (as of 2000). At the second level, the provinces are aggregated into eight economic-geographical regions as defined in the CHINAGRO project based on earlier activities in the Land-use Change (LUC) project at IIASA. This level of aggregation makes modeling activities more tractable, but it still preserves a reasonable degree of homogeneity within and differentiation across the regions. Henceforth we refer to these regions as CHINAGRO or LUC regions.

1.2 Conceptual foundations and key assumptions

The *ideal procedure* to prepare regional population projections would involve calibration of regional models based on reliable, generally accepted, and detailed region-specific information about the main driving forces: fertility, mortality, and migration rates according to gender, age, education, and residence (rural versus urban). These regional projection models should then be simultaneously run on a joint accounting platform that keeps track of population movements across the regions and updates the regional model accordingly over time. Unfortunately, the reality is very far from such ideal conditions. First, there is a considerable degree of disagreement about the initial conditions: results of the year 2000 census are widely disputed in the demographic community in China and outside. Second, the availability and reliability of detailed information at the provincial scale is rather unbalanced: some regions seem to have good records while data concerning other provinces are scarce or less reliable.

With a view to the above circumstances, our *modelling strategy* for producing province-level population projections entails the incorporation of relevant data from diverse sources, their harmonization to ensure consistency, and the preparation of detailed projections by using the maximum amount of information available about the relevant features of the Chinese population. The core building blocks of the projection model are the national-level projections of urban and rural populations by age groups prepared by Cao (2003) and the population distribution across provinces in rural and urban areas by age groups reported by the year 2000 census (NBS, 2002a). Additional information sources include provincial projections of birth rates and death rates, projections of provincial urbanization rates, and the magnitude, direction, and age structure of inter-provincial migration.

The modelling procedure itself is based on the following *key assumptions* the range of possible future evolution of the population in China is properly depicted by Cao's national projections, while the best source of the provincial distribution is the year 2000 census. From this longitudinal (national population over time) and cross-sectional (provincial distribution in 2000), an appropriate decomposition procedure can be developed that provides the evolution of provincial population over the next 30 to 50 years. The decomposition procedure can be enhanced and the precision of the results can be increased by drawing on information from supplementary models like statistics-based projections of regional birth rates, death rates, urbanization rates, and inter-provincial migration.

The implementation of the above modelling strategy by using the above assumptions results in the following steps in our *modelling procedure*

- harmonize the year 2000 values in the national-level projections with those in the year 2000 census;
- then, for each five-year time step:
- calculate the size of the provincial 0-4 age-groups from the national-level projections by accounting for the provincial differences in fertility as they are captured by statistically estimated extrapolation of provincial birth rates;
 - calculate the size of all other age-groups by accounting for the provincial differences in mortality as they are captured by statistically estimated extrapolation of provincial death rates;
 - establish the distribution of provincial populations between urban and rural groups by considering the provincial differences in urbanization rates as they are captured by a statistically estimated extrapolation of provincial urbanization rates;
 - augment the provincial population values by accounting for inter-provincial migration as they are captured by statistically estimated extrapolations of magnitudes and directions of migration flows.

The general ordering principle is that the nationally aggregated provincial population numbers must match the national-level projections by Cao taken as a starting point in terms of all main features: age-group totals in urban and rural areas for each five-year time-step. The computer code implementing the disaggregation procedure contains several routines checking the consistency of the re-aggregated provincial results with the original national-level values.

2. DATA SOURCES

The procedure to develop regional population projections draws on six main sources. They range from a set of national-level projections and the regional population distribution documented in the year 2000 census to the projections of birth rates, death rates, and urbanization rates at the province level as well as projections of interprovincial migration flows. The method presented in the next section attempts to utilize the maximum amount of information available from these sources. Unfortunately, the reliability of data from different sources varies considerably. Therefore, an important task is to reduce inconsistencies across the data sources to the extent it is possible. It is fair to say that our results are more reliable at higher aggregation levels (multiple age groups, larger regions) than at the very detailed level. This section presents and documents each data source in turn.

2.1 National multi-state population projections

Cao (2000) prepared a series of multi-state population projections for China as a whole by distinguishing demographic patterns (fertility, mortality, migration) in the future according to education achievement and the place of residence (rural or urban) in addition to the usual male–female differentiation. She clustered her assumptions in a scenario matrix along two groups of attributes: fertility, mortality, educational achievements, and migration on the one hand, and convergence of fertility levels in educational categories and in the urban/rural regions, on the other. Migration throughout this paper refers to internal (domestic as opposed to international) migration and the numbers always indicate the size of net migration flows. The first dimension in Cao’s matrix leads to three clusters:

- low scenarios: low fertility, low mortality, high education, low migration;
- central scenarios: central fertility, central mortality, central education, central migration;
- and
- high scenarios: high fertility, high mortality, low education, high migration.

Different assumptions about the convergence of fertility levels along the second group of attributes give variants within the low, central, and high scenario groups.

The span of all scenarios in terms of projected population for the year 2045 is 1.37 to 1.59 billion people. The large number of scenario variants provides interesting insights into the details of the population evolution. Not surprisingly, however, fertility dominates the final outcome. Variations in the assumptions about the other determinants of population change lead to relatively small variations within the scenario family. There is a rather simple explanation for that. Due to historical reasons, especially the tight fertility policy in China over the past decades, fertility rates are already low and even large variations around a central value in percentage terms lead only to minor variations in the resulting total population. Similarly, the relatively high life expectancy leaves little room for creating large differences in the total population by varying the expected future life times and the resulting death rates.

Although there are clear differences both in fertility rates and mortality patterns between the rural-urban population groups and among the different educational categories, the relatively homogeneous characteristics described above do not lead to large deviations across the different convergence scenario variants.

For the purposes of the regional population projections presented in this report, a new set of national projections has been prepared. The most important novelty of the new projection set compared to Cao (2000) is that Cao (2003) re-estimated the fertility, mortality, and other demographic parameters based on the year 2000 census. This increases the consistency of the two major data sources of the present study and provides a set of projections based on the most up-to-date demographic data.

Considering the limited effect on mid-term 2030 population levels of the differences in educational achievements and their different convergence ratios on fertility rates (under the special conditions in China), the new projections do not disaggregate female age groups according to their education level. The new projections have the following features. First, we select the combinations of the variants from each scenario family that, taken together, provide the largest variance across the national projections for 2030. From the low scenario family (low fertility, mortality, migration), we adopt the variant assuming the convergence of fertility rates between rural and urban areas. This is the basis of the “low population” scenarios L1 and L2. The central projection in this study is based on Cao's central scenario (central fertility, mortality, and migration) and the variant assuming the convergence of the fertility rates between rural and urban areas. These assumptions constitute the C scenario. Finally, the variant selected for this study from the high scenario family of Cao (high fertility, high mortality, high migration) is the one in which no convergence of fertility rates is assumed between rural and urban regions. This is the foundation of scenarios H1 and H2. The actual scenario runs lump the education categories together but keep track of the fertility differences between rural and urban areas. The difference between scenarios *1 and *2 is in the assumed rate of urbanization, including rural-urban migration. Variants L1 and H1 are based on low urbanization rate assumptions whereas variants L2 and H2 imply high rates of urbanization. The central scenario (C) entails median urbanization rates. Finally, the projection period has been restricted to run up to 2030. Table 2.1 presents the results of the new national-level projections.

Table 2.1: Projections of rural, urban, and total population for China under different scenario assumptions (1000 people). Source: Cao (2003)

Central -- C				
	Urban	Rural	Total	Urban share (%)
2000	456498	818636	1275134	35.8
2005	539572	781893	1321465	40.8
2010	597638	764657	1362295	43.9
2015	656802	742876	1399678	46.9
2020	715261	713484	1428745	50.1
2025	775339	672796	1448135	53.5
2030	839480	619118	1458599	57.6
Low -- L1				
	Urban	Rural	Total	Urban share (%)
2000	456498	818636	1275134	35.8
2005	539572	781893	1321465	40.8
2010	581241	776410	1357651	42.8
2015	627824	762408	1390232	45.2
2020	682254	732100	1414354	48.2
2025	732357	695950	1428307	51.3
2030	780881	652062	1432943	54.5
Low -- L2				
	Urban	Rural	Total	Urban share (%)
2000	456498	818636	1275134	35.8
2005	539572	781893	1321465	40.8
2010	618563	739088	1357651	45.6
2015	696410	692712	1389122	50.1
2020	769532	642100	1411632	54.5
2025	839723	584389	1424112	59.0
2030	909664	517653	1427317	63.7
High -- H1				
	Urban	Rural	Total	Urban share (%)
2000	456498	818636	1275134	35.8
2005	539572	781893	1321465	40.8
2010	584773	777031	1361805	42.9
2015	634514	765824	1400338	45.3
2020	688826	744023	1432849	48.1
2025	741338	713824	1455162	50.9
2030	796398	671517	1467915	54.3
High -- H2				
	Urban	Rural	Total	Urban share (%)
2000	456498	818636	1275134	35.8
2005	539572	781893	1321465	40.8
2010	616402	745402	1361805	45.3
2015	698702	701064	1399766	49.9
2020	782269	648512	1430781	54.7
2025	859577	591608	1451185	59.2
2030	933955	528010	1461964	63.9

The range of scenarios used in this study is somewhat narrower than population levels projected by the UN. The projections are based on a carefully defined and realistic range of fertility assumptions: a total fertility rate in 2030 of between 1.42 – 1.64 in urban areas (TFR estimated to be 1.58 in 2000) and of 1.85 – 2.11 for rural areas (estimated at 1.98 in 2000). It may be noted that the extremely low total fertility rates reported by the Chinese State Statistical Bureau in the statistical data in the 2000 census (TFR of 1.27 in urban areas and of 1.43 in rural areas) are still a matter of contention among Chinese and international demographers and were not adopted in this study as being unrealistically low.

2.2 Regional and rural-urban population distribution: the 2000 census data

The most recent regionally disaggregated population statistics for China can be obtained from the latest census conducted in the year 2000. Yet the use of data from the year 2000 census might raise some problems for our study because there is some controversy about the reliability of the 2000 census data, especially for rural regions and some younger age groups.

It is far beyond the scope and objectives of the present study to assess the quality and reliability of the year 2000 census. Our disaggregation procedure involves a simple adjustment algorithm that harmonizes Cao's population numbers and the census data to the extent possible. The inconsistencies between the two datasets (Cao's rural-urban distribution and age group patterns in 2000 and those of the year 2000 census) lead to some small imbalances across age groups, especially in relatively small and already highly urbanized provinces. Therefore, special adjustment mechanisms are also incorporated into the disaggregation procedure to detect and correct these imbalances so that the results are both internally consistent and externally coherent with Cao's national-level projections. Moreover, these minor imbalances are smoothed out when the five-year age groups are aggregated into larger groups. Therefore at this higher level of aggregation, the results reflect the best possible compromise and harmonization between the two data sources.

Table 2.2 presents the population distribution between the rural and urban areas in the 31 provinces based on the Year 2000 census. In addition, it shows the same population data aggregated into the eight major economic regions defined for the CHINAGRO project.

Table 2.2 Rural, urban, and total population in China's 31 provinces and in the 8 LUC-regions according to the year 2000 census (1000 people). Source: NBS –CD (2003).

CENSUS 2000

Province	Urban			Rural			Urban total	Rural total	Prov/Reg total	Urban share %
	0-14	15-64	65+	0-14	15-64	65+				
Beijing	1258	8378	886	585	2205	257	10522	3047	13569	77.55
Tianjin	998	5484	608	653	1885	220	7090	2759	9849	71.99
Hebei	3334	13204	1021	11856	33590	3678	17560	49124	66684	26.33
Shanxi	2553	8269	609	5802	13791	1446	11432	21039	32471	35.21
Inner-Mongolia	1951	7512	497	3002	9575	788	9959	13365	23323	42.70
Liaoning	3541	17599	1826	3852	13535	1471	22966	18858	41824	54.91
Jilin	2221	10267	822	2851	9843	797	13311	13492	26802	49.66
Heilongjiang	3164	14378	1129	3681	12999	886	18672	17566	36238	51.53
Shanghai	1764	11088	1638	247	1429	242	14490	1918	16408	88.31
Jiangsu	5304	23239	2320	9038	29005	4138	30862	42181	73044	42.25
Zhejiang	3610	17144	1602	4683	16395	2496	22357	23574	45931	48.67
Anhui	3352	11360	1054	11688	28120	3426	15766	43234	59000	26.72
Fujian	2681	10782	844	5163	13192	1436	14307	19791	34098	41.96
Jiangxi	2377	8174	634	8087	19228	1898	11185	29213	40398	27.69
Shandong	6421	25635	2270	12321	38285	5039	34326	55646	89972	38.15
Henan	4611	15524	1251	19015	45605	5231	21385	69851	91237	23.44
Hubei	4692	18027	1370	8879	24092	2449	24089	35420	59509	40.48
Hunan	3242	13092	1063	10757	31456	3663	17398	45876	63274	27.50
Guangdong	8998	36084	2350	11553	23330	2910	47432	37793	85225	55.66
Guangxi	2596	8994	761	8889	20173	2442	12350	31504	43855	28.16
Hainan	725	2182	167	1348	2794	343	3075	4484	7559	40.68
Chongqing	1704	7610	781	4958	13795	1664	10096	20417	30513	33.09
Sichuan	3935	16851	1524	14665	40668	4705	22310	60038	82348	27.09
Guizhou	2025	5947	474	8608	16564	1629	8445	26802	35248	23.96
Yunnan	1928	7424	550	9068	21359	2030	9903	32457	42360	23.38
Tibet	109	384	16	707	1292	109	508	2108	2616	19.43
Shaanxi	2245	8462	661	6575	15907	1515	11368	23997	35365	32.15
Gansu	1173	4546	300	5594	12504	1008	6018	19106	25124	23.95
Qinghai	318	1170	72	977	2138	148	1559	3263	4823	32.33
Ningxia	380	1317	82	1176	2367	163	1780	3706	5486	32.44
Xinjiang	1298	4669	281	3736	7895	582	6247	12212	18460	33.84
Total 31prov	84510	344796	29465	200018	525015	58809	458771	783841	1242612	36.92
LUC-regions										
North	19175	76495	6646	50234	135362	15871	102316	201467	303782	33.68
Northeast	8926	42245	3778	10384	36377	3155	54949	49915	104864	52.40
East	14029	62830	6615	25657	74948	10302	83475	110907	194382	42.94
Central	10311	39293	3067	27723	74776	8010	52672	110509	163181	32.28
South	12405	49048	3361	18064	39316	4688	64814	62068	126882	51.08
Southwest	12190	46825	4090	46189	112559	12471	63105	171219	234323	26.93
Plateau	426	1554	88	1685	3430	257	2068	5371	7439	27.80
Northwest	7047	26506	1820	20083	48247	4056	35373	72385	107759	32.83

Note: The composition of the LUC-regions is as follows:

North Beijing, Tianjin, Hebei, Shanxi, Shandong, Henan
 Northeast Liaoning, Jilin, Heilongjiang
 East Shanghai, Jiangsu, Zhejiang, Anhui
 Central Jiangxi, Hubei, Hunan
 South Fujian, Guangdong, Hainan
 Southwest Guangxi, Chongqing, Sichuan, Guizhou, Yunnan
 Plateau Tibet, Qinghai
 Northwest Inner-Mongolia, Shaanxi, Gansu, Ningxia, Xinjiang

The “Total 31 provinces” line indicates the sum of the corresponding provincial populations based on the NBS-CD and does not include special territories, military population, etc. therefore the numbers slightly differ from the “China total” in the Statistical Yearbook (NBS, 2002b).

2.3 Provincial birth rate projections

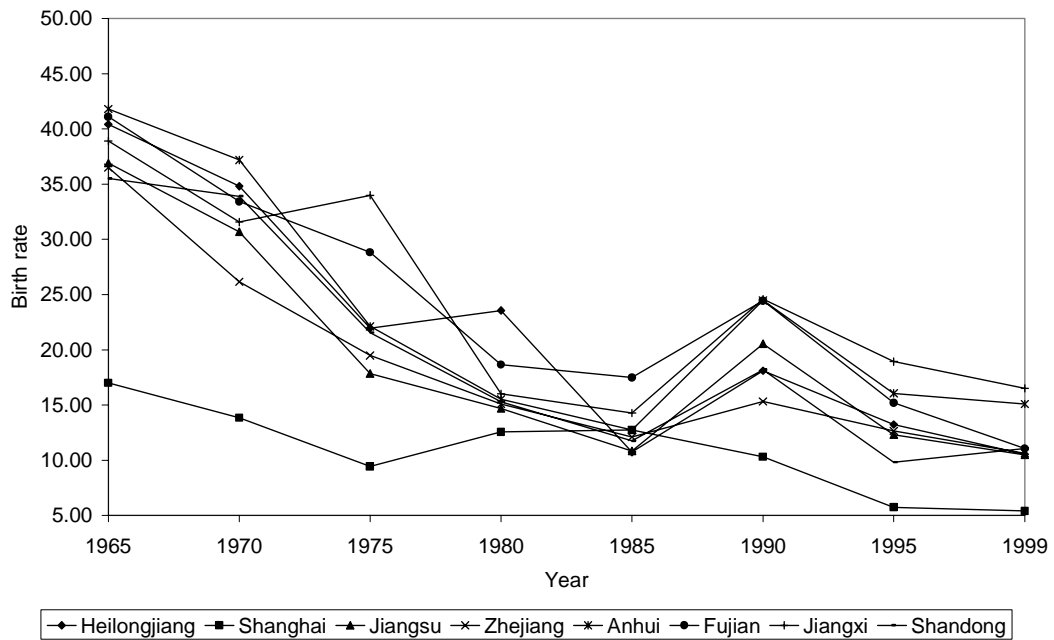
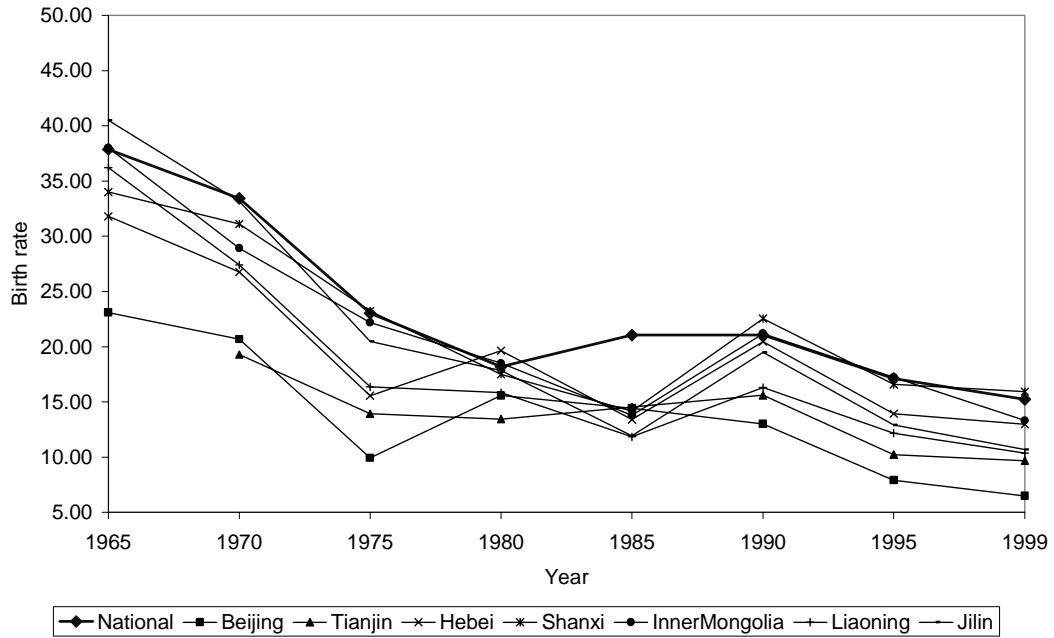
The provincial disaggregation of the nationally projected age groups is based on the population distribution depicted by the 2000 Census. The disaggregation of the newly born age groups, however, requires a special procedure. The simplest solution would be to keep the distribution of the new age groups constant according to the year 2000 pattern. However, this would result in increasing distortions as we proceed further into the future because it ignores the variations in the dynamics of birth rates across provinces.

The method applied here extrapolates provincial birth rates to make a shortcut to doing full multi-state regional population projections instead of making assumptions about fertility rates over time in each province, and applying them to an evolving age structure of the provincial populations. Birth rates, unlike fertility rates, include the effects of age structure, without actually calculating the age structures themselves. Therefore, the quality of the disaggregation of the newborn age group depends to a large extent on the quality of the provincial birth rate extrapolation. This is likely to be acceptable because the time horizon is thirty years and thus much of the age structure of the childbearing population over the next three decades is well known.

Over the past forty years, provincial birth rates have been converging towards a gradually sinking national birth rate from widely diverging values in the 1960s. The national birth rate has declined from 37.88 in 1965 to 15.23 in 1999. A logistic approximation of this declining trend gives the best fit when we assume the limit value of 13.

We use this logistic model to extrapolate provincial birth rates into the future. We establish the provincial limit values for 2050 by following a simple rule of thumb. We assume that provincial birth rates will continue converging and the difference between the provincial birth rates and the national birth rate in 1999 will be reduced to half by the year 2050. For most provinces, we fit a logistic curve to historical data and use the resulting parameters with this functional relationship to extrapolate provincial birth rates into the future. However, some provinces are already far below the national average projected for 2050: Beijing 6.50, Shanghai 5.40. For these provinces, we assume a slight recovery from these extremely low birth levels to a limit value of 8 by the year 2050. Figure 2.1 illustrates the declining and converging birth rates in the past. Results of the logistic extrapolation of provincial reference birth rates up to the year 2030 are presented in Table 2.3.

Figure 2.1: The historical evolution of birth rates in the 31 provinces and the national level. Source: NBS (2001). Note: Birth rates are defined as the number of births per 1000 people.



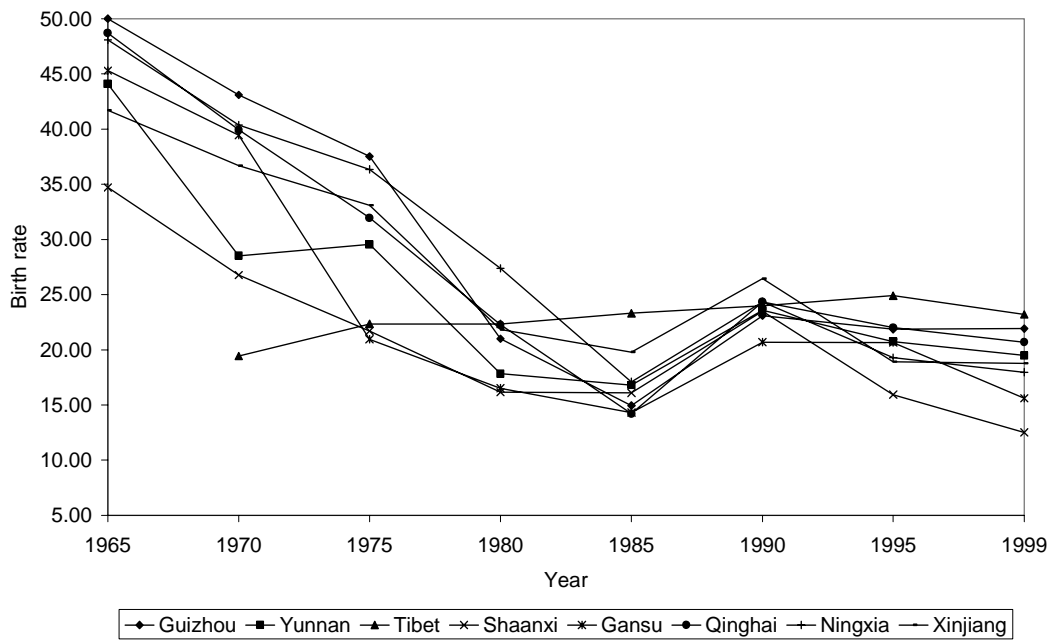
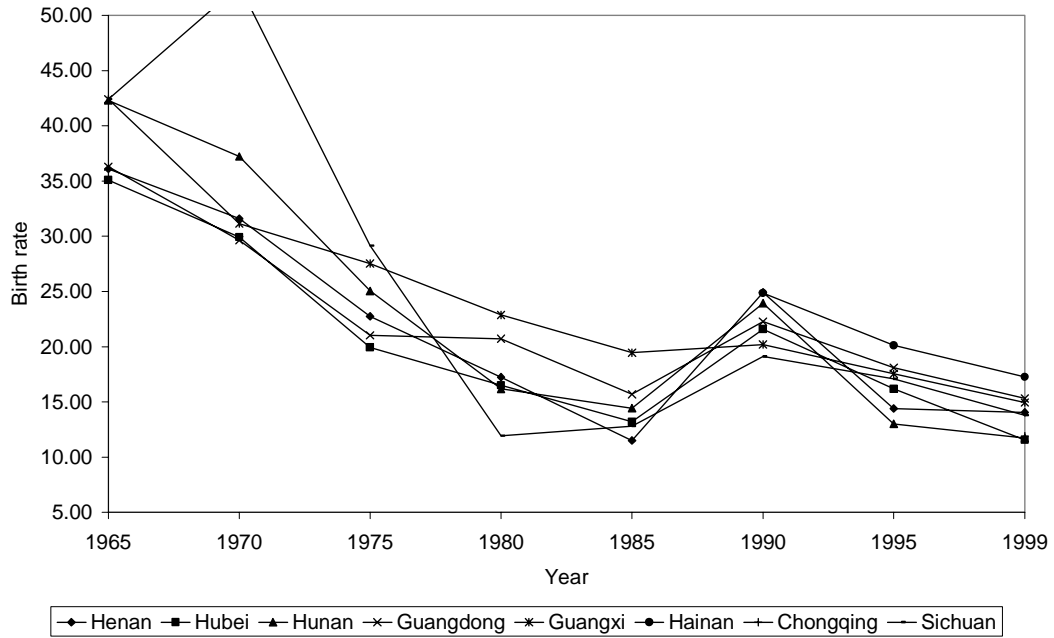


Table 2.3. Projected provincial reference birth rates used for the regional population projections

	2000	2005	2010	2015	2020	2025	2030
Beijing	8.9	8.6	8.4	8.3	8.2	8.1	8.1
Tianjin	10.8	10.5	10.3	10.2	10.2	10.1	10.1
Hebei	12.9	12.4	12.0	11.7	11.5	11.4	11.3
Shanxi	15.3	14.6	14.2	13.9	13.6	13.5	13.3
InnerMongolia	14.3	13.6	13.2	12.8	12.6	12.4	12.3
Liaoning	10.8	10.5	10.3	10.2	10.1	10.1	10.0
Jilin	11.6	11.1	10.7	10.5	10.3	10.2	10.1
Heilongjiang	12.1	11.4	11.0	10.7	10.4	10.3	10.2
Shanghai	8.2	8.1	8.1	8.0	8.0	8.0	8.0
Jiangsu	11.2	10.7	10.5	10.3	10.2	10.1	10.1
Zhejiang	10.9	10.6	10.4	10.2	10.1	10.1	10.1
Anhui	14.3	13.8	13.5	13.3	13.2	13.1	13.1
Fujian	13.8	13.0	12.4	12.0	11.7	11.5	11.3
Jiangxi	16.3	15.4	14.8	14.4	14.0	13.8	13.6
Shandong	11.9	11.5	11.3	11.2	11.1	11.1	11.0
Henan	13.8	13.2	12.8	12.6	12.4	12.3	12.2
Hubei	13.4	12.8	12.3	11.9	11.7	11.5	11.4
Hunan	12.8	12.2	11.8	11.5	11.4	11.2	11.2
Guangdong	15.7	15.0	14.5	14.1	13.8	13.6	13.4
Guangxi	15.5	14.6	13.9	13.4	13.0	12.8	12.6
Hainan	17.5	16.0	15.1	14.6	14.4	14.2	14.1
Chongqing	11.8	11.1	11.0	11.0	11.0	11.0	11.0
Sichuan	14.2	13.5	13.0	12.7	12.4	12.3	12.2
Guizhou	18.9	18.1	17.4	17.0	16.7	16.5	16.4
Yunnan	17.6	16.9	16.4	16.0	15.7	15.5	15.4
Tibet	23.0	23.0	22.7	22.3	22.0	21.7	21.3
Shaanxi	13.9	13.2	12.6	12.2	11.9	11.7	11.5
Gansu	14.7	14.2	13.8	13.5	13.3	13.2	13.1
Qinghai	18.3	17.3	16.7	16.2	15.9	15.6	15.5
Ningxia	17.8	16.8	16.0	15.5	15.1	14.8	14.6
Xinjiang	18.4	17.4	16.6	16.0	15.5	15.2	14.9

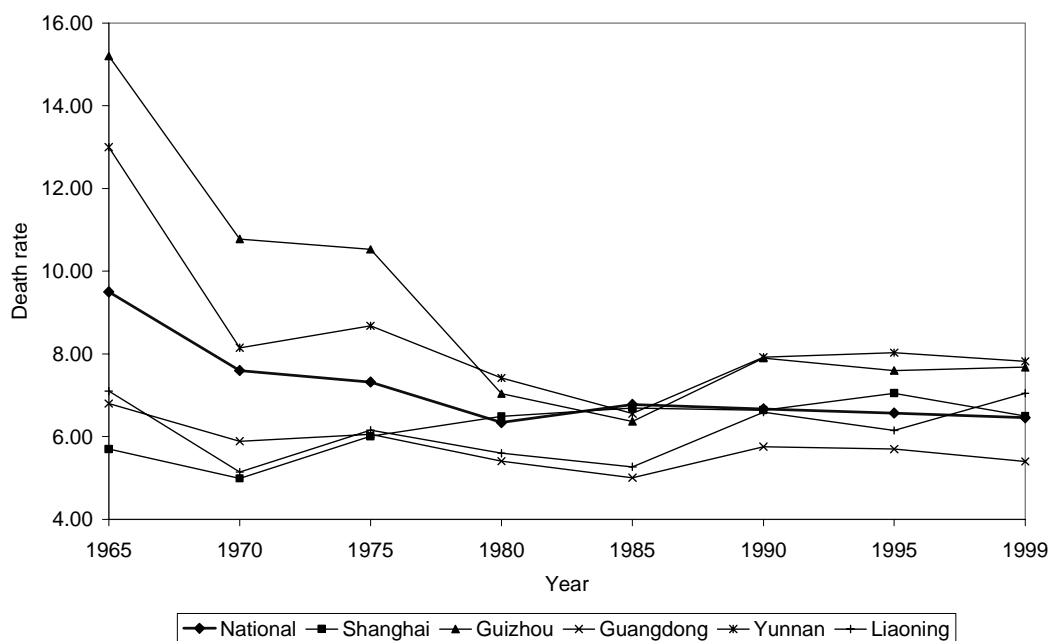
Note: The provincial reference birth rate projections are based on data published in NBS (2001) and may differ slightly from the data published in the Statistical Yearbook (NBS, 2002b). The resulting bias is likely to be negligible because it is the relative values that count in the disaggregation procedure.

2.4 Provincial death rate projections

In 2005 and beyond, the provincial disaggregation of the nationally projected age groups aged 5+ in rural and urban areas needs to draw on the provincial population structures described by the 2000 census. Keeping the relative size of age groups fixed across provinces, however, might raise some problems. Specifically, it would imply that if province A had 10% more people aged 10-14 than province B in year 2000, then in year 2005, province A will have 10% more people aged 15-19. This would allow downscaling to province level with age detail without actually doing calculations that use different age-specific mortality and migration rates in each region. While computationally convenient, this procedure would result in increasing distortions because it does not account for the differences in provincial mortality and migration rates. This subsection presents the procedure to obtain data for including differing provincial death rates into the decomposition process. The migration issues are addressed in subsection 2.6.

We adopt a procedure to estimate and forecast provincial reference death rates similar to the one presented above for provincial birth rates. Changes in provincial death rates over the past 35 years are used to estimate a simple statistical model. The parameters from these logistic approximations serve as input parameters for our logistic forecasting model. The initial data screening indicates that the range and variability of provincial death rates are much smaller than those of birth rates. This is illustrated by Figure 2.2 where, in addition to the national data, death rates are presented for selected provinces like the ones with the highest (Yunnan) and lowest (Guangdong not considering Hainan that was part of Guangdong until recently) death rates in 1999 and the highest (Guizhou) and lowest (Shanghai) death rates in 1965, the ones with the largest (Guizhou) and smallest (Liaoning) change between 1965 and 1999.

Figure 2.2 The historical evolution of death rates in selected provinces and at the national level from 1965 to 1999. Source: NBS (2001). Note: death rates are defined as the number of deaths per 1000 people.



Results of the provincial reference death rate projections are presented in Table 2.4. Considering their relatively (to the birth rates) small variations in the initial year 2000, it is not surprising that provincial differences are projected to decline only modestly in the future.

Table 2.4. Projected provincial reference death rates used for the regional population projections

	2000	2005	2010	2015	2020	2025	2030
Beijing	5.5	5.4	5.3	5.3	5.2	5.2	5.2
Tianjin	6.5	6.6	6.6	6.7	6.8	6.9	7.0
Hebei	6.3	6.2	6.2	6.1	6.1	6.1	6.1
Shanxi	6.1	6.1	6.0	6.0	6.0	6.0	6.0
InnerMongolia	5.9	5.8	5.7	5.6	5.6	5.5	5.4
Liaoning	6.4	6.5	6.6	6.8	6.9	7.0	7.1
Jilin	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Heilongjiang	5.2	5.1	5.1	5.1	5.0	5.0	5.0
Shanghai	7.1	7.4	7.8	8.1	8.5	9.0	9.5
Jiangsu	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Zhejiang	6.2	6.1	6.1	6.1	6.1	6.0	6.0
Anhui	6.4	6.4	6.5	6.5	6.6	6.6	6.7
Fujian	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Jiangxi	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Shandong	6.1	6.1	6.0	6.0	6.0	6.0	6.0
Henan	6.1	6.1	6.0	6.0	6.0	6.0	6.0
Hubei	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Hunan	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Guangdong	5.5	5.4	5.3	5.3	5.2	5.2	5.2
Guangxi	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Hainan	5.7	5.6	5.6	5.5	5.5	5.4	5.4
Chongqing	6.7	6.5	6.4	6.3	6.2	6.2	6.1
Sichuan	6.7	6.5	6.3	6.2	6.2	6.1	6.1
Guizhou	7.1	7.1	7.0	7.0	7.0	7.0	7.0
Yunnan	8.0	8.0	8.0	8.0	8.0	8.0	8.0
Tibet	8.0	7.8	7.6	7.5	7.3	7.2	7.0
Shaanxi	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Gansu	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Qinghai	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Ningxia	5.1	5.1	5.0	5.0	5.0	5.0	5.0
Xinjiang	7.0	7.0	7.0	7.0	7.0	7.0	7.0

Note: The provincial reference birth rate projections are based on data published in NBS (2001) and may differ slightly from the data published in Statistical Yearbook (NBS, 2002b). The resulting bias is likely to be negligible because it is the relative values that count in the disaggregation procedure.

2.5 Provincial urbanization rate projections

The Chinese society has been going through various phases of fast urbanization and anti-urbanization periods over the past half century. Liu et al. (2003) present an in-depth analysis of the characteristics and trends of China's urbanization. They conclude that the urbanization process in China has been heavily regulated and has always been under strict government control. The result of these tight policies is a relatively under-urbanized Chinese society in comparison to other developing countries at a similar stage of socioeconomic development and also compared to the level of industrialization in China. An important component of the government policy has been rural urbanization adopted to limit rural-urban migration to cities.

There are several important implications of the strong government influence on the urbanization process and on rural-urban migration in the past. First, it has suppressed at least

part of the intended migration that would have taken place in the absence of government control. Second, due to the regulation, the complex permit scheme and the difficulties of obtaining permits to change place of residence (“hukou”) resulted in illegal or tolerated migration, a large part of which remained unregistered. The combined implication is that statistical models trying to establish key historical patterns and relationships for use in projecting possible future trends might be somewhat misleading.

Liu et al. (2003) also conduct a thorough statistical analysis of the urbanization process at the national and at the provincial level. They transform the historical data series according to the 2000 definition (the authors call this the “transformation approach”) and apply suitable assumptions about the shares of population with hukou and urban immigrants without hukou. The latter approach is called the “modified transformation” approach and it provides reasonably good statistical fit for most provinces. We use the projections of urbanization levels for the provinces to split the urban population age groups projected by Cao at the national level to provincial age groups. Table 2.5 summarizes the provincial urbanization levels projected by Liu et al. (2003).

Table 2.5 Projections of China's urbanization level at provincial level 2000-2030. Source: Liu et al. (2003) Note: Numbers indicate the percent share of the population living in urban areas of the given province.

	2000	2005	2010	2015	2020	2025	2030
Beijing	76.7	80.0	82.8	85.4	87.6	89.5	91.2
Tianjin	71.8	73.6	75.3	76.9	78.4	79.9	81.3
Hebei	26.4	31.0	36.1	41.4	47.0	52.7	58.3
Shanxi	36.3	41.5	47.0	52.5	58.0	63.3	68.3
Inner-Mongolia	42.2	45.8	49.6	53.3	57.0	60.6	64.1
Liaoning	55.8	59.7	63.5	67.2	70.7	73.9	76.9
Jilin	51.6	56.2	60.7	65.1	69.1	73.0	76.5
Heilongjiang	53.1	56.8	60.4	63.8	67.2	70.4	73.3
Shanghai	87.2	90.2	92.6	94.4	95.8	96.8	97.6
Jiangsu	38.1	46.0	54.1	61.9	69.2	75.6	81.1
Zhejiang	47.4	54.4	61.2	67.6	73.4	78.5	82.8
Anhui	28.9	34.7	40.9	47.5	54.2	60.7	66.9
Fujian	41.7	47.1	52.5	52.5	63.1	68.0	72.6
Jiangxi	28.4	32.4	36.7	41.1	45.7	50.4	55.1
Shandong	41.3	51.7	61.9	71.2	79.0	85.1	89.7
Henan	23.7	28.6	34.1	40.0	46.3	52.6	58.9
Hubei	43.3	50.1	57.0	63.7	69.8	75.3	80.1
Hunan	30.1	35.2	40.7	46.3	52.1	57.8	63.3
Guangdong	58.3	68.2	76.6	83.4	88.5	92.2	94.7
Guangxi	29.9	35.4	41.3	47.4	53.7	59.8	65.6
Hainan	40.7	47.6	53.5	58.2	61.7	64.3	66.1
Chongqing	33.1	38.9	45.1	51.7	58.5	65.2	71.7
Sichuan	28.8	33.8	39.3	45.0	50.8	56.7	62.3
Guizhou	24.4	27.3	30.4	33.7	37.1	40.7	44.4
Yunnan	23.0	26.8	31.1	35.7	40.6	45.7	50.8
Tibet	18.4	19.7	21.1	22.6	24.2	25.8	27.5
Shaanxi	32.4	36.6	41.1	45.7	50.4	55.1	59.7
Gansu	24.8	27.8	31.0	34.5	38.0	41.8	45.6
Qinghai	37.6	41.3	45.1	49.0	52.9	56.7	60.5
Ningxia	34.4	39.5	44.9	50.4	55.8	61.2	66.3
Xinjiang	34.5	37.9	41.4	45.1	48.8	52.5	56.1

2.6 Interprovincial migration projection

Historical data about interprovincial migrations indicate that on average 2.2 million people migrated across provincial boundaries between 1985 and 1990 annually whereas this figure amounts to 2.724 million/year for the period 1990 to 1999. These are the officially registered and statistically recorded migration numbers and as such, are likely to be underestimated.

We have developed a simple model to estimate the provincial share of the national interprovincial migration based on the historical data between 1990 and 2000. The model takes the population of the given province in 1990 and the natural growth rates between 1990 and 1999 for each year. The difference between the calculated population (based on natural growth rates) and the actual population (based on the census data) in 2000 is taken to be the population won or lost due to interprovincial migration. This provides us with the total number of interprovincial migrants as well as the share of each province in the flow of interprovincial migration. These provincial shares are presented in Table 2.6. The numbers

represent a convenient accounting mechanism concerning the net balances of emigrants and immigrants at the province level but do not indicate source-destination relationships. These would require comprehensive migration matrices and are beyond the scope of this study. For our purposes, the provincial distribution of migration balances is sufficient.

Table 2.6 Provincial share in inter-provincial migration (in percent).

Region	Share(%)	Region	Share (%)
Beijing	9.1	Hubei	-0.7
Tianjin	2.3	Hunan	-9.1
Hebei	-0.7	Guangdong	51.8
Shanxi	0.9	Guangxi	-10.7
Inner Mongolia	-1.8	Hainan	0.6
Liaoning	-0.9	Chongqing	0.0
Jilin	0.5	Sichuan	-19.1
Heilongjiang	-7.3	Guizhou	-9.8
Shanghai	11.9	Yunnan	0.1
Jiangsu	4.3	Tibet	0.0
Zhejiang	7.4	Shaanxi	-3.8
Anhui	-14.7	Gansu	-0.3
Fujian	3.6	Qinghai	-0.3
Jiangxi	-6.8	Ningxia	0.6
Shandong	1.1	Xinjiang	5.7
Henan	-14.0		

Note: Positive numbers imply net gains and indicate the percent share of the province in the total number of immigrants. Negative numbers imply net losses through inter-provincial migration and indicate the share of the province in the total number of emigrants. For example, in any given period, about 9% of all inter-provincial migrants go to Beijing, whereas about 9% of all inter-provincial migrants stem from Hunan.

Three externally defined scenarios of interprovincial migration are used in this regional population projection study. The underlying assumption is rather simple. The flows of interprovincial migration are harmonized with the urbanization rates in the underlying demographic scenarios. Three cases are defined on the basis of taking historical interprovincial migration data as a starting point. The central case assumes the continuation of interprovincial migration of the magnitude observed in the 1990s. The low interprovincial migration flows resemble the late 1980s and thus imply a slowdown compared to the 1990s and amount to about two-thirds of the central case. Finally, the high case assumes increased interprovincial migration relative to the 1990s at the level of one-third above the central case. Accordingly, we assume 10, 15, and 20 million interprovincial migrants in any five year period in the low, medium, and high urbanization scenarios, respectively.

It is worth noting that scenarios of interprovincial migration can be easily modified and the disaggregation model can be rerun accordingly. Nevertheless, diverging too far from the range used in this study might undermine the consistency of the magnitudes of interprovincial migration flows with other components of the disaggregation procedure, notably with Cao's assumptions about national-level demographic characteristics and with the provincial urbanization projections by Liu et al. (2003).

3. METHOD: CONCEPT AND PROCEDURE

Considering the objective of this report to produce regionally disaggregated population projections for China and the data sources presented in the previous section, the range of possible methodological deliberations is rather limited. We need a conceptual framework and a computational procedure that make use of the maximum amount of information available from the data sources. In addition, we conduct supplementary analysis of the data available from the year 2000 census to derive plausible assumptions about the differences in regional demographic patterns for use in the regional decomposition exercise.

3.1 Conceptual framework

Economic disparities in terms of per capita incomes, labor productivity, and economic growth remain significant across provinces in China. This would suggest major differences in demographic patterns across the country as well. Yet, due to the rigorous enforcement of demographic policies over the past few decades, interregional differences in key demographic indicators are considerably smaller than one would expect by looking at the standard development indicators of the provinces. This observation is the first point to guide the conceptual design for our disaggregation exercise.

The above point can be illustrated by the spread of total fertility indicators across the provinces observed in 1989 (Yao, 1995). The extreme low values are observed in two metropolitan regions, Beijing and Shanghai (both with 1.33 total fertility rates), while the extreme high values characterize the sparsely populated regions of Tibet (4.22) and Xinjiang (3.22). Total fertility rates in the majority of the remaining regions range between 1.7 and 2.6. This is still a significant variation around the replacement fertility level. Therefore we need to incorporate additional information in the decomposition procedure.

The case of mortality is similar. Year 2005 and beyond, the provincial disaggregation of the nationally projected age groups aged 5+ in rural and urban areas needs to draw on the provincial population structures described by the 2000 census. This is complemented by additional information from analyzing historical provincial mortality data. By incorporating the results of the provincial death rate projections (see Section 2.4), the procedure accounts for differences in provincial mortality.

Another important observation concerns the differences of demographic indicators between the rural and urban areas in China. This reveals characteristic differences in fertility patterns between urban and rural areas. The study by Yao (1995) finds that for China as a whole, the total fertility rate was just above replacement level at 2.29 in 1989. Although total fertility rates in rural and urban areas have been converging for decades (see Figure 2 in Cao, 2000), this number still hides a considerable difference between 1.59 in urban and 2.58 in rural areas. The multi-state population projections by Cao, providing the national-level projections for this study, keep track of this difference by distinguishing rural and urban population groups in terms of fertility and mortality indicators and by applying different assumptions about future convergence of those indicators under different scenarios.

The fourth factor to consider in the long-range population projection is urbanization and rural-urban migration. Despite severe restrictions prevailing in recent decades, migration has become an increasingly important factor in population changes, especially in fast industrializing urban areas in the dynamic coastal regions. With easing regulation, migration is expected to develop into a more significant determinant of population characteristics in many regions than the differences in fertility and mortality rates. The predominant form of

migration is short-distance from rural to urban, typically within provincial boundaries. Annual average rates of rural-urban migration in the period 1990-2000 varied across provinces between 0.01 and 0.07%/year. The fastest rates characterize the regions with the lowest rates of urban population in 1990. This is a clear indication of convergence in terms of urbanization across the provinces and it is expected to continue in the future. Yet the present levels and the future rates of urbanization differ significantly across provinces. These differences need to be accounted for in the disaggregation procedure.

We can conclude from the above considerations that it is a sensible approximation to use a differentiated regional decomposition of the national population projections according to the year 2000 provincial and rural-urban distribution and on the basis of additional information concerning persistent long-term trends in birth-rate, death-rate, and urbanization-rate differences across the provinces. The next task is to find the procedure that integrates the maximum amount of information available from the data sources in a consistent manner.

3.2 The decomposition procedure

The main source of the regional population projections discussed here is the new series of projections produced by Cao (2003). For each projection (scenario), the multi-state projection model adopted by her produces detailed projection tables that contain five-year age groups for male and female populations in rural and urban areas according to the 2000 classification. These tables are created in five-year time steps over the period 2000 to 2030.

The first task is to harmonize Cao's age group population numbers in the rural and urban categories with those in the year 2000 census. We use the ratio of Cao's age group population and the census figure to define a multiplier. This correction multiplier is then applied to the provincial age group population figures in the census so that the sum of the adjusted population exactly matches Cao's figures in each age group. The result is a set of rescaled provincial population tables (rural, urban, total population) that matches Cao's national total figures.

$$(1) \quad p_{i,j,k}^{u/r} = c_{i,j}^{u/r} * \frac{s_{j,k}^{u/r}}{\sum_i c_{i,j}^{u/r}} \quad i = 1, \dots, 31; j = 1, \dots, 17; k = 2000$$

where: $p_{i,j,k}^{u/r}$ = adjusted urban/rural population in province i, age group j, year k

$c_{i,j}^{u/r}$ = census-based urban/rural population in province i, age group j

$s_{j,k}^{u/r}$ = scenario-based national urban/rural population in age group j, year k

After the adjustments for the year 2000, the disaggregation procedure consists of the following steps for each five-year period between 2005 and 2030.

We use the projected provincial reference birth rates to produce a preliminary provincial total population for the '0-4' age group. The sum of these approximate numbers would usually not match the national total projected by Cao. Therefore a correction multiplier is defined as a ratio of Cao's projected age group population and the estimated age group population based on the projected provincial birth rates. The provincial numbers are then adjusted so that their sum will match Cao's national total figures.

$$(2) \quad \bar{p}_{i,1,k}^t = b_{i,k-5} * \sum_{j=1}^{17} p_{i,j,k-5}^t * \frac{s_{1,k}^t}{\sum_i b_{i,k-5} * \sum_{j=1}^{17} p_{i,j,k-5}^t} \quad i = 1, \dots, 31; j = 1, \dots, 17; k = 2005, \dots, 2030$$

where: $\bar{p}_{i,1,k}^t$ = total population in province i, age group 0-4, year k

$b_{i,k-5}$ = projected reference birth rate in province i, year k-5

$s_{1,k}^t$ = total projected national population in age group 0-4, year k

For all other age groups, we take the provincial total population number of the same age group in the previous (5 year earlier) period, account for the provincial reference death rate projected for the given period, and compare the outcome to Cao's projected national total population in that age group. We then readjust the provincial total populations in each age group to match the projected national population figures.

$$(3) \quad \bar{p}_{i,j,k}^t = (1 - d_{i,k}) * p_{i,j-1,k-5}^t * \frac{s_{j,k}^t}{\sum_i p_{i,j-1,k-5}^t} \quad i = 1, \dots, 31; j = 2, \dots, 17; k = 2005, \dots, 2030$$

where: $d_{i,k}$ = projected reference death rate in province i, year k

$\bar{p}_{i,j,k}^t$ = total population in province i, age group j, year k

$s_{j,k}^t$ = total projected national population in age group j, year k

Inter-provincial migration is treated as an external scenario. The total number of inter-provincial migrants can be specified for each time step. The share of each age group in the total number of migrants is defined according to the age group distribution of rural-urban migration used by Cao in the national projections. These migrants are then distributed across the provinces according to the provincial shares in the national inter-provincial migration. Just as in the past, some provinces lose, other provinces gain people from inter-provincial migration.

$$(4) \quad p_{i,j,k}^t = \bar{p}_{i,j,k}^t + a_j * i_k * h_i \quad i = 1, \dots, 31; j = 1, \dots, 17; k = 2005, \dots, 2030$$

where: $p_{i,j,k}^t$ = total population after inter-provincial migration in province i, age group j, year k

$\bar{p}_{i,j,k}^t$ = total population before inter-provincial migration in province i, age group j, year k

$i_k^{u/r}$ = number of inter-provincial migrants in year k

h_i = share of province i in the inter-provincial migration

a_j = share of age group j in the inter-provincial migration

The next step is to split the provincial population into rural and urban populations. We use the results of the urbanization rate forecasts by Liu et al. (2003) for the provinces as reference to produce preliminary provincial urban population figures for each age group. Due to the general upward bias in the projected provincial urbanization rates produced by Liu et al.

(2003), the procedure involves the use urbanization rates of each age group in each province in the previous time step and the distribution of the additional urban population according to the relative growth rates in provincial urbanization projected by Liu et al. (2003) in the given time period. We then use Cao's projected national urban population figures to adjust the provincial urban numbers so that the provincial totals match the national figures for each age group. The core of this procedure is as follows:

$$(5) \quad p_{i,j,k}^u = p_{i,j,k}^t * u_{i,k} * \frac{s_{j,k}^u}{\sum_i p_{i,j,k}^t * u_{i,k}} \quad i = 1, \dots, 31; j = 1, \dots, 17; k = 2005, \dots, 2030$$

where: $p_{i,j,k}^u$ = urban population in province i, age group j, year k

$p_{i,j,k}^t$ = total population in province i, age group j, year k

$u_{i,k}$ = forecasted reference urbanization rate in province i, year k

$s_{j,k}^u$ = total projected national urban population in age group j, year k

The rural population numbers for each age group and province are calculated by subtracting the urban population from the corresponding total population figures.

$$(6) \quad p_{i,j,k}^r = p_{i,j,k}^t - p_{i,j,k}^u \quad i = 1, \dots, 31; j = 1, \dots, 17; k = 2005, \dots, 2030$$

where: $p_{i,j,k}^{r/u/t}$ = rural/urban/total population in province i, age group j, year k

These three sets of numbers constitute the starting values for the disaggregation procedure in the next period (Equation 2). The above procedure from Equations 2 through 6 is repeated for each five-year time step over the projection horizon. The same procedure is used for all scenarios.

Finally, the aggregation step involves combining the modified tables into three larger population age groups in the rural and urban categories and for total populations as follows:

$$(7) \quad p_{i,g,k}^{u/r/t} = \sum_j p_{i,j,k}^{u/r/t}$$

where: $p_{i,j,k}^{u/r/t}$ = urban/rural/total population age group in province i, age group j, year k

and the larger age groups: g=1: 0-14 (j=1-3); g=2: 15-64 (j=4-13), g=3: 65+ (j=14-17)

Summing up the five-year age groups into the three larger age groups is practical because these three age clusters represent the typical active-age versus dependent population groups that are of primary concern in most socioeconomic studies. Accordingly, this is the resolution adopted for presenting the results of our disaggregation procedure in this report.

In an additional (optional) step, projected population numbers for the 31 provinces are added up according to the economic regions defined for the IIASA LUC study and models. Obviously, any regional aggregation can be easily produced from the province-level projections.

The computer implementation of this disaggregation procedure takes the form of a FORTRAN code. It is formulated according to the specific disaggregation task and the given data structure. However, it is easy to rerun the code with different national-level demographic scenarios, modified or re-estimated provincial birth-rate, death-rate, or migration-rate projections, alternative assumptions about the magnitude, dynamics, and regional distribution of interprovincial migration flows. Yet such changes need to be internally consistent. Moreover, the time horizon can also be extended up to 2050, but in this case all scenario-type input files must be expanded to include input data for the additional five-year periods. The computer implementation is simple: the user needs to replace the particular input file(s) with the one(s) containing the modified data. The model runs in about a second on any suitable PC or workstation platform.

4. RESULTS

The numerical results of this study are available at three levels of aggregation. The most aggregated results are presented in this section: rural and urban populations in the three large age groups in the 8 LUC regions and their national totals. For those, who are interested in province-level details, rural and urban populations in the same three large age groups are presented in the Appendix. Finally, the full-size output files (31 provinces, 17 age groups, 7 time steps from 2000 to 2030) for all five scenarios are available from the authors.

This section presents the regional population projections obtained by using the procedure outlined in Section 3 to a number of nation-wide projections prepared by Cao (2003). The series of tables for each scenario present projected population levels in the three large age groups for urban and rural areas as well as totals for age groups and LUC-regions. The tables are also available in electronic form as Excel spreadsheets for easy integration into the input data set of any model.

4.1 Scenario C

This regional projection is based on Cao's C scenario. The underlying assumptions are presented in Table 4.1.

Table 4.1 Main characteristics of the Central-C scenario assumptions

	<i>Urban</i>		<i>Rural</i>	
	2000	2030	2000	2030
<i>TFR</i>				
Total fertility rate	1.58	1.58	1.98	1.98
<i>Life expectancy</i>				
Male	71.57	75.32	67.89	72.39
Female	75.58	78.93	71.00	75.44
<i>Migration</i>				
Total net rural-urban migration from 2000-2030 (in millions)	287.831		-287.831	

Table 4.2 summarizes the provincial projections under the above scenario assumptions for the period 2000-2030 in five-year time steps aggregated to the eight CHINAGRO-LUC regions.

Table 4.2 Population projection for China and the LUC-regions under the Central scenario assumptions for the period 2000-2030 (1000 people).

CENTRAL PROJECTION -- C

China

Year	Urban			Rural			Urban total	Rural total	Region total	Urban share %
	0-14	15-64	65+	0-14	15-64	65+				
2000	84091	343087	29319	232747	527780	58109	456498	818636	1275134	35.80
2005	88891	414318	36364	200581	519102	62210	539573	781893	1321465	40.83
2010	102699	452579	42361	172140	524833	67684	597639	764657	1362296	43.87
2015	118842	485458	52503	149639	515216	78020	656803	742875	1399678	46.93
2020	119689	526194	69380	142339	474837	96307	715262	713484	1428746	50.06
2025	115983	572773	86583	137922	427891	106984	775339	672796	1448136	53.54
2030	119059	608692	111730	123247	374480	121391	839481	619118	1458599	57.55

North

Year	Urban			Rural			Urban total	Rural total	Region total	Urban share %
	0-14	15-64	65+	0-14	15-64	65+				
2000	19080	76116	6613	57691	135922	15677	101809	209291	311100	32.73
2005	19635	94056	8392	46679	135994	16233	122083	198906	320990	38.03
2010	23335	102807	9811	40742	135585	17340	135953	193667	329620	41.25
2015	26864	111012	12240	34744	132092	20423	150115	187259	337374	44.50
2020	27089	120413	16431	32994	120243	25886	163933	179124	343057	47.79
2025	26199	131210	20718	31915	107103	29442	178127	168460	346587	51.39
2030	26869	139864	26350	28449	92960	33475	193083	154884	347967	55.49

Northeast

Year	Urban			Rural			Urban total	Rural total	Region total	Urban share %
	0-14	15-64	65+	0-14	15-64	65+				
2000	8882	42036	3759	11920	36621	3117	54676	51658	106334	51.42
2005	8241	46822	4805	10161	34740	3436	59868	48337	108204	55.33
2010	8881	48413	5499	8960	33733	3865	62793	46558	109351	57.42
2015	9997	48802	6601	8166	31503	4829	65400	44498	109898	59.51
2020	9688	48980	8904	7669	27799	6569	67572	42037	109609	61.65
2025	9095	48847	11487	7365	23494	7905	69429	38764	108193	64.17
2030	8923	47777	14602	6412	19341	8929	71301	34682	105984	67.28

East

Year	Urban			Rural			Urban total	Rural total	Region total	Urban share %
	0-14	15-64	65+	0-14	15-64	65+				
2000	13960	62519	6583	29648	75266	10173	83062	115087	198149	41.92
2005	14283	74134	7426	25048	72034	10401	95843	107484	203326	47.14
2010	15953	80348	8311	20368	71727	10971	104612	103066	207677	50.37
2015	18325	84771	10267	17753	68040	12385	113363	98179	211541	53.59
2020	18298	89910	13424	16775	60833	14872	121632	92481	214113	56.81
2025	17651	95652	16559	16178	53758	15700	129863	85636	215498	60.26
2030	17830	99299	20963	14289	45383	17597	138093	77269	215362	64.12

Central

Year	Urban			Rural			Urban total	Rural total	Region total	Urban share %
	0-14	15-64	65+	0-14	15-64	65+				
2000	10260	39098	3052	31767	75157	7922	52411	114845	167256	31.34
2005	10711	47384	3884	26263	73877	8671	61978	108810	170789	36.29
2010	12391	51031	4585	22398	73532	9252	68007	105183	173190	39.27
2015	14468	53634	5891	19849	70522	10604	73992	100974	174966	42.29
2020	14247	57611	7750	18470	64514	12838	79608	95822	175430	45.38
2025	13460	62181	9531	17502	57408	14365	85172	89275	174447	48.82
2030	13516	65072	12387	15324	49349	16689	90975	81362	172337	52.79

South

Year	Urban			Rural			Urban total	Rural total	Region total	Urban share %
	0-14	15-64	65+	0-14	15-64	65+				
2000	12343	48805	3344	21261	39563	4625	64493	65449	129942	49.63
2005	13569	62035	3994	19967	40718	4749	79598	65434	145032	54.88
2010	15407	72551	4619	17414	45475	4934	92577	67823	160399	57.72
2015	18277	82032	5798	16227	48388	5422	106107	70036	176144	60.24
2020	19332	93415	7767	16510	47914	6702	120514	71126	191639	62.89
2025	19736	106123	10179	17112	45419	7992	136038	70523	206561	65.86
2030	21153	118083	14210	16155	41999	9417	153445	67571	221016	69.43

Southwest

Year	Urban			Rural			Urban total	Rural total	Region total	Urban share %
	0-14	15-64	65+	0-14	15-64	65+				
2000	12129	46593	4070	55029	113271	12323	62792	180623	243414	25.80
2005	14228	56062	5105	49854	109180	13589	75395	172623	248018	30.40
2010	17095	60196	6114	42997	109651	15346	83405	167994	251399	33.18
2015	19582	64665	7513	35632	109149	17260	91759	162041	253800	36.15
2020	19523	70813	9729	33232	100572	20676	100065	154480	254544	39.31
2025	18611	78594	11379	31522	91636	21485	108584	144643	253227	42.88
2030	19072	84088	14378	27807	80917	23633	117537	132358	249895	47.03

Plateau

Year	Urban			Rural			Urban total	Rural total	Region total	Urban share %
	0-14	15-64	65+	0-14	15-64	65+				
2000	424	1546	87	2041	3457	255	2058	5752	7810	26.35
2005	527	1892	136	2013	3476	306	2555	5796	8351	30.59
2010	663	2099	175	1853	3726	361	2937	5940	8878	33.09
2015	804	2341	212	1672	3967	416	3357	6055	9413	35.67
2020	846	2694	266	1665	3953	482	3806	6100	9906	38.42
2025	851	3131	325	1663	3841	531	4307	6035	10342	41.64
2030	924	3525	451	1549	3644	637	4900	5830	10730	45.67

Northwest

Year	Urban			Rural			Urban total	Rural total	Region total	Urban share %
	0-14	15-64	65+	0-14	15-64	65+				
2000	7012	26375	1811	23390	48523	4017	35198	75930	111128	31.67
2005	7698	31933	2622	20595	49083	4824	42253	74502	116755	36.19
2010	8973	35135	3248	17409	51404	5613	47355	74426	121782	38.89
2015	10525	38202	3982	15596	51555	6682	52709	73833	126542	41.65
2020	10666	42357	5110	15023	49009	8282	58133	72315	130447	44.56
2025	10380	47034	6405	14665	45233	9563	63819	69461	133279	47.88
2030	10773	50985	8389	13261	40886	11014	70147	65161	135308	51.84

4.2 Scenario L1

This regional projection is based on Cao's Low-L1 scenario (low population low urbanization). It is based on the following assumptions (see Table 4.3).

Table 4.3 Main characteristics of the Low-L1 scenario assumptions

	<i>Urban</i>		<i>Rural</i>	
	2000	2030	2000	2030
<i>TFR</i>				
Total fertility rate	1.58	1.42	1.98	1.85
<i>Life expectancy</i>				
Male	71.57	76.14	67.89	72.39
Female	75.58	79.54	71.00	75.44
<i>Migration</i>				
Total net rural-urban migration from 2000-2030 (in millions)	250.286		-250.286	

Table 4.4 summarizes the provincial projections under the above scenario assumptions for the period 2000-2030 in five-year time steps aggregated to the eight CHINAGRO-LUC regions.

Table 4.4 Population projection for China and the LUC-regions under the Low- L1 scenario assumptions for the period 2000-2030 (1000 people).

LOW POP -- LOW MIG PROJECTION (L1)

China

Year	Urban			Rural			Urban total	Rural total	Region total	Urban share %
	0-14	15-64	65+	0-14	15-64	65+				
2000	84091	343087	29319	232747	527780	58109	456498	818636	1275134	35.80
2005	88891	414317	36364	200581	519102	62210	539572	781893	1321465	40.83
2010	97334	441735	42172	172671	535746	67993	581241	776410	1357651	42.81
2015	107917	467639	52268	150598	533201	78609	627824	762408	1390232	45.16
2020	104225	508627	69402	142376	492698	97027	682254	732100	1414354	48.24
2025	99559	545986	86812	137489	450397	108064	732357	695949	1428307	51.27
2030	100946	567813	112123	122769	406148	123145	780882	652062	1432943	54.49

North

Year	Urban			Rural			Urban total	Rural total	Region total	Urban share %
	0-14	15-64	65+	0-14	15-64	65+				
2000	19080	76116	6613	57691	135922	15677	101809	209291	311100	32.73
2005	19638	94143	8392	46684	135965	16234	122173	198883	321056	38.05
2010	22099	100235	9764	40892	138292	17421	132098	196606	328704	40.19
2015	24372	106768	12181	35001	136559	20577	143321	192137	335458	42.72
2020	23586	116321	16434	33052	124653	26078	156341	183783	340123	45.97
2025	22520	125000	20772	31870	112646	29737	168292	174253	342545	49.13
2030	22834	130481	26455	28412	100624	33948	179769	162984	342754	52.45

Northeast

Year	Urban			Rural			Urban total	Rural total	Region total	Urban share %
	0-14	15-64	65+	0-14	15-64	65+				
2000	8882	42036	3759	11920	36621	3117	54676	51658	106334	51.42
2005	8268	47112	4813	10177	34782	3437	60192	48396	108589	55.43
2010	8559	48221	5505	9041	34606	3891	62284	47538	109822	56.71
2015	9293	48465	6620	8338	32882	4877	64378	46096	110474	58.27
2020	8681	49004	8969	7847	29180	6629	66654	43655	110309	60.42
2025	8057	48617	11603	7559	25173	7999	68277	40731	109008	62.63
2030	7838	46992	14792	6617	21600	9078	69622	37296	106918	65.12

East

Year	Urban			Rural			Urban total	Rural total	Region total	Urban share %
	0-14	15-64	65+	0-14	15-64	65+				
2000	13960	62519	6583	29648	75266	10173	83062	115087	198149	41.92
2005	14236	73778	7418	25045	72005	10399	95432	107448	202880	47.04
2010	15101	78077	8260	20487	73234	11019	101438	104740	206178	49.20
2015	16630	81121	10197	18012	70552	12476	107948	101041	208988	51.65
2020	15909	85903	13379	17001	63340	14978	115192	95319	210511	54.72
2025	15077	90045	16533	16410	56903	15852	121655	89165	210820	57.71
2030	15055	91491	20939	14511	49752	17846	127484	82110	209594	60.82

Central

Year	Urban			Rural			Urban total	Rural total	Region total	Urban share %
	0-14	15-64	65+	0-14	15-64	65+				
2000	10260	39098	3052	31767	75157	7922	52411	114845	167256	31.34
2005	10751	47819	3894	26317	74161	8681	62464	109159	171622	36.40
2010	11809	50505	4583	22555	75522	9315	66897	107392	174288	38.38
2015	13273	52729	5900	20092	73649	10719	71901	104460	176361	40.77
2020	12597	57295	7815	18638	67810	12989	77707	99437	177144	43.87
2025	11809	61357	9656	17665	61374	14588	82823	93627	176450	46.94
2030	11782	63240	12581	15517	54460	17030	87604	87008	174611	50.17

South

Year	Urban			Rural			Urban total	Rural total	Region total	Urban share %
	0-14	15-64	65+	0-14	15-64	65+				
2000	12343	48805	3344	21261	39563	4625	64493	65449	129942	49.63
2005	13453	60607	3963	19767	39728	4711	78023	64205	142229	54.86
2010	14401	68267	4531	17119	44860	4876	87199	66855	154054	56.60
2015	16175	75240	5648	15873	47750	5336	97063	68959	166022	58.46
2020	16186	84790	7559	15861	46586	6556	108535	69003	177538	61.13
2025	16037	94024	9862	16173	44374	7791	119923	68338	188260	63.70
2030	16733	101363	13724	15087	42234	9187	131820	66508	198328	66.47

Southwest

Year	Urban			Rural			Urban total	Rural total	Region total	Urban share %
	0-14	15-64	65+	0-14	15-64	65+				
2000	12129	46593	4070	55029	113271	12323	62792	180623	243414	25.80
2005	14306	56912	5123	49999	110034	13619	76341	173651	249993	30.54
2010	16238	59989	6118	43334	113318	15475	82345	172127	254472	32.36
2015	17897	64144	7540	36059	114924	17488	89581	168471	258052	34.71
2020	17249	71517	9850	33517	106912	20988	98616	161416	260033	37.92
2025	16411	78900	11615	31822	99232	21930	106926	152985	259911	41.14
2030	16785	83284	14734	28189	90451	24279	114803	142919	257723	44.55

Plateau

Year	Urban			Rural			Urban total	Rural total	Region total	Urban share %
	0-14	15-64	65+	0-14	15-64	65+				
2000	424	1546	87	2041	3457	255	2058	5752	7810	26.35
2005	528	1904	137	2013	3476	306	2569	5796	8364	30.71
2010	624	2056	175	1850	3793	363	2855	6007	8861	32.22
2015	724	2263	212	1663	4082	419	3198	6164	9362	34.16
2020	732	2629	268	1636	4067	486	3629	6189	9817	36.96
2025	729	3007	329	1620	3986	537	4064	6142	10207	39.82
2030	783	3295	456	1500	3858	646	4534	6004	10539	43.03

Northwest

Year	Urban			Rural			Urban total	Rural total	Region total	Urban share %
	0-14	15-64	65+	0-14	15-64	65+				
2000	7012	26375	1811	23390	48523	4017	35198	75930	111128	31.67
2005	7711	32043	2624	20580	48953	4822	42378	74354	116732	36.30
2010	8504	34384	3237	17393	52121	5632	46125	75146	121271	38.03
2015	9553	36910	3971	15559	52803	6719	50435	75080	125515	40.18
2020	9285	41168	5127	14826	50149	8323	55581	73298	128879	43.13
2025	8919	45038	6443	14369	46709	9629	60399	70708	131107	46.07
2030	9137	47667	8442	12935	43168	11130	65245	67232	132477	49.25

4.3 Scenario L2

This regional projection is based on Cao's L2 scenario (low population high urbanization). It is based on the following assumptions (see Table 4.5).

Table 4.5 Main characteristics of the Low-L2 scenario assumptions

	<i>Urban</i>		<i>Rural</i>	
	2000	2030	2000	2030
<i>TFR</i>				
Total fertility rate	1.58	1.42	1.98	1.85
<i>Life expectancy</i>				
Male	71.57	76.14	67.89	72.39
Female	75.58	79.54	71.00	75.44
<i>Migration</i>				
Total net rural-urban migration from 2000-2030 (in millions)	360.571		-360.571	

Table 4.6 summarizes the provincial projections under the above scenario assumptions for the period 2000-2030 in five-year time steps aggregated to the eight CHINAGRO-LUC regions.

Table 4.6 Population projection for China and the LUC-regions under the Low-L2 scenario assumptions for the period 2000-2030 (1000 people).

LOW POP -- HIGH MIG PROJECTION (L2)

China										
Year	Urban			Rural			Urban total	Rural total	Region total	Urban share %
	0-14	15-64	65+	0-14	15-64	65+				
2000	84091	343087	29319	232747	527780	58109	456498	818636	1275134	35.80
2005	88891	414318	36364	200581	519102	62210	539573	781893	1321465	40.83
2010	101550	473929	43085	168455	503553	67081	618564	739088	1357652	45.56
2015	117975	524290	54145	139272	476667	76773	696411	692712	1389123	50.13
2020	119713	577697	72123	123735	423942	94422	769533	642100	1411633	54.51
2025	120140	628828	90756	111939	368107	104342	839724	584389	1424113	58.96
2030	122812	668888	117965	95285	304689	117679	909665	517653	1427317	63.73

North										
Year	Urban			Rural			Urban total	Rural total	Region total	Urban share %
	0-14	15-64	65+	0-14	15-64	65+				
2000	19080	76116	6613	57691	135922	15677	101809	209291	311100	32.73
2005	19633	93970	8391	46675	136023	16231	121994	198929	320923	38.01
2010	23083	108011	9991	39862	130281	17187	141085	187329	328414	42.96
2015	26662	120373	12652	32326	122621	20102	159687	175049	334736	47.71
2020	27074	132753	17125	28682	107808	25396	176952	161887	338838	52.22
2025	27138	144525	21783	25897	92622	28751	193445	147270	340715	56.78
2030	27712	153944	27926	21981	76288	32528	209582	130798	340379	61.57

Northeast										
Year	Urban			Rural			Urban total	Rural total	Region total	Urban share %
	0-14	15-64	65+	0-14	15-64	65+				
2000	8882	42036	3759	11920	36621	3117	54676	51658	106334	51.42
2005	8214	46533	4797	10145	34697	3435	59544	48276	107820	55.23
2010	8690	49335	5540	8730	32144	3813	63565	44687	108252	58.72
2015	9768	50535	6710	7500	28770	4716	67013	40986	108000	62.05
2020	9473	51124	9106	6459	24330	6387	69703	37176	106879	65.22
2025	9139	50768	11819	5669	19595	7629	71726	32893	104619	68.56
2030	8913	49425	15110	4618	14962	8543	73448	28122	101570	72.31

East										
Year	Urban			Rural			Urban total	Rural total	Region total	Urban share %
	0-14	15-64	65+	0-14	15-64	65+				
2000	13960	62519	6583	29648	75266	10173	83062	115087	198149	41.92
2005	14330	74489	7434	25052	72064	10404	96253	107520	203773	47.24
2010	15847	84165	8459	19916	68696	10870	108471	99481	207952	52.16
2015	18284	91403	10592	16416	62618	12172	120278	91206	211484	56.87
2020	18398	98547	13954	14355	53836	14552	130899	82743	213641	61.27
2025	18316	105159	17355	12803	45683	15259	140829	73744	214574	65.63
2030	18436	109550	22148	10699	36130	16972	150134	63802	213937	70.18

Central

Year	Urban			Rural			Urban total	Rural total	Region total	Urban share %
	0-14	15-64	65+	0-14	15-64	65+				
2000	10260	39098	3052	31767	75157	7922	52411	114845	167256	31.34
2005	10671	46951	3875	26209	73591	8660	61496	108459	169955	36.18
2010	12144	52855	4652	21813	70263	9154	69651	101229	170880	40.76
2015	14192	57066	6054	18356	64923	10411	77312	93690	171003	45.21
2020	13979	61908	8020	15917	57350	12553	83908	85821	169728	49.44
2025	13610	66224	9935	14055	49182	13966	89769	77203	166972	53.76
2030	13513	68723	12992	11693	40016	16132	95228	67841	163069	58.40

South

Year	Urban			Rural			Urban total	Rural total	Region total	Urban share %
	0-14	15-64	65+	0-14	15-64	65+				
2000	12343	48805	3344	21261	39563	4625	64493	65449	129942	49.63
2005	13684	63454	4025	20168	41717	4787	81163	66672	147835	54.90
2010	15517	78409	4755	17432	44528	4964	98681	66924	165605	59.59
2015	18695	92267	6075	15583	45632	5446	117037	66661	183699	63.71
2020	20263	107914	8233	14902	43480	6728	136410	65109	201519	67.69
2025	21646	124157	10929	14436	39558	8011	156732	62005	218737	71.65
2030	23437	140059	15401	13021	34134	9382	178897	56537	235434	75.99

Southwest

Year	Urban			Rural			Urban total	Rural total	Region total	Urban share %
	0-14	15-64	65+	0-14	15-64	65+				
2000	12129	46593	4070	55029	113271	12323	62792	180623	243414	25.80
2005	14149	55220	5086	49710	108319	13560	74455	171589	246043	30.26
2010	16767	62124	6210	41812	104287	15164	85100	161262	246362	34.54
2015	19146	68639	7740	32903	99997	16920	95525	149821	245346	38.93
2020	19026	75694	10097	28683	88797	20179	104817	137659	242476	43.23
2025	18656	82661	11876	25476	77934	20827	113193	124237	237430	47.67
2030	18752	87026	15056	21409	65268	22746	120833	109423	230256	52.48

Plateau

Year	Urban			Rural			Urban total	Rural total	Region total	Urban share %
	0-14	15-64	65+	0-14	15-64	65+				
2000	424	1546	87	2041	3457	255	2058	5752	7810	26.35
2005	525	1879	136	2013	3477	306	2541	5796	8337	30.48
2010	653	2206	178	1814	3596	358	3037	5769	8805	34.49
2015	797	2558	218	1567	3716	410	3573	5692	9265	38.56
2020	845	2994	276	1475	3607	474	4115	5557	9671	42.55
2025	880	3459	340	1398	3414	520	4679	5332	10012	46.74
2030	944	3883	474	1255	3117	620	5301	4993	10293	51.50

Northwest

Year	Urban			Rural			Urban total	Rural total	Region total	Urban share %
	0-14	15-64	65+	0-14	15-64	65+				
2000	7012	26375	1811	23390	48523	4017	35198	75930	111128	31.67
2005	7685	31822	2620	20611	49213	4827	42128	74651	116779	36.07
2010	8848	36825	3299	17077	49759	5572	48972	72408	121381	40.35
2015	10432	41450	4103	14622	48389	6595	55985	69606	125591	44.58
2020	10655	46763	5313	13263	44733	8153	62731	66149	128880	48.67
2025	10755	51876	6720	12205	40119	9380	69351	61703	131054	52.92
2030	11106	56278	8858	10608	34772	10757	76242	56137	132379	57.59

4.4 Scenario H1

This regional projection is based on Cao's H1 scenario (high population low urbanization). It is based on the following assumptions (see Table 4.7).

Table 4.7 Main characteristics of the High-H1 scenario assumptions

	<i>Urban</i>		<i>Rural</i>	
	2000	2030	2000	2030
<i>TFR</i>				
Total fertility rate	1.58	1.64	1.98	2.11
<i>Life expectancy</i>				
Male	71.57	74.5	67.89	71.79
Female	75.58	78.21	71.00	74.87
<i>Migration</i>				
Total net rural-urban migration from 2000-2030 (in millions)	249.201		-249.201	

Table 4.8 summarizes the provincial projections under the above scenario assumptions for the period 2000-2030 in five-year time steps aggregated to the eight CHINAGRO-LUC regions.

Table 4.8 Population projection for China and the LUC-regions under the High-H1 scenario assumptions for the period 2000-2030 (1000 people).

HIGH POP -- LOW MIG PROJECTION (H1)

China

Year	Urban			Rural			Urban total	Rural total	Region total	Urban share %
	0-14	15-64	65+	0-14	15-64	65+				
2000	84091	343087	29319	232747	527780	58109	456498	818636	1275134	35.80
2005	88891	414317	36364	200581	519102	62210	539572	781893	1321465	40.83
2010	101257	441594	41923	173544	535657	67830	584774	777031	1361805	42.94
2015	116767	466265	51483	153739	533908	78176	634515	765823	1400338	45.31
2020	117018	504119	67689	151834	495963	96226	688827	744023	1432849	48.07
2025	112710	544787	83842	152747	454355	106722	741338	713823	1455162	50.95
2030	115241	573780	107378	141124	409367	121026	796398	671517	1467915	54.25

North

Year	Urban			Rural			Urban total	Rural total	Region total	Urban share %
	0-14	15-64	65+	0-14	15-64	65+				
2000	19080	76116	6613	57691	135922	15677	101809	209291	311100	32.73
2005	19638	94143	8392	46684	135965	16234	122173	198883	321056	38.05
2010	23004	100201	9704	41088	138268	17378	132909	196734	329643	40.32
2015	26407	106429	11991	35715	136730	20462	144827	192906	337734	42.88
2020	26524	115229	16018	35207	125439	25867	157771	186513	344284	45.83
2025	25520	124684	20045	35350	113581	29367	170249	178297	348547	48.85
2030	26078	131805	25289	32586	101398	33338	183172	167321	350493	52.26

Northeast

Year	Urban			Rural			Urban total	Rural total	Region total	Urban share %
	0-14	15-64	65+	0-14	15-64	65+				
2000	8882	42036	3759	11920	36621	3117	54676	51658	106334	51.42
2005	8268	47112	4813	10177	34782	3437	60192	48396	108589	55.43
2010	8856	48205	5477	9073	34600	3884	62537	47558	110095	56.80
2015	9970	48353	6533	8472	32931	4859	64856	46262	111118	58.37
2020	9653	48676	8775	8359	29395	6593	67104	44347	111451	60.21
2025	9048	48540	11263	8422	25411	7932	68851	41764	110615	62.24
2030	8869	47440	14233	7665	21750	8959	70542	38375	108917	64.77

East

Year	Urban			Rural			Urban total	Rural total	Region total	Urban share %
	0-14	15-64	65+	0-14	15-64	65+				
2000	13960	62519	6583	29648	75266	10173	83062	115087	198149	41.92
2005	14236	73778	7418	25045	72005	10399	95432	107448	202880	47.04
2010	15668	78052	8211	20559	73222	10994	101931	104775	206706	49.31
2015	17909	80912	10049	18323	70654	12411	108870	101388	210258	51.78
2020	17753	85261	13070	18088	63790	14863	116083	96741	212824	54.54
2025	16971	89866	15990	18222	57406	15667	122828	91294	214122	57.36
2030	17065	92302	20073	16718	50103	17562	129440	84382	213822	60.54

Central

Year	Urban			Rural			Urban total	Rural total	Region total	Urban share %
	0-14	15-64	65+	0-14	15-64	65+				
2000	10260	39098	3052	31767	75157	7922	52411	114845	167256	31.34
2005	10751	47819	3894	26317	74161	8681	62464	109159	171622	36.40
2010	12309	50488	4555	22681	75509	9292	67352	107482	174834	38.52
2015	14384	52558	5808	20530	73735	10656	72750	104920	177671	40.95
2020	14185	56739	7614	19889	68207	12873	78538	100969	179506	43.75
2025	13411	61228	9308	19629	61866	14399	83947	95894	179841	46.68
2030	13499	64003	12021	17832	54881	16726	89523	89440	178962	50.02

South

Year	Urban			Rural			Urban total	Rural total	Region total	Urban share %
	0-14	15-64	65+	0-14	15-64	65+				
2000	12343	48805	3344	21261	39563	4625	64493	65449	129942	49.63
2005	13453	60607	3963	19767	39728	4711	78023	64205	142229	54.86
2010	14919	68251	4506	17172	44855	4865	87675	66892	154567	56.72
2015	17403	75067	5571	16118	47854	5308	98041	69280	167322	58.59
2020	18015	84175	7391	16854	47060	6512	109581	70426	180007	60.88
2025	18012	93827	9565	17955	44902	7718	121404	70576	191980	63.24
2030	18947	102186	13218	17374	42536	9070	134351	68980	203331	66.08

Southwest

Year	Urban			Rural			Urban total	Rural total	Region total	Urban share %
	0-14	15-64	65+	0-14	15-64	65+				
2000	12129	46593	4070	55029	113271	12323	62792	180623	243414	25.80
2005	14306	56912	5123	49999	110034	13619	76341	173651	249993	30.54
2010	16984	59968	6078	43604	113298	15437	83030	172339	255369	32.51
2015	19539	63901	7412	36948	115051	17383	90851	169382	260234	34.91
2020	19599	70687	9569	35841	107528	20787	99855	164156	264011	37.82
2025	18786	78711	11142	35387	100067	21606	108639	157060	265699	40.89
2030	19403	84457	14026	32366	91285	23806	117886	147457	265343	44.43

Plateau

Year	Urban			Rural			Urban total	Rural total	Region total	Urban share %
	0-14	15-64	65+	0-14	15-64	65+				
2000	424	1546	87	2041	3457	255	2058	5752	7810	26.35
2005	528	1904	137	2013	3476	306	2569	5796	8364	30.71
2010	654	2056	174	1865	3793	362	2884	6020	8903	32.39
2015	793	2254	209	1710	4087	416	3255	6214	9469	34.38
2020	833	2598	260	1756	4091	481	3691	6328	10020	36.84
2025	836	3002	316	1809	4022	529	4154	6360	10513	39.51
2030	909	3349	437	1729	3900	634	4695	6263	10958	42.84

Northwest

Year	Urban			Rural			Urban total	Rural total	Region total	Urban share %
	0-14	15-64	65+	0-14	15-64	65+				
2000	7012	26375	1811	23390	48523	4017	35198	75930	111128	31.67
2005	7711	32043	2624	20580	48953	4822	42378	74354	116732	36.30
2010	8863	34374	3219	17501	52112	5619	46455	75232	121688	38.18
2015	10362	36790	3911	15923	52866	6681	51062	75470	126533	40.36
2020	10457	40755	4991	15841	50452	8250	56203	74543	130746	42.99
2025	10126	44930	6211	15973	47101	9504	61266	72579	133845	45.77
2030	10469	48238	8081	14853	43514	10932	66789	69299	136088	49.08

4.5 Scenario H2

This regional projection is based on Cao's H2 scenario. It is based on the following assumptions (see Table 4.9).

Table 4.9 Main characteristics of the High-H2 scenario assumptions

	<i>Urban</i>		<i>Rural</i>	
	2000	2030	2000	2030
<i>TFR</i>				
Total fertility rate	1.58	1.64	1.98	2.11
<i>Life expectancy</i>				
Male	71.57	74.50	67.89	71.79
Female	75.58	78.21	71.00	74.87
<i>Migration</i>				
Total net rural-urban migration from 2000-2030 (in millions)	363.772		-363.772	

Table 4.10 summarizes the provincial projections under the above scenario assumptions for the period 2000-2030 in five-year time steps aggregated to the eight CHINAGRO-LUC regions.

Table 4.10 Population projection for China and the LUC-regions under the High-H2 scenario assumptions for the period 2000-2030 (1000 people).

HIGH POP -- HIGH MIG PROJECTION (H2)

China										
Year	Urban			Rural			Urban total	Rural total	Region total	Urban share %
	0-14	15-64	65+	0-14	15-64	65+				
2000	84091	343087	29319	232747	527780	58109	456498	818636	1275134	35.80
2005	88891	414318	36364	200581	519102	62210	539573	781893	1321465	40.83
2010	104830	468877	42697	169971	508374	67057	616403	745402	1361805	45.26
2015	126496	519008	53198	143317	481258	76489	698702	701064	1399766	49.92
2020	134088	577757	70425	132360	422585	93567	782270	648512	1430781	54.67
2025	136938	634810	87829	123916	364809	102883	859578	591608	1451185	59.23
2030	142044	678844	113067	108051	304379	115580	933955	528009	1461965	63.88

North										
Year	Urban			Rural			Urban total	Rural total	Region total	Urban share %
	0-14	15-64	65+	0-14	15-64	65+				
2000	19080	76116	6613	57691	135922	15677	101809	209291	311100	32.73
2005	19633	93970	8391	46675	136023	16231	121994	198929	320923	38.01
2010	23832	106743	9896	40212	131490	17178	140471	188881	329352	42.65
2015	28613	119065	12421	33249	123756	20026	160099	177031	337130	47.49
2020	30361	132749	16713	30644	107494	25171	179824	163309	343133	52.41
2025	30951	145909	21069	28624	91838	28350	197929	148812	346741	57.08
2030	32050	156229	26722	24879	76201	31922	215001	133002	348003	61.78

Northeast										
Year	Urban			Rural			Urban total	Rural total	Region total	Urban share %
	0-14	15-64	65+	0-14	15-64	65+				
2000	8882	42036	3759	11920	36621	3117	54676	51658	106334	51.42
2005	8214	46533	4797	10145	34697	3435	59544	48276	107820	55.23
2010	8946	48973	5501	8801	32484	3817	63420	45102	108523	58.44
2015	10416	50155	6610	7692	29086	4711	67182	41489	108671	61.82
2020	10551	51068	8915	6891	24270	6346	70534	37508	108042	65.28
2025	10370	51111	11488	6278	19408	7549	72968	33236	106204	68.71
2030	10259	50081	14543	5254	14932	8425	74882	28610	103493	72.36

East										
Year	Urban			Rural			Urban total	Rural total	Region total	Urban share %
	0-14	15-64	65+	0-14	15-64	65+				
2000	13960	62519	6583	29648	75266	10173	83062	115087	198149	41.92
2005	14330	74489	7434	25052	72064	10404	96253	107520	203773	47.24
2010	16331	83432	8386	20073	69390	10868	108149	100332	208481	51.87
2015	19521	90637	10415	16848	63274	12133	120572	92254	212827	56.65
2020	20469	98484	13644	15320	53696	14428	132597	83445	216043	61.38
2025	20730	105892	16814	14154	45259	15056	143437	74469	217906	65.83
2030	21159	110854	21248	12122	36042	16694	153261	64859	218119	70.26

Central

Year	Urban			Rural			Urban total	Rural total	Region total	Urban share %
	0-14	15-64	65+	0-14	15-64	65+				
2000	10260	39098	3052	31767	75157	7922	52411	114845	167256	31.34
2005	10671	46951	3875	26209	73591	8660	61496	108459	169955	36.18
2010	12558	52215	4607	22021	70873	9148	69379	102042	171421	40.47
2015	15240	56418	5943	18906	65485	10367	77601	94758	172359	45.02
2020	15718	61908	7823	17050	57188	12430	85449	86669	172118	49.65
2025	15587	66932	9599	15586	48828	13763	92117	78178	170295	54.09
2030	15718	69908	12424	13290	40062	15832	98051	69184	167235	58.63

South

Year	Urban			Rural			Urban total	Rural total	Region total	Urban share %
	0-14	15-64	65+	0-14	15-64	65+				
2000	12343	48805	3344	21261	39563	4625	64493	65449	129942	49.63
2005	13684	63454	4025	20168	41717	4787	81163	66672	147835	54.90
2010	15982	77707	4718	17561	45207	4965	98407	67733	166140	59.23
2015	19965	91464	5982	15956	46359	5431	117411	67746	185157	63.41
2020	22508	107918	8058	15822	43316	6678	138484	65815	204299	67.78
2025	24445	125115	10618	15860	38919	7924	160178	62703	222881	71.87
2030	26831	141646	14844	14642	33779	9260	183321	57681	241002	76.07

Southwest

Year	Urban			Rural			Urban total	Rural total	Region total	Urban share %
	0-14	15-64	65+	0-14	15-64	65+				
2000	12129	46593	4070	55029	113271	12323	62792	180623	243414	25.80
2005	14149	55220	5086	49710	108319	13560	74455	171589	246043	30.26
2010	17356	61258	6142	42223	105112	15153	84756	162488	247244	34.28
2015	20667	67769	7583	33968	100749	16845	96019	151562	247581	38.78
2020	21551	75829	9823	30823	88447	19970	107203	139240	246443	43.50
2025	21534	83856	11422	28332	77375	20485	116812	126192	243004	48.07
2030	22015	88906	14345	24403	65464	22280	125266	112147	237413	52.76

Plateau

Year	Urban			Rural			Urban total	Rural total	Region total	Urban share %
	0-14	15-64	65+	0-14	15-64	65+				
2000	424	1546	87	2041	3457	255	2058	5752	7810	26.35
2005	525	1879	136	2013	3477	306	2541	5796	8337	30.48
2010	678	2175	176	1834	3626	358	3029	5818	8847	34.24
2015	862	2525	214	1622	3744	408	3602	5775	9376	38.41
2020	957	3002	269	1590	3592	469	4227	5652	9879	42.79
2025	1016	3514	328	1558	3390	512	4859	5460	10319	47.09
2030	1111	3969	454	1434	3130	609	5534	5173	10707	51.69

Northwest

Year	Urban			Rural			Urban total	Rural total	Region total	Urban share %
	0-14	15-64	65+	0-14	15-64	65+				
2000	7012	26375	1811	23390	48523	4017	35198	75930	111128	31.67
2005	7685	31822	2620	20611	49213	4827	42128	74651	116779	36.07
2010	9147	36374	3271	17245	50191	5570	48792	73006	121798	40.06
2015	11210	40976	4030	15077	48805	6569	56216	70450	126666	44.38
2020	11972	46800	5179	14218	44580	8075	63951	66873	130824	48.88
2025	12303	52481	6493	13523	39792	9243	71277	62558	133835	53.26
2030	12902	57250	8487	12027	34768	10558	78639	57353	135992	57.83

5. DISCUSSION

Earlier sections in this report raise and discuss potential imprecision and errors of the regional population projections. The sources of imprecision can be classified into three main categories: general projection errors, data sources, and procedures.

The multi-state population projection method adopted by Cao to produce the national-level projections is a widely accepted and used method in demography. It requires that assumptions underlying the projections are clearly specified, thereby making their implications clear and the results transparent. Yet this does not eliminate the risk of usual projection errors. Demographic behavior and relationships observed in the past and incorporated in the projection model as parameters can change in the future, sometimes surprisingly. One possible source of surprise in the case of China could be a major fertility revival if prevailing demographic policies or their enforcement relax before incomes in China reach the level at which the low-fertility effects of affluence observed in most developed countries become dominant. The period of over two decades of strict population policies has certainly produced a durable impact on the social culture and attitudes towards fertility that makes the return to high-fertility levels rather unlikely. Nevertheless, the only remedy to this problem is to develop a set of assumptions that covers a sufficiently broad range and thus produces a wide but plausible range of projections. Cao's national-level assumptions attempt to fulfill this principle, but the span of projections in terms of total population in 2020 or 2030 is still relatively narrow.

The regional disaggregation procedure draws on additional information in order to reduce the magnitude of possible errors. Provincial birth rate projections (based on long-term historical trends) are used to account for differences in fertility patterns. Provincial death rate projections (also based on historical data) are applied to observe the effect of varying life expectancy across the provinces. Provincial urbanization rate projections (based on rigorous statistical analysis of past trends) are adopted to incorporate the differences in rates and levels of urbanization. Finally, historically observed patterns of interprovincial migration are also reflected in the disaggregation model.

The combination of multi-state demographic projection method with the 2000 census data for preparing the national-level projections by Cao (2003), and the additional information on provincial birth rates, death rates, and urbanization rates incorporated in the disaggregation model also based on the 2000 census provide detailed long-term province-level demographic scenarios that might be useful for regional studies of the Chinese economy and society.

6. SUMMARY AND CONCLUSIONS: POTENTIAL USES OF THE REGIONAL PROJECTIONS

As indicated in earlier sections of this report, the demographic parameters driving the multi-state national projections (Cao, 2003) are not tied to specific assumptions about overall economic development. Instead, they are based on observations of historical patterns of demographic processes and extended into the future by assuming continuing trends without significant disruptions. These assumptions are perfectly sensible from the demographer's perspective and the resulting scenarios cover a reasonably broad range of possible population futures. However, the use of the population projections in socioeconomic studies requires the

harmonization of the assumptions behind the different development scenarios and the population scenarios. Recent population-development relationships in China and lessons from such studies in other countries might provide the clues for linking selected population projections to specific development scenarios. The key issues to consider are the following: what rates and patterns of economic growth are most compatible with the high or low fertility scenarios and migration rates, slow or fast convergence of fertility patterns across rural-urban groups and different education categories.

The use of regional population projections in development studies makes the careful coupling of national-scale demographic scenarios and macroeconomic projections even more important. Here again, past observations and common sense can be helpful in making the relevant linkages. High rates of economic development are likely to require more labor and provide greater employment opportunities in the industrial and service sectors, hence such socioeconomic scenarios are more likely to be consistent with demographic scenarios incorporating with fast urbanization and high rates of rural-urban migration.

A possible practical approach to using the population scenarios presented here is to select the most relevant assumptions for a particular application and take the corresponding regional population projection as the baseline. Subsequently, one can make additional changes to the baseline population projection on the basis of the internal dynamics of the particular socioeconomic scenario or model run. This could be taken to the point where the emerging population story is a mixture of an external demographic scenario and a semi-endogenized feed-back process. Typically, inter-provincial migration flows could be generated on the basis of the emerging regional dynamics of a relevant multi-regional economic model. These migration flows could then be superimposed on the underlying population projection to keep track of the relevant changes in dependency ratios, labor force availability, etc.

There is no categorically proper way to produce long-term regional population projections. The procedure developed in this study and the results presented in this report are characterized by limitations arising from the restricted amount of information available in the main data sources. Yet results of any projection are driven by the underlying assumptions. By making these assumptions transparent and by openly discussing possible sources of errors in this report, users of these regional projections can make their own judgments regarding the uncertainties involved and the implications for the studies in which the projections will be used. We believe that the assumptions we used to produce these regional projections are sufficiently reasonable and defensible. Accordingly, the numbers computed under the different scenarios can serve as useful input to studies of regional socioeconomic development in China looking at the next few decades.

REFERENCES

- Cao, Gui-Ying. 2000. The Future Population of China: Prospects to 2045 by Place of Residence and by Level of Education. IR-00-026. Laxenburg, Austria: IIASA.
- Cao, Gui-Ying. 2003. The Future Population of China: New Projections. Model Runs. Laxenburg, Austria: IIASA.
- Liu, S., Li, X., Zhang, M. 2003. Scenario Analysis on Urbanization and Rural-Urban Migration in China. IR-03-036. Laxenburg, Austria: IIASA.
- NBS (National Bureau of Statistics of the People's Republic of China), 2001: China Population Statistics Yearbook 2001. China Statistics Press, Beijing, China.
- NBS (National Bureau of Statistics of the People's Republic of China). 2002a. China Census 2000, detailed data tables. CD-ROM, Michigan University and China Data Center, Ann Arbor.
- NBS (National Bureau of Statistics of the People's Republic of China), 2002b: China Statistical Yearbook 2002. China Statistics Press, Beijing, China.
- Yao, Xin-Wu. 1995. Fertility data of China. Beijing, China: Data User Service, China Population Information and Research Center.

APPENDIX

This Appendix presents detailed results of the regional projections for the 31 provinces and for the 8 LUC-regions:

- the initial conditions for all five scenarios for the year 2000;
- results of the regional projections for the five scenarios for the years 2015 and 2030;
- the underlying assumptions for the five scenarios are also listed.

Initial conditions for all five scenarios for the year 2000 (1000 people)

Note: Data in this table are based on the harmonization of Cao's (2003) national level initial starting values with the year 2000 census data (see Section 2 for explanation)

YEAR:2000

Prov/Reg	Urban			Rural			Urban total	Rural total	Prov/Reg total	Urban share %
	0-14	15-64	65+	0-14	15-64	65+				
Beijing	1252	8336	882	660	2214	254	10470	3128	13598	77.00
Tianjin	993	5457	605	751	1894	217	7055	2863	9917	71.13
Hebei	3318	13139	1016	13606	33720	3635	17473	50961	68434	25.53
Shanxi	2541	8228	606	6887	13876	1431	11375	22194	33570	33.89
Inner-Mongolia	1941	7474	494	3483	9643	782	9909	13907	23816	41.61
Liaoning	3523	17512	1817	4484	13621	1451	22852	19556	42408	53.89
Jilin	2210	10217	818	3225	9905	789	13245	13919	27164	48.76
Heilongjiang	3149	14307	1124	4211	13095	877	18580	18183	36763	50.54
Shanghai	1755	11033	1630	292	1438	239	14418	1969	16387	87.99
Jiangsu	5277	23123	2309	10269	29126	4084	30709	43480	74189	41.39
Zhejiang	3592	17059	1595	5563	16478	2465	22246	24506	46752	47.58
Anhui	3336	11303	1049	13525	28223	3385	15688	45133	60821	25.79
Fujian	2668	10728	840	5879	13286	1417	14236	20582	34818	40.89
Jiangxi	2365	8133	631	9523	19393	1876	11130	30791	41921	26.55
Shandong	6389	25508	2258	14016	38405	4975	34156	57396	91552	37.31
Henan	4588	15447	1245	21771	45813	5164	21279	72749	94028	22.63
Hubei	4669	17938	1363	9961	24187	2424	23970	36572	60542	39.59
Hunan	3226	13027	1058	12283	31578	3622	17312	47482	64794	26.72
Guangdong	8954	35905	2338	13789	23471	2870	47197	40130	87327	54.05
Guangxi	2583	8949	757	10352	20261	2410	12289	33023	45312	27.12
Hainan	722	2171	166	1593	2806	338	3059	4737	7796	39.24
Chongqing	1696	7572	777	5908	13864	1645	10045	21417	31462	31.93
Sichuan	3916	16767	1517	17357	40932	4648	22200	62938	85137	26.08
Guizhou	2015	5917	471	10430	16682	1612	8404	28724	37128	22.63
Yunnan	1919	7387	548	10981	21532	2008	9854	34520	44374	22.21
Tibet	108	382	16	862	1301	107	506	2270	2776	18.22
Shaanxi	2234	8420	658	7513	15980	1499	11312	24993	36305	31.16
Gansu	1167	4523	298	6561	12558	1000	5989	20119	26107	22.94
Qinghai	316	1164	71	1179	2156	147	1552	3482	5034	30.82
Ningxia	378	1311	82	1420	2385	162	1771	3967	5738	30.87
Xinjiang	1291	4646	279	4414	7957	574	6217	12945	19161	32.44
Total 31prov	84091	343087	29319	232747	527780	58109	456498	818636	1275134	35.80
North	19080	76116	6613	57691	135922	15677	101809	209291	311100	32.73
Northeast	8882	42036	3759	11920	36621	3117	54676	51658	106334	51.42
East	13960	62519	6583	29648	75266	10173	83062	115087	198149	41.92
Central	10260	39098	3052	31767	75157	7922	52411	114845	167256	31.34
South	12343	48805	3344	21261	39563	4625	64493	65449	129942	49.63
Southwest	12129	46593	4070	55029	113271	12323	62792	180623	243414	25.80
Plateau	424	1546	87	2041	3457	255	2058	5752	7810	26.35
Northwest	7012	26375	1811	23390	48523	4017	35198	75930	111128	31.67

Central – C scenario

Assumptions

Rural

Life Expectancy

Year	Males	Females
2000-2005	67.89	71
2005-2010	68.82	71.93
2010-2015	69.73	72.83
2015-2020	70.63	73.72
2020-2025	71.52	74.59
2025-2030	72.39	75.44

Total Fertility Rate

Year	TFR
2000-2005	1.98
2005-2010	1.98
2010-2015	1.98
2015-2020	1.98
2020-2025	1.98
2025-2030	1.98

Net Migration

Year	Males	Females
2000-2005	-34159431	-29098561
2005-2010	-18787687	-16004209
2010-2015	-21605840	-18404840
2015-2020	-24846716	-21165566
2020-2025	-27331388	-23282122
2025-2030	-28697957	-24446229

Urban

Life Expectancy

Year	Males	Females
2000-2005	71.57	75.58
2005-2010	72.34	76.28
2010-2015	73.1	76.96
2015-2020	73.85	77.63
2020-2025	74.59	78.29
2025-2030	75.32	78.93

Total Fertility Rate

Year	TFR
2000-2005	1.58
2005-2010	1.58
2010-2015	1.58
2015-2020	1.58
2020-2025	1.58
2025-2030	1.58

Net Migration

Year	Males	Females
2000-2005	34159431	29098561
2005-2010	18787687	16004209
2010-2015	21605840	18404840
2015-2020	24846716	21165566
2020-2025	27331388	23282122
2025-2030	28697957	24446229

Projections (1000 people)

CENTRAL PROJECTION

YEAR:2015

Prov/Reg	Urban			Rural			Urban total	Rural total	Prov/Reg total	Urban share %
	0-14	15-64	65+	0-14	15-64	65+				
Beijing	1848	12198	1385	451	1874	322	15431	2646	18077	85.36
Tianjin	1203	6659	937	558	1672	267	8798	2497	11295	77.90
Hebei	5174	20064	2159	8343	33370	4994	27396	46706	74103	36.97
Shanxi	3410	12484	1211	4635	14979	1960	17104	21573	38678	44.22
Inner-Mongolia	2580	9744	1032	2590	8932	1210	13356	12732	26088	51.20
Liaoning	3811	20107	2856	3139	11633	1987	26774	16758	43532	61.50
Jilin	2664	12723	1566	2167	9035	1268	16954	12471	29424	57.62
Heilongjiang	3522	15971	2179	2860	10836	1574	21672	15270	36942	58.67
Shanghai	2526	15525	2023	77	659	218	20074	954	21028	95.46
Jiangsu	6611	30448	3866	6065	26123	4994	40926	37181	78107	52.40
Zhejiang	4402	23153	2534	3808	15391	2796	30089	21995	52084	57.77
Anhui	4786	15645	1845	7803	25868	4378	22275	38049	60323	36.93
Fujian	3538	15601	1373	3964	14199	1672	20511	19836	40347	50.84
Jiangxi	3661	11647	1178	6362	19196	2460	16486	28018	44504	37.04
Shandong	8337	35500	4053	8493	35214	6211	47890	49918	97809	48.96
Henan	6892	24107	2496	12266	44982	6669	33495	63917	97413	34.38
Hubei	6174	24259	2627	6109	22988	3397	33061	32493	65554	50.43
Hunan	4633	17727	2085	7378	28338	4747	24445	40463	64908	37.66
Guangdong	13738	62992	4135	11153	30960	3382	80865	45496	126361	64.00
Guangxi	3727	12594	1331	6296	19246	2930	17651	28472	46123	38.27
Hainan	1001	3439	290	1109	3228	368	4731	4705	9436	50.14
Chongqing	2195	10170	1343	3392	13462	2462	13709	19316	33024	41.51
Sichuan	6233	21233	2863	10963	36034	6748	30329	53746	84075	36.07
Guizhou	3381	8673	917	6909	17075	2423	12972	26408	39379	32.94
Yunnan	4046	11994	1059	8072	23331	2697	17099	34100	51199	33.40
Tibet	285	687	42	776	1600	162	1015	2539	3554	28.56
Shaanxi	3015	11400	1321	4411	15574	2311	15737	22297	38034	41.38
Gansu	2009	7131	750	3989	13902	1864	9889	19755	29644	33.36
Qinghai	519	1654	170	897	2367	253	2342	3517	5859	39.98
Ningxia	612	2151	193	1039	2967	290	2956	4296	7252	40.76
Xinjiang	2309	7776	686	3567	10180	1006	10771	14753	25524	42.20
Total 31prov	118842	485458	52503	149639	515216	78020	656803	742875	1399678	46.93
North	26864	111012	12240	34744	132092	20423	150115	187259	337374	44.50
Northeast	9997	48802	6601	8166	31503	4829	65400	44498	109898	59.51
East	18325	84771	10267	17753	68040	12385	113363	98179	211541	53.59
Central	14468	53634	5891	19849	70522	10604	73992	100974	174966	42.29
South	18277	82032	5798	16227	48388	5422	106107	70036	176144	60.24
Southwest	19582	64665	7513	35632	109149	17260	91759	162041	253800	36.15
Plateau	804	2341	212	1672	3967	416	3357	6055	9413	35.67
Northwest	10525	38202	3982	15596	51555	6682	52709	73833	126542	41.65

**Central
YEAR:2030**

Prov/Reg	Urban			Rural			Urban total	Rural total	Prov/Reg total	Urban share %
	0-14	15-64	65+	0-14	15-64	65+				
Beijing	2025	15122	3085	467	825	539	20231	1831	22062	91.70
Tianjin	1193	7095	1965	507	980	429	10253	1916	12170	84.25
Hebei	5186	26693	4708	6774	24043	8653	36587	39469	76057	48.11
Shanxi	3556	16685	2816	4020	11641	3405	23057	19066	42123	54.74
Inner-Mongolia	2456	11379	2400	2125	6125	2325	16234	10575	26809	60.56
Liaoning	3484	19294	6208	2524	7031	3424	28986	12979	41965	69.07
Jilin	2489	13702	3553	1777	5916	2445	19744	10138	29882	66.07
Heilongjiang	2950	14780	4841	2111	6394	3060	22572	11565	34137	66.12
Shanghai	2690	17671	4175	129	87	186	24537	403	24939	98.39
Jiangsu	6247	35347	7630	4931	17138	7199	49224	29267	78492	62.71
Zhejiang	4415	27394	5681	3322	10418	4413	37490	18154	55644	67.38
Anhui	4478	18887	3477	5907	17739	5799	26842	29446	56287	47.69
Fujian	3539	20179	3167	3357	11012	2986	26885	17355	44240	60.77
Jiangxi	3513	15204	2495	4926	14278	4043	21211	23247	44458	47.71
Shandong	8161	42535	8549	7121	23524	9954	59245	40599	99844	59.34
Henan	6748	31734	5227	9560	31947	10496	43709	52003	95712	45.67
Hubei	5760	28947	5655	4897	15909	5595	40363	26401	66764	60.46
Hunan	4243	20921	4237	5501	19163	7050	29400	31714	61115	48.11
Guangdong	16589	93102	10374	11825	28273	5814	120065	45912	165977	72.34
Guangxi	3359	15552	2693	4583	13702	4106	21605	22391	43996	49.11
Hainan	1025	4801	669	974	2714	617	6495	4304	10799	60.14
Chongqing	2239	12353	2605	2817	9910	3237	17198	15964	33161	51.86
Sichuan	5648	25236	5205	7983	24484	8946	36089	41413	77502	46.56
Guizhou	3373	12393	1681	5447	13272	3111	17447	21830	39276	44.42
Yunnan	4453	18553	2194	6976	19549	4234	25200	30760	55959	45.03
Tibet	377	1235	115	779	1598	246	1727	2623	4350	39.71
Shaanxi	2779	13780	2644	3359	10829	3777	19203	17965	37168	51.67
Gansu	2182	10352	1506	3436	11405	2768	14039	17609	31648	44.36
Qinghai	548	2290	335	770	2047	391	3173	3207	6380	49.73
Ningxia	688	3242	423	947	2715	507	4354	4169	8523	51.08
Xinjiang	2668	12232	1415	3394	9813	1636	16316	14843	31159	52.36
Total 31prov	119059	608692	111730	123247	374480	121391	839481	619118	1458599	57.55
North	26869	139864	26350	28449	92960	33475	193083	154884	347967	55.49
Northeast	8923	47777	14602	6412	19341	8929	71301	34682	105984	67.28
East	17830	99299	20963	14289	45383	17597	138093	77269	215362	64.12
Central	13516	65072	12387	15324	49349	16689	90975	81362	172337	52.79
South	21153	118083	14210	16155	41999	9417	153445	67571	221016	69.43
Southwest	19072	84088	14378	27807	80917	23633	117537	132358	249895	47.03
Plateau	924	3525	451	1549	3644	637	4900	5830	10730	45.67
Northwest	10773	50985	8389	13261	40886	11014	70147	65161	135308	51.84

Low – L1 scenario

Assumptions

Rural

Life Expectancy

Year	Males	Females
2000-2005	67.89	71
2005-2010	68.82	71.93
2010-2015	69.73	72.83
2015-2020	70.63	73.72
2020-2025	71.52	74.59
2025-2030	72.39	75.44

Total Fertility Rate

Year	TFR
2000-2005	1.98
2005-2010	1.95
2010-2015	1.91
2015-2020	1.88
2020-2025	1.85
2025-2030	1.85

Net Migration

Year	Males	Females
2000-2005	-34159431	-29098561
2005-2010	-11955801	-10184496
2010-2015	-17335911	-14767520
2015-2020	-25137071	-21412904
2020-2025	-23880218	-20342258
2025-2030	-22686207	-19325145

Urban

Life Expectancy

Year	Males	Females
2000-2005	71.57	75.58
2005-2010	72.51	76.41
2010-2015	73.44	77.22
2015-2020	74.36	78.02
2020-2025	75.26	78.79
2025-2030	76.14	79.54

Total Fertility Rate

Year	TFR
2000-2005	1.58
2005-2010	1.42
2010-2015	1.42
2015-2020	1.42
2020-2025	1.42
2025-2030	1.42

Net Migration

Year	Males	Females
2000-2005	34159431	29098561
2005-2010	11955801	10184496
2010-2015	17335911	14767520
2015-2020	25137071	21412904
2020-2025	23880218	20342258
2025-2030	22686207	19325145

Projections (1000 people)

LOW POP -- LOW MIG PROJECTION (L1)

YEAR:2015

Prov/Reg	Urban			Rural			Urban total	Rural total	Prov/Reg total	Urban share %
	0-14	15-64	65+	0-14	15-64	65+				
Beijing	1612	10990	1351	458	1876	317	13953	2651	16604	84.04
Tianjin	1091	6322	929	564	1709	267	8342	2540	10882	76.66
Hebei	4680	19305	2152	8346	34230	5024	26137	47600	73737	35.45
Shanxi	3092	12025	1207	4631	15324	1968	16324	21923	38247	42.68
Inner-Mongolia	2385	9625	1035	2627	9287	1222	13044	13136	26180	49.82
Liaoning	3522	19814	2858	3186	12054	2002	26194	17241	43435	60.31
Jilin	2451	12411	1564	2192	9279	1276	16426	12747	29173	56.30
Heilongjiang	3320	16240	2198	2960	11549	1599	21758	16108	37866	57.46
Shanghai	2203	13950	1974	120	673	217	18127	1010	19137	94.72
Jiangsu	6025	29348	3850	6109	26673	5013	39223	37796	77019	50.93
Zhejiang	3981	22043	2514	3797	15528	2795	28539	22121	50659	56.33
Anhui	4421	15780	1858	7986	27677	4451	22059	40114	62174	35.48
Fujian	3207	14935	1363	3947	14389	1673	19505	20008	39513	49.36
Jiangxi	3353	11548	1185	6436	20204	2495	16086	29135	45221	35.57
Shandong	7609	34417	4041	8576	36170	6246	46067	50992	97059	47.46
Henan	6288	23708	2502	12427	47250	6755	32498	66431	98929	32.85
Hubei	5666	23630	2624	6175	23722	3420	31920	33316	65236	48.93
Hunan	4254	17551	2091	7481	29724	4803	23896	42008	65904	36.26
Guangdong	12057	57009	3996	10817	30069	3294	73063	44180	117243	62.32
Guangxi	3440	12664	1342	6428	20602	2981	17445	30012	47457	36.76
Hainan	911	3296	288	1108	3293	369	4495	4770	9265	48.52
Chongqing	1988	9843	1339	3393	13794	2476	13170	19664	32834	40.11
Sichuan	5746	21452	2878	11185	38352	6849	30076	56386	86463	34.79
Guizhou	3103	8739	926	7021	18309	2469	12767	27800	40567	31.47
Yunnan	3621	11447	1054	8032	23867	2711	16122	34610	50731	31.78
Tibet	252	652	42	766	1635	163	946	2565	3511	26.95
Shaanxi	2768	11227	1324	4456	16252	2336	15319	23044	38363	39.93
Gansu	1807	6833	747	3971	14243	1875	9387	20089	29476	31.84
Qinghai	471	1611	170	897	2447	256	2252	3600	5852	38.48
Ningxia	548	2039	192	1028	3003	290	2779	4320	7099	39.14
Xinjiang	2046	7187	674	3478	10017	996	9906	14491	24397	40.60
Total 31prov	107917	467639	52268	150598	533201	78609	627824	762408	1390232	45.16
North	24372	106768	12181	35001	136559	20577	143321	192137	335458	42.72
Northeast	9293	48465	6620	8338	32882	4877	64378	46096	110474	58.27
East	16630	81121	10197	18012	70552	12476	107948	101041	208988	51.65
Central	13273	52729	5900	20092	73649	10719	71901	104460	176361	40.77
South	16175	75240	5648	15873	47750	5336	97063	68959	166022	58.46
Southwest	17897	64144	7540	36059	114924	17488	89581	168471	258052	34.71
Plateau	724	2263	212	1663	4082	419	3198	6164	9362	34.16
Northwest	9553	36910	3971	15559	52803	6719	50435	75080	125515	40.18

L1
YEAR:2030

Prov/Reg	Urban			Rural			Urban total	Rural total	Prov/Reg total	Urban share %
	0-14	15-64	65+	0-14	15-64	65+				
Beijing	1555	12532	2981	481	902	524	17068	1908	18976	89.95
Tianjin	981	6332	1951	511	1079	428	9265	2018	11283	82.12
Hebei	4412	24934	4748	6658	25526	8750	34094	40934	75028	45.44
Shanxi	3008	15491	2829	3934	12312	3433	21327	19680	41007	52.01
Inner-Mongolia	2142	11062	2431	2158	6738	2364	15635	11260	26895	58.13
Liaoning	3019	18588	6265	2568	7749	3468	27872	13785	41657	66.91
Jilin	2132	12945	3575	1791	6366	2469	18652	10626	29278	63.71
Heilongjiang	2687	15459	4952	2258	7486	3141	23099	12885	35983	64.19
Shanghai	2075	14489	4034	196	126	182	20598	504	21102	97.61
Jiangsu	5278	32746	7655	4907	18200	7246	45680	30353	76032	60.08
Zhejiang	3656	24718	5656	3238	10847	4411	34030	18496	52526	64.79
Anhui	4046	19537	3593	6171	20579	6008	27176	32758	59934	45.34
Fujian	2958	18505	3160	3262	11456	2989	24623	17707	42330	58.17
Jiangxi	3094	15031	2555	4994	15935	4153	20680	25081	45761	45.19
Shandong	6952	39981	8603	7124	25224	10056	55536	42403	97940	56.70
Henan	5926	31211	5343	9704	35581	10758	42479	56042	98521	43.12
Hubei	4946	27451	5702	4920	17187	5662	38100	27769	65868	57.84
Hunan	3743	20758	4324	5604	21339	7215	28824	34158	62982	45.77
Guangdong	12914	78438	9896	10874	27921	5580	101248	44374	145622	69.53
Guangxi	3024	15925	2782	4764	15877	4255	21732	24896	46628	46.61
Hainan	860	4420	668	952	2857	619	5949	4428	10376	57.33
Chongqing	1904	11582	2628	2769	10496	3271	16113	16536	32650	49.35
Sichuan	5084	26064	5367	8287	28198	9233	36515	45718	82233	44.40
Guizhou	3027	12620	1751	5609	15325	3244	17398	24177	41575	41.85
Yunnan	3746	17093	2206	6760	20554	4277	23045	31591	54637	42.18
Tibet	314	1125	116	743	1666	248	1555	2657	4212	36.92
Shaanxi	2429	13435	2689	3387	11930	3852	18552	19169	37721	49.18
Gansu	1849	9615	1519	3343	12014	2800	12982	18158	31140	41.69
Qinghai	469	2170	340	757	2193	397	2979	3347	6326	47.09
Ningxia	571	2937	422	905	2802	508	3930	4214	8144	48.26
Xinjiang	2147	10617	1382	3141	9684	1605	14146	14430	28577	49.50
Total 31prov	100946	567813	112123	122769	406148	123145	780882	652062	1432943	54.49
North	22834	130481	26455	28412	100624	33948	179769	162984	342754	52.45
Northeast	7838	46992	14792	6617	21600	9078	69622	37296	106918	65.12
East	15055	91491	20939	14511	49752	17846	127484	82110	209594	60.82
Central	11782	63240	12581	15517	54460	17030	87604	87008	174611	50.17
South	16733	101363	13724	15087	42234	9187	131820	66508	198328	66.47
Southwest	16785	83284	14734	28189	90451	24279	114803	142919	257723	44.55
Plateau	783	3295	456	1500	3858	646	4534	6004	10539	43.03
Northwest	9137	47667	8442	12935	43168	11130	65245	67232	132477	49.25

Low – L2 scenario

Assumptions

Rural

Life Expectancy

Year	Males	Females
2000-2005	67.89	71
2005-2010	68.82	71.93
2010-2015	69.73	72.83
2015-2020	70.63	73.72
2020-2025	71.52	74.59
2025-2030	72.39	75.44

Total Fertility Rate

Year	TFR
2000-2005	1.98
2005-2010	1.95
2010-2015	1.91
2015-2020	1.88
2020-2025	1.85
2025-2030	1.85

Net Migration

Year	Males	Females
2000-2005	-34159431	-29098561
2005-2010	-32109865	-27352647
2010-2015	-32109865	-27352647
2015-2020	-32109865	-27352647
2020-2025	-32109865	-27352647
2025-2030	-32109865	-27352647

Urban

Life Expectancy

Year	Males	Females
2000-2005	71.57	75.58
2005-2010	72.51	76.41
2010-2015	73.44	77.22
2015-2020	74.36	78.02
2020-2025	75.26	78.79
2025-2030	76.14	79.54

Total Fertility Rate

Year	TFR
2000-2005	1.58
2005-2010	1.42
2010-2015	1.42
2015-2020	1.42
2020-2025	1.42
2025-2030	1.42

Net Migration

Year	Males	Females
2000-2005	34159431	29098561
2005-2010	32109865	27352647
2010-2015	32109865	27352647
2015-2020	32109865	27352647
2020-2025	32109865	27352647
2025-2030	32109865	27352647

Projection (1000 people)

LOW POP -- HIGH MIG PROJECTION (L2)

YEAR:2015

Prov/Reg	Urban			Rural			Urban total	Rural total	Prov/Reg total	Urban share %
	0-14	15-64	65+	0-14	15-64	65+				
Beijing	1944	13576	1440	419	1709	314	16961	2442	19403	87.41
Tianjin	1212	7128	959	519	1508	259	9299	2286	11585	80.27
Hebei	5131	22016	2241	7812	31341	4930	29387	44083	73471	40.00
Shanxi	3383	13558	1249	4343	14030	1935	18191	20308	38499	47.25
Inner-Mongolia	2527	10215	1053	2391	8232	1188	13795	11811	25606	53.87
Liaoning	3746	20963	2909	2900	10666	1944	27618	15509	43127	64.04
Jilin	2632	13453	1600	2011	8384	1245	17685	11640	29325	60.31
Heilongjiang	3391	16118	2201	2589	9721	1528	21710	13837	35547	61.07
Shanghai	2665	17207	2101	34	546	203	21973	783	22756	96.56
Jiangsu	6571	32788	3982	5665	24360	4925	43340	34950	78290	55.36
Zhejiang	4419	25103	2613	3592	14430	2768	32135	20791	52926	60.72
Anhui	4628	16305	1896	7125	23281	4276	22830	34681	57511	39.70
Fujian	3522	16921	1414	3744	13368	1657	21858	18769	40627	53.80
Jiangxi	3577	12361	1208	5875	17588	2408	17147	25871	43018	39.86
Shandong	8246	38123	4178	7907	32753	6122	50546	46782	97329	51.93
Henan	6746	25972	2585	11326	41280	6541	35302	59148	94450	37.38
Hubei	6088	25904	2696	5672	21259	3343	34688	30274	64962	53.40
Hunan	4526	18801	2150	6809	26076	4660	25478	37545	63022	40.43
Guangdong	14177	71603	4362	10798	29259	3425	90142	43481	133624	67.46
Guangxi	3613	13167	1364	5765	17260	2859	18144	25885	44029	41.21
Hainan	996	3743	299	1041	3006	364	5037	4411	9448	53.32
Chongqing	2179	10994	1388	3178	12644	2429	14561	18251	32812	44.38
Sichuan	6046	22015	2946	10044	32743	6603	31007	49391	80397	38.57
Guizhou	3282	9100	941	6337	15361	2363	13322	24060	37382	35.64
Yunnan	4027	13363	1102	7579	21989	2666	18492	32234	50726	36.45
Tibet	285	776	44	730	1513	161	1105	2404	3509	31.50
Shaanxi	2955	12125	1356	4086	14358	2270	16436	20714	37150	44.24
Gansu	1996	7894	778	3744	13104	1842	10669	18689	29358	36.34
Qinghai	512	1781	174	837	2202	249	2467	3288	5756	42.87
Ningxia	612	2388	200	982	2808	287	3201	4077	7278	43.98
Xinjiang	2342	8827	716	3419	9887	1008	11885	14314	26199	45.36
Total 31prov	117975	524290	54145	139272	476667	76773	696411	692712	1389123	50.13
North	26662	120373	12652	32326	122621	20102	159687	175049	334736	47.71
Northeast	9768	50535	6710	7500	28770	4716	67013	40986	108000	62.05
East	18284	91403	10592	16416	62618	12172	120278	91206	211484	56.87
Central	14192	57066	6054	18356	64923	10411	77312	93690	171003	45.21
South	18695	92267	6075	15583	45632	5446	117037	66661	183699	63.71
Southwest	19146	68639	7740	32903	99997	16920	95525	149821	245346	38.93
Plateau	797	2558	218	1567	3716	410	3573	5692	9265	38.56
Northwest	10432	41450	4103	14622	48389	6595	55985	69606	125591	44.58

L2
YEAR:2030

Prov/Reg	Urban			Rural			Urban total	Rural total	Prov/Reg total	Urban share %
	0-14	15-64	65+	0-14	15-64	65+				
Beijing	2348	17886	3310	226	441	498	23545	1165	24710	95.29
Tianjin	1286	8001	2059	341	623	397	11347	1361	12708	89.29
Hebei	5342	29681	5028	5415	20385	8469	40051	34268	74319	53.89
Shanxi	3675	18517	2974	3189	9753	3326	25166	16268	41435	60.74
Inner-Mongolia	2460	11928	2498	1583	4907	2247	16886	8737	25623	65.90
Liaoning	3539	20423	6440	1852	5418	3278	30403	10549	40951	74.24
Jilin	2559	14836	3708	1316	4761	2362	21103	8439	29542	71.44
Heilongjiang	2814	14166	4961	1450	4782	2903	21942	9135	31077	70.60
Shanghai	2949	20697	4479	3	65	115	28125	183	28308	99.35
Jiangsu	6513	39237	8050	3755	13946	7010	53799	24710	78510	68.53
Zhejiang	4713	31117	6007	2575	8398	4314	41838	15287	57125	73.24
Anhui	4261	18499	3612	4367	13722	5533	26372	23622	49994	52.75
Fujian	3712	22664	3350	2668	9246	2926	29726	14840	44566	66.70
Jiangxi	3452	15743	2608	3784	11533	3892	21802	19209	41011	53.16
Shandong	8393	46543	9024	5444	19206	9698	63960	34348	98308	65.06
Henan	6668	33314	5531	7367	25880	10140	45513	43387	88900	51.20
Hubei	5877	31321	5931	3699	12908	5427	43129	22035	65164	66.19
Hunan	4183	21660	4454	4209	15575	6812	30297	26597	56894	53.25
Guangdong	18659	112043	11346	9589	22639	5853	142048	38081	180129	78.86
Guangxi	3211	15456	2788	3413	10521	3912	21455	17846	39300	54.59
Hainan	1065	5352	705	764	2249	603	7123	3616	10739	66.33
Chongqing	2313	13662	2753	2252	8406	3155	18727	13813	32540	57.55
Sichuan	5410	24723	5431	5972	19216	8576	35564	33764	69328	51.30
Guizhou	3217	12321	1736	4104	10296	2954	17274	17354	34628	49.88
Yunnan	4601	20864	2348	5669	16829	4149	27813	26646	54460	51.07
Tibet	389	1400	123	644	1393	242	1912	2278	4190	45.63
Shaanxi	2773	14538	2772	2588	8794	3658	20083	15041	35123	57.18
Gansu	2250	11600	1605	2792	9855	2711	15455	15358	30813	50.16
Qinghai	555	2483	351	612	1724	379	3388	2714	6103	55.52
Ningxia	724	3704	450	778	2352	499	4878	3628	8506	57.35
Xinjiang	2899	14508	1533	2867	8865	1642	18940	13374	32314	58.61
Total 31prov	122812	668888	117965	95285	304689	117679	909665	517653	1427317	63.73
North	27712	153944	27926	21981	76288	32528	209582	130798	340379	61.57
Northeast	8913	49425	15110	4618	14962	8543	73448	28122	101570	72.31
East	18436	109550	22148	10699	36130	16972	150134	63802	213937	70.18
Central	13513	68723	12992	11693	40016	16132	95228	67841	163069	58.40
South	23437	140059	15401	13021	34134	9382	178897	56537	235434	75.99
Southwest	18752	87026	15056	21409	65268	22746	120833	109423	230256	52.48
Plateau	944	3883	474	1255	3117	620	5301	4993	10293	51.50
Northwest	11106	56278	8858	10608	34772	10757	76242	56137	132379	57.59

High – H1 scenario

Assumptions

Rural

Life Expectancy

Year	Males	Females
2000-2005	67.89	71
2005-2010	68.69	71.8
2010-2015	69.48	72.59
2015-2020	70.26	73.36
2020-2025	71.03	74.12
2025-2030	71.79	74.87

Total Fertility Rate

Year	TFR
2000-2005	1.98
2005-2010	1.98
2010-2015	2
2015-2020	2.09
2020-2025	2.11
2025-2030	2.11

Net Migration

Year	Males	Females
2000-2005	-34159431	-29098561
2005-2010	-11955801	-10184496
2010-2015	-16738121	-14258295
2015-2020	-23433370	-19961613
2020-2025	-23902037	-20360845
2025-2030	-24380078	-20768062

Urban

Life Expectancy

Year	Males	Females
2000-2005	71.57	75.58
2005-2010	72.16	76.12
2010-2015	72.76	76.65
2015-2020	73.34	77.18
2020-2025	73.93	77.7
2025-2030	74.5	78.21

Total Fertility Rate

Year	TFR
2000-2005	1.58
2005-2010	1.58
2010-2015	1.64
2015-2020	1.64
2020-2025	1.64
2025-2030	1.64

Net Migration

Year	Males	Females
2000-2005	34159431	29098561
2005-2010	11955801	10184496
2010-2015	16738121	14258295
2015-2020	23433370	19961613
2020-2025	23902037	20360845
2025-2030	24380078	20768062

Projections (1000 people)

HIGH POP -- LOW MIG PROJECTION (H1)

YEAR:2015

Prov/Reg	Urban			Rural			Urban total	Rural total	Prov/Reg total	Urban share %
	0-14	15-64	65+	0-14	15-64	65+				
Beijing	1710	10971	1334	448	1887	317	14015	2652	16667	84.09
Tianjin	1164	6310	918	567	1715	267	8391	2549	10940	76.70
Hebei	5093	19232	2115	8535	34266	4994	26441	47795	74236	35.62
Shanxi	3352	11987	1188	4732	15344	1957	16527	22034	38561	42.86
Inner-Mongolia	2568	9600	1020	2677	9299	1216	13187	13192	26379	49.99
Liaoning	3779	19769	2820	3238	12073	1995	26368	17306	43674	60.37
Jilin	2629	12382	1543	2226	9293	1270	16554	12790	29344	56.42
Heilongjiang	3562	16202	2169	3009	11565	1594	21934	16167	38101	57.57
Shanghai	2323	13933	1951	99	680	219	18206	998	19203	94.80
Jiangsu	6488	29269	3794	6199	26712	4987	39551	37898	77449	51.07
Zhejiang	4278	21991	2479	3853	15554	2780	28747	22187	50935	56.44
Anhui	4821	15720	1825	8172	27708	4424	22367	40305	62672	35.69
Fujian	3459	14897	1344	4023	14408	1663	19700	20093	39793	49.51
Jiangxi	3654	11505	1166	6595	20226	2480	16325	29301	45626	35.78
Shandong	8218	34319	3980	8714	36218	6212	46516	51144	97660	47.63
Henan	6871	23610	2456	12719	47301	6714	32937	66734	99671	33.05
Hubei	6105	23564	2587	6282	23755	3402	32256	33439	65695	49.10
Hunan	4625	17488	2056	7653	29753	4774	24169	42180	66349	36.43
Guangdong	12962	56883	3943	10966	30148	3279	73788	44393	118181	62.44
Guangxi	3748	12617	1319	6580	20628	2963	17684	30171	47854	36.95
Hainan	982	3287	284	1130	3298	366	4553	4795	9348	48.71
Chongqing	2159	9810	1318	3468	13810	2463	13288	19741	33029	40.23
Sichuan	6265	21373	2830	11454	38389	6809	30468	56652	87120	34.97
Guizhou	3397	8702	910	7211	18330	2454	13008	27995	41003	31.73
Yunnan	3969	11399	1035	8236	23894	2694	16403	34825	51228	32.02
Tibet	279	649	41	790	1637	162	969	2589	3558	27.24
Shaanxi	3001	11190	1304	4557	16271	2323	15495	23151	38645	40.09
Gansu	1975	6805	735	4074	14258	1864	9514	20196	29710	32.02
Qinghai	513	1606	167	920	2450	254	2286	3625	5911	38.68
Ningxia	597	2032	189	1053	3007	288	2818	4348	7165	39.33
Xinjiang	2222	7163	664	3562	10031	991	10049	14584	24632	40.79
Total 31prov	116767	466265	51483	153739	533908	78176	634515	765823	1400338	45.31
North	26407	106429	11991	35715	136730	20462	144827	192906	337734	42.88
Northeast	9970	48353	6533	8472	32931	4859	64856	46262	111118	58.37
East	17909	80912	10049	18323	70654	12411	108870	101388	210258	51.78
Central	14384	52558	5808	20530	73735	10656	72750	104920	177671	40.95
South	17403	75067	5571	16118	47854	5308	98041	69280	167322	58.59
Southwest	19539	63901	7412	36948	115051	17383	90851	169382	260234	34.91
Plateau	793	2254	209	1710	4087	416	3255	6214	9469	34.38
Northwest	10362	36790	3911	15923	52866	6681	51062	75470	126533	40.36

H1
YEAR:2030

Prov/Reg	Urban			Rural			Urban total	Rural total	Prov/Reg total	Urban share %
	0-14	15-64	65+	0-14	15-64	65+				
Beijing	1718	12545	2880	574	944	530	17142	2048	19191	89.33
Tianjin	1098	6380	1881	599	1086	430	9359	2114	11473	81.57
Hebei	5060	25211	4515	7610	25710	8582	34786	41901	76687	45.36
Shanxi	3444	15677	2710	4519	12414	3374	21831	20307	42138	51.81
Inner-Mongolia	2438	11195	2336	2496	6789	2326	15969	11611	27579	57.90
Liaoning	3411	18754	6031	2970	7808	3425	28196	14203	42399	66.50
Jilin	2409	13062	3437	2071	6403	2435	18908	10909	29817	63.41
Heilongjiang	3049	15624	4765	2624	7540	3099	23438	13263	36701	63.86
Shanghai	2280	14549	3890	270	124	203	20720	597	21317	97.20
Jiangsu	5983	33037	7330	5635	18303	7126	46350	31064	77414	59.87
Zhejiang	4128	24899	5431	3721	10916	4344	34458	18982	53440	64.48
Anhui	4674	19817	3421	7091	20759	5889	27912	33740	61651	45.27
Fujian	3363	18662	3034	3748	11543	2944	25059	18234	43293	57.88
Jiangxi	3571	15250	2437	5741	16082	4076	21258	25899	47156	45.08
Shandong	7917	40386	8231	8174	25376	9877	56533	43427	99961	56.56
Henan	6842	31606	5072	11110	35868	10545	43520	57523	101044	43.07
Hubei	5627	27749	5466	5669	17299	5573	38842	28541	67384	57.64
Hunan	4300	21003	4119	6422	21501	7078	29422	35000	64422	45.67
Guangdong	14601	79051	9542	12530	28113	5517	103194	46160	149353	69.09
Guangxi	3495	16143	2654	5475	16030	4176	22292	25681	47973	46.47
Hainan	983	4473	642	1097	2880	609	6098	4586	10685	57.08
Chongqing	2178	11687	2507	3162	10571	3210	16373	16942	33315	49.14
Sichuan	5871	26430	5099	9510	28449	9044	37399	47003	84403	44.31
Guizhou	3520	12848	1665	6468	15500	3177	18032	25145	43177	41.76
Yunnan	4340	17349	2101	7751	20736	4199	23790	32686	56475	42.12
Tibet	368	1148	111	858	1686	244	1627	2787	4414	36.85
Shaanxi	2783	13594	2568	3889	12029	3783	18945	19702	38647	49.02
Gansu	2131	9730	1446	3826	12110	2746	13308	18681	31989	41.60
Qinghai	541	2201	326	872	2214	390	3068	3476	6544	46.89
Ningxia	657	2974	404	1038	2826	499	4035	4363	8398	48.05
Xinjiang	2460	10746	1326	3605	9760	1577	14533	14942	29475	49.31
Total 31prov	115241	573780	107378	141124	409367	121026	796398	671517	1467915	54.25
North	26078	131805	25289	32586	101398	33338	183172	167321	350493	52.26
Northeast	8869	47440	14233	7665	21750	8959	70542	38375	108917	64.77
East	17065	92302	20073	16718	50103	17562	129440	84382	213822	60.54
Central	13499	64003	12021	17832	54881	16726	89523	89440	178962	50.02
South	18947	102186	13218	17374	42536	9070	134351	68980	203331	66.08
Southwest	19403	84457	14026	32366	91285	23806	117886	147457	265343	44.43
Plateau	909	3349	437	1729	3900	634	4695	6263	10958	42.84
Northwest	10469	48238	8081	14853	43514	10932	66789	69299	136088	49.08

High – H2 scenario

Assumptions

Rural

Life Expectancy

Year	Males	Females
2000-2005	67.89	71
2005-2010	68.69	71.8
2010-2015	69.48	72.59
2015-2020	70.26	73.36
2020-2025	71.03	74.12
2025-2030	71.79	74.87

Total Fertility Rate

Year	TFR
2000-2005	1.98
2005-2010	1.98
2010-2015	2
2015-2020	2.09
2020-2025	2.11
2025-2030	2.11

Net Migration

Year	Males	Females
2000-2005	-34159431	-29098561
2005-2010	-29035516	-24733777
2010-2015	-32229423	-27454492
2015-2020	-35774660	-30474486
2020-2025	-33628180	-28646017
2025-2030	-31610489	-26927256

Urban

Life Expectancy

Year	Males	Females
2000-2005	71.57	75.58
2005-2010	72.16	76.12
2010-2015	72.76	76.65
2015-2020	73.34	77.18
2020-2025	73.93	77.7
2025-2030	74.5	78.21

Total Fertility Rate

Year	TFR
2000-2005	1.58
2005-2010	1.58
2010-2015	1.64
2015-2020	1.64
2020-2025	1.64
2025-2030	1.64

Net Migration

Year	Males	Females
2000-2005	34159431	29098561
2005-2010	29035516	24733777
2010-2015	32229423	27454492
2015-2020	35774660	30474486
2020-2025	33628180	28646017
2025-2030	31610489	26927256

Projection (1000 people)

HIGH POP -- HIGH MIG PROJECTION (H2)

YEAR:2015

Prov/Reg	Urban			Rural			Urban total	Rural total	Prov/Reg total	Urban share %
	0-14	15-64	65+	0-14	15-64	65+				
Beijing	2050	13512	1421	415	1763	317	16983	2495	19478	87.19
Tianjin	1285	7089	947	527	1540	260	9321	2327	11648	80.02
Hebei	5524	21722	2196	8048	31596	4909	29442	44553	73996	39.79
Shanxi	3634	13411	1227	4473	14159	1928	18271	20560	38831	47.05
Inner-Mongolia	2702	10123	1036	2459	8310	1183	13861	11953	25813	53.70
Liaoning	3994	20813	2865	2974	10791	1942	27672	15706	43378	63.79
Jilin	2805	13345	1577	2061	8476	1243	17727	11780	29507	60.08
Heilongjiang	3617	15998	2169	2657	9820	1526	21783	14003	35786	60.87
Shanghai	2791	17171	2074	23	571	208	22036	802	22837	96.49
Jiangsu	7022	32476	3914	5799	24631	4909	43411	35338	78749	55.13
Zhejiang	4714	24897	2571	3677	14609	2759	32181	21045	53226	60.46
Anhui	4994	16094	1856	7350	23463	4256	22944	35070	58014	39.55
Fujian	3769	16753	1391	3846	13517	1650	21913	19014	40927	53.54
Jiangxi	3857	12206	1185	6066	17723	2397	17248	26186	43433	39.71
Shandong	8833	37730	4103	8105	33093	6100	50667	47298	97965	51.72
Henan	7286	25601	2528	11682	41603	6512	35415	59797	95212	37.20
Hubei	6511	25645	2651	5821	21486	3332	34807	30638	65445	53.19
Hunan	4872	18567	2107	7019	26276	4639	25546	37934	63480	40.24
Guangdong	15131	71007	4297	11041	29801	3418	90435	44260	134694	67.14
Guangxi	3895	12998	1336	5947	17408	2846	18229	26201	44430	41.03
Hainan	1065	3704	294	1069	3040	363	5063	4472	9536	53.10
Chongqing	2343	10873	1362	3273	12748	2420	14578	18440	33018	44.15
Sichuan	6521	21749	2886	10365	32967	6574	31156	49907	81063	38.43
Guizhou	3550	8978	921	6555	15467	2351	13448	24373	37821	35.56
Yunnan	4359	13171	1078	7828	22159	2653	18608	32640	51248	36.31
Tibet	310	764	43	757	1524	160	1118	2441	3559	31.41
Shaanxi	3175	11985	1331	4212	14479	2261	16491	20951	37442	44.04
Gansu	2156	7784	762	3867	13201	1834	10703	18901	29604	36.15
Qinghai	552	1761	171	864	2221	248	2484	3333	5817	42.70
Ningxia	660	2360	197	1013	2834	286	3216	4133	7349	43.76
Xinjiang	2518	8724	704	3526	9981	1005	11946	14512	26457	45.15
Total 31prov	126496	519008	53198	143317	481258	76489	698702	701064	1399766	49.92
North	28613	119065	12421	33249	123756	20026	160099	177031	337130	47.49
Northeast	10416	50155	6610	7692	29086	4711	67182	41489	108671	61.82
East	19521	90637	10415	16848	63274	12133	120572	92254	212827	56.65
Central	15240	56418	5943	18906	65485	10367	77601	94758	172359	45.02
South	19965	91464	5982	15956	46359	5431	117411	67746	185157	63.41
Southwest	20667	67769	7583	33968	100749	16845	96019	151562	247581	38.78
Plateau	862	2525	214	1622	3744	408	3602	5775	9376	38.41
Northwest	11210	40976	4030	15077	48805	6569	56216	70450	126666	44.38

H2
YEAR:2030

Prov/Reg	Urban			Rural			Urban total	Rural total	Prov/Reg total	Urban share %
	0-14	15-64	65+	0-14	15-64	65+				
Beijing	2620	17966	3199	258	419	505	23786	1183	24969	95.26
Tianjin	1458	8089	1985	387	592	399	11532	1379	12911	89.32
Hebei	6205	30175	4788	6116	20376	8300	41168	34792	75960	54.20
Shanxi	4264	18837	2852	3612	9737	3266	25954	16615	42569	60.97
Inner-Mongolia	2846	12122	2402	1802	4905	2209	17369	8916	26285	66.08
Liaoning	4063	20679	6202	2101	5399	3236	30944	10736	41680	74.24
Jilin	2936	15019	3567	1490	4740	2328	21522	8558	30080	71.55
Heilongjiang	3260	14383	4774	1662	4793	2861	22417	9316	31733	70.64
Shanghai	3278	20757	4322	14	67	138	28357	219	28577	99.23
Jiangsu	7481	39731	7712	4225	13867	6891	54925	24983	79907	68.74
Zhejiang	5388	31455	5772	2894	8326	4247	42615	15467	58082	73.37
Anhui	5012	18911	3441	4989	13782	5418	27364	24190	51554	53.08
Fujian	4274	22974	3219	3013	9195	2879	30467	15088	45554	66.88
Jiangxi	4048	16081	2489	4317	11572	3816	22619	19706	42325	53.44
Shandong	9688	47192	8638	6136	19144	9521	65518	34801	100319	65.31
Henan	7815	33969	5259	8370	25933	9930	47043	44233	91276	51.54
Hubei	6786	31781	5688	4189	12878	5339	44255	22407	66662	66.39
Hunan	4884	22046	4247	4784	15612	6677	31177	27072	58249	53.52
Guangdong	21324	113234	10946	10763	22341	5788	145504	38892	184396	78.91
Guangxi	3776	15784	2662	3901	10573	3835	22222	18309	40531	54.83
Hainan	1233	5438	679	866	2243	593	7350	3702	11052	66.51
Chongqing	2681	13871	2629	2539	8386	3094	19180	14019	33200	57.77
Sichuan	6357	25277	5163	6818	19298	8391	36797	34508	71305	51.61
Guizhou	3806	12667	1652	4712	10360	2890	18125	17962	36087	50.23
Yunnan	5395	21306	2240	6432	16846	4070	28941	27348	56290	51.41
Tibet	461	1436	118	737	1402	237	2015	2376	4391	45.90
Shaanxi	3227	14794	2650	2942	8808	3589	20671	15338	36010	57.41
Gansu	2626	11818	1531	3164	9859	2656	15974	15679	31653	50.47
Qinghai	649	2533	337	697	1728	372	3519	2797	6316	55.72
Ningxia	843	3770	432	880	2350	491	5045	3720	8766	57.56
Xinjiang	3359	14747	1472	3239	8848	1613	19579	13699	33278	58.83
Total 31prov	142044	678844	113067	108051	304379	115580	933955	528009	1461965	63.88
North	32050	156229	26722	24879	76201	31922	215001	133002	348003	61.78
Northeast	10259	50081	14543	5254	14932	8425	74882	28610	103493	72.36
East	21159	110854	21248	12122	36042	16694	153261	64859	218119	70.26
Central	15718	69908	12424	13290	40062	15832	98051	69184	167235	58.63
South	26831	141646	14844	14642	33779	9260	183321	57681	241002	76.07
Southwest	22015	88906	14345	24403	65464	22280	125266	112147	237413	52.76
Plateau	1111	3969	454	1434	3130	609	5534	5173	10707	51.69
Northwest	12902	57250	8487	12027	34768	10558	78639	57353	135992	57.83