# 2013
# Report on the State of the Environment in China

Ministry of Environmental Protection
The People's Republic of China

**The *2013 Report on the State of the Environment in China* is hereby announced in accordance with the *Environmental Protection Law of the People's Republic of China.***

Minister of Environmental Protection
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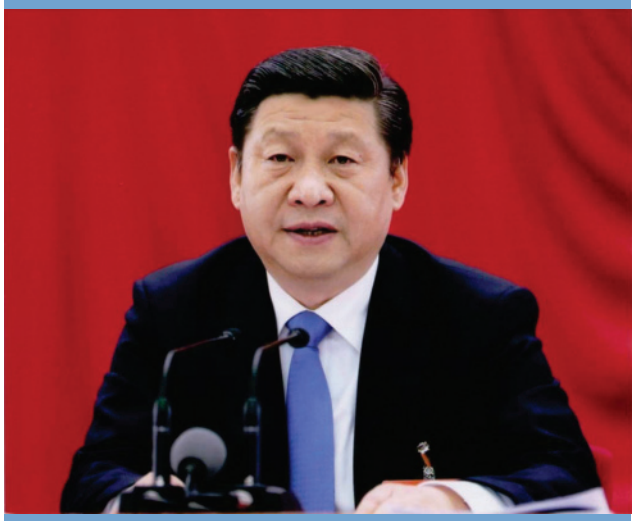
May 27, 2014

# CONTENTS



## Boxes



The 3rd plenary session of the 18th CPC Central Committee is held in Beijing between November 9 and 12, 2013. The meeting is chaired by the CPC Political Bureau, and General Secretary Xi Jinping gives an important statement. The meeting comes up with the proposal to establish a systematic and complete set of institutions with regard to ecological civilization and protect the ecological environment with institutional tools, in an effort to develop ecological civilization. The meeting also stresses the need to improve the property system and use management system of natural resources assets, draw eco-environmental protection red lines, introduce resources paid use scheme and eco-compensation scheme, and conduct institutional reform on the administration over eco-environmental protection.

Photo by Xinhua News Agency

Premier Li Keqiang of the State Council meets with the international delegates to the annual general meeting of China Council for International Cooperation on Environment and Development at the Great Hall of the People on November 14, 2013. Li said China has ushered in a crucial stage at which sustained and sound economic growth can only be achieved through transition and upgrading. Our development is for the people. As people are having increasingly higher requirements for environmental quality, the environmental protection has grown into an important issue having something to do with people's living conditions. The Chinese Government has highly valued the balance between development and environment and sought to better protect the environment in the course of advancing continuous economic development.

Photo by Xinhua News Agency

Starting 2013, we will be implementing the guidelines of the 18th National Congress of the CPC in all respects. Confronting the interwoven and complicated circumstances in and out of the country, the CPC Central Committee and the State Council have rallied and led the Chinese people of all ethnic groups to adhere to the general keynote of making new strides in our work steadily, and stay poised to cope with all sorts of risks and challenges. As it turns out, the economic and social development has been steady and yet progressive and towards a good direction, opening up new prospects. Under the correct leadership of the CPC Central Committee and the State Council, local areas and State departments have, around the three priorities tasks which are air, water, and soil pollution treatment, stepped up the environmental protection efforts, gone all out to address pressing environmental problems, and made encouraging progress in this regard.

**1. The prevention and control of atmospheric pollution has been highlighted.** The State Council printed and circulated the *Action Plan on Prevention and Control of Atmospheric Pollution* (hereinafter referred to as the "Action Plan"), which has come up with 35 comprehensive control measures in 10 Articles. Accordingly, the following tasks have been carried out, a.) division of labor. The State Council General Office circulated the program on division of labor among State departments with regard to the major tasks specified by the "Action Plan"; relevant State departments designed detailed rules to guide the Beijing-Tianjin-Hebei region and surrounding area to implement the "Action Plan", and then sealed the target responsibility documents with local provinces (autonomous regions and municipalities directly under the Central Government) in an effort to battle atmospheric pollution. Twenty-five local provinces (autonomous regions and municipalities) as well as relevant State departments have come up with their own implementation plans. b.) establishing cooperation mechanisms. Regional cooperation mechanism has been devised to fight atmospheric pollution in Beijing-Tianjin-Hebei region and surrounding area, as well as Yangtze River delta, so has a national inter-departmental coordination mechanism, in an effort to make overall plans and advance regional cooperation and inter-departmental collaboration against atmospheric pollution. c.) improving integrated management. Measures with regard to improvements of key industries, industrial restructuring, better energy structure, and vehicle exhaust control have been implemented. d.) introducing supplementary policies. Six supplementary policies in respect of green electricity pricing, special funds, subsidies to new energy automobiles, and pricing of upgraded oil products were introduced, and 18 emission/discharge standards, 9 technical policies, and 19 technical specifications promulgated. e.) improving monitoring, early warning, and emergency response systems. Policy documents with regard to improvement of monitoring, early warning, and emergency response management of heavy pollution weather events were put in place. The real-time monitoring data of fine particulate matters ($PM_{2.5}$) were available in 74 cities, including cities at or above prefectural level and seated in Beijing-Tianjin-Hebei region, Yangtze River delta, and Pearl River delta, as well as municipalities directly under the Central Government and provincial capital cities, and the air quality of those cities were being ranked. Additional 87 cities were capable of monitoring $PM_{2.5}$ and would release real-time monitoring data as of January 1, 2014. A preliminary air quality forecast and early warning system was introduced in Beijing,

Shanghai, as well as Beijing-Tianjin-Hebei region. f.) intensifying safeguard measures. A special fund geared for battling atmospheric pollution was set up by the Central Government, and 5 bn. yuan was allocated from the fund to finance the air management projects in Beijing-Tianjin-Hebei region and surrounding area this year. The *Clean Air Research Initiative* was started. The *Action Plan on Prevention and Control of Water Pollution* and the *Action Plan for Soil Environment Protection and Contaminated Soil Remediation* were being developed alongside the implementation of the ten major measures against atmospheric pollution.

**2. The annual tasks of reducing main pollutants have been accomplished in all respects.** The responsibility appraisal mechanism was employed, and environmental review of new projects was halted in three provinces (autonomous region), three corporate groups, and six cities because they had failed the 2012 annual performance evaluation with regard to pollution reduction or had not carried out the key projects specified in their target responsibility documents. Forty-three companies were put on watch list and ordered to make improvements within a limited period of time. The construction of pollution reduction projects was accelerated, with de-$NO_X$ facilities available to additional 205 mil. kW thermal power generating units, and de-$SO_2$ facilities expanded and upgraded for 34 mil. kW such units. The economic policies with regard to pollution reduction have been improved. The de-$NO_X$ electricity price was raised from 0.8 cent/kWh to 1 cent/kWh, and de-dust electricity price was set at 0.2 cent/kWh. The total load of $SO_2$, $NO_X$, COD, and ammonia nitrogen went down 3.5%, 4.7%, 2.9% and 3.1% respectively year on year.

**3. New strides have been made in development of ecological civilization.** Efforts were made to design targets for developing ecological civilization. The "ecological development model zone" was officially renamed as "ecological civilization development model zone", as approved by the central authorities. Documents including the *Opinions on Energetically Advancing the Ecological Civilization Development Model Zone, Indicators for Pilot Model Zone of Ecological Civilization Development*, etc., were circulated and there were additional 72 pilot projects targeted at promoting ecological progress. Sixteen provinces (autonomous regions) including Hainan and Heilongjiang had already engaged in eco-province (eco-region) development, and over 1,000 cities (counties) were in the eco-city (eco-county) drive.

**4. The environmental protection has played a greater role in bettering economic development.** Up to 241 environmental impact statements of construction projects which cost a total investment of 1.9 tril. yuan were reviewed this year. Among others, there were 106 projects aiming at improvement of people's living conditions, infrastructure development, and eco-environmental protection, accounting for about 64% of the total investment. Thirty-two statements were returned, rejected, or suspended review because of environmental incompliances, with potential investment up to 118.4 bn. yuan. The strategic environment assessment of western development campaign was concluded. Institutional reforms were carried out with regard to review of environmental impact statements, and the review authority for 25 categories of construction projects were delegated to lower levels. The whole-process regulation was intensified, and the *Circular on Substantially Strengthening the Supervision and Administration over Environmental Impact Assessment* was

circulated. The environmental impact assessment information was shared on a larger scale, and *Guidelines on Sharing Government Information on Environmental Impact Assessment of Construction Projects* were published. The environmental standards were improved, 135 national environmental standards were promulgated, and tougher special emission limits were set with respect to air pollutants from thermal power, iron and steel, petrochemical, cement, and non-ferrous metal industries as well as coal-fired boiler projects in key regions.

**5. The pollution prevention at the source and ecological conservation has been highlighted.** The State Council executive meeting deliberated and adopted the *Master Plan for Eco-environmental Protection of Lakes with Fine Water Quality (2013-2020)*, in order to step up the conservation of lakes with good water qualities. There is a special fund under the Central Government earmarked for eco-environmental protection of rivers and lakes, and 1.6 bn. yuan from the fund were allocated to help protect 27 lakes with fine water qualities. The eco-environmental protection efforts have escalated, the biodiversity conservation strategies and action plans have been implemented, pilot projects on whole-process management over ecological conservation have been carried out, and pilot projects have been made available in Inner Mongolia, Jiangxi, Guangxi, and Hubei with regard to technologies to draw eco-environmental protection red lines. The Central Government continued to arrange special funds in support of key projects on natural forest conservation, conversion of croplands into forests, grassland ecological conservation, and water and soil conservation, and to secure financial compensations for the ecological benefits provided by 92.3 mil. ha. State-level non-commercial forests. The eco-compensation mechanism was perfected. The transfer payments to national key ecological functional zones reached up to 42.3 bn. yuan and were extended to 492 counties in 2013. Pilot projects proceeded with regard to the water environment compensation across provincial boundaries in Xin'an River basin, and the Central Government earmarked 300 mil. yuan for this purpose.

**6. The supervision on environmental enforcement has been intensified.** Thematic environmental campaigns and safety checks have been continued this year, and environmental inspectors thus mobilized totaled 1.83 mil. persons (times), inspecting enterprises for 0.81 mil. sites (times) and identifying almost 10,000 environmental incompliances, risks and hazards. Thematic campaigns were conducted in key regions to inspect local enforcement of atmospheric pollution control regulations, and over 70,000 persons (times) of environmental inspectors were called out in November alone when 38,000 enterprises were under scrutiny and almost 11,000 environmental incompliances were investigated and punished. The thematic campaigns carried out in Beijing-Tianjin-Hebei region and surrounding area found around 200 environmental compliance problems. The thematic inspection on groundwater pollution in North China targeted at almost 26,000 enterprises where 558 environmental problems were addressed.

**7. Pollution control efforts have been advanced further in key sectors.** The *Plan for Prevention and Control of Water Pollution in Key Basins (2011-2015)* was being implemented at a faster rate. The national survey on basic environmental conditions of groundwater proceeded, the restoration of contaminated groundwater was initiated in key regions, and the *Work Programme*

*on Prevention and Control of Groundwater Pollution in North China Plain* was put in place. The policy measure of "offering financial rewards as incentives to promote pollution control" was carried forward, and the Central Government appropriated 6 bn. yuan of special funds to support the integrated rural environment management. Pilot projects were conducted with regard to the province-wide, intensive, and integrated rural environment management in selected localities of Jiangsu and Ningxia. The cumulative inputs of local areas in addressing pollution by scaled livestock and poultry breeding farms amounted to over 4 bn. yuan. There were increased efforts in tackling pollution by heavy metals, solid wastes and chemicals. A special fund equivalent to 3.4 bn. yuan was secured to help address the contamination caused by heavy metals in key regions. The endeavors to facilitate the tackling of pollution by heavy metals in soils at national farm produce bases were accelerated, and nine demonstration sites were designated in an effort to remediate contaminated soils. Over 0.3 mil. t chromium residues generated this year were disposed, so it was possible to utilize or dispose all of the chromium residues generated within the year. More than 6.7 mil. t chromium residues generated half a century ago and left untreated throughout the country were also disposed. Policies were improved in respect of the funds established for processing waste electric appliances and electronic products, with the subsidies allocated this year equivalent to 629 mil. yuan. More than 40 mil. sets of waste electric appliances and electronic products that fall into five categories were disposed. The *"Twelfth Five-Year Plan" for Prevention and Control of Environmental Risks of Chemicals* was promulgated and enforced.

**8. The nuclear and radiation safety regulation has been taken up to a new level.** Nuclear safety improvement activities continued in the aftermath of Fukushima nuclear incident. The 17 in-service nuclear power generating units and 19 research reactors in China were in safe operating conditions, and the construction quality of 31 proposed nuclear power generating units was kept at acceptable levels. The frequency of incidents caused by radioactive sources became lower, under one incident per 10,000 sources.

The overall environmental quality was average in 2013, as indicated below. The surface water was mildly polluted, with certain urban river segments badly polluted; the environmental conditions of seawaters were good in general, while the quality of nearshore seawaters was average; ambient air quality was not optimistic in cities; the urban acoustic environmental quality was good at large; radiation environment was in good shape; and eco-environmental quality was kept stable in general.

# Pollutant Discharge

## General Situation

The annual targets for reducing the total loads of main pollutants COD, ammonia nitrogen, $SO_2$ and $NO_X$ in China were all met in 2013.

**Main Pollutants in Wastewater** A total of 23.527 mil. t COD was discharged within the year, down 2.9% from a year earlier; as well as 2.457 mil. t ammonia nitrogen, down 3.1% from a year earlier.

**Main Pollutants in Waste Gas** A total of 20.439 mil. t $SO_2$ was emitted within the year, down 3.5% from a year earlier; as well as 22.273 mil. t $NO_X$, down 4.7% from a year earlier.

**Solid Wastes** Up to 3,277.019 mil. t industrial solid wastes were generated nationwide in 2013, and 2,059.163 mil. t were comprehensively utilized (including wastes generated in previous years), accounting for 62.3% of the total.

A total of 173 mil. t municipal solid wastes were cleared away in 2013 from municipalities that administer one or more county-level cities in China. With environmentally sound processing capacity totaling 0.493 mil. t/d, up to 154 mil. t solid wastes were decontaminated and processed, which accounted for 89.0%.

Discharge of main pollutants in wastewater in China in 2013

| COD (10,000 t) | | | | | Ammonia nitrogen (10,000 t) | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Total | Industry | Municipal | Agriculture | Centralized | Total | Industry | Municipal | Agriculture | Centralized |
| 2352.7 | 319.5 | 889.8 | 1125.7 | 17.7 | 245.7 | 24.6 | 141.4 | 77.9 | 1.8 |

Emission of main pollutants in waste gas in China in 2013

| $SO_2$ (10,000 t) | | | | $NO_X$ (10,000 t) | | | | |
|---|---|---|---|---|---|---|---|---|
| Total | Industry | Municipal | Centralized | Total | Industry | Municipal | Motor vehicles | Centralized |
| 2043.9 | 1835.2 | 208.5 | 0.2 | 2227.3 | 1545.7 | 40.7 | 640.5 | 0.4 |

Industrial solid wastes generated and utilized in China in 2013

| Generated (10,000 t) | Comprehensively utilized (10,000 t) | Stored (10,000 t) | Disposed (10,000 t) |
|---|---|---|---|
| 327701.9 | 205916.3 | 42634.2 | 82969.5 |

## Measures and Actions

**【Reduction of main pollutants】** Earnest efforts were made this year in implementation of the *Twelfth Five-Year Comprehensive Work Programme on Energy Conservation and Pollution Reduction*, the *Twelfth Five-Year Plan for National Environmental Protection*, and the *Twelfth Five-Year Plan for Energy Conservation and Pollution Reduction*, as well as in the improved verification and regulation on the reduction of total load of main pollutants. Wastewater advanced treatment and reclamation engineering was available for 842 key projects in paper making, printing and dyeing industries. The processing and resource use facilities of wastes were upgraded in 12,724 scaled livestock and poultry breeding farms, improving the COD and ammonia nitrogen removal efficiency by 7 and 27 percentage points respectively. A larger share of the de-$SO_2$ facilities attained emission standards among thermal power generating units, and de-$SO_2$ facilities were being expanded and upgraded for 34 mil. kW in-service units. The flue gas sulfur removal facilities of sintering machines increased by 23,600 $m^2$ in iron and steel industry. The gas availability was up 2.6 bn. $m^3$, owing to local coal-to-gas upgrading engineering, which had 4.9 mil. t raw coal replaced and 39,000 t $SO_2$ emission reduced. Notable progress was made in the catalytic cracking flue gas sulfur removal engineering in petroleum refining industry, and sulfur removal facility was made available to 18 sets of catalytic cracking devices with combined capacity at 31.5 mil. t. The flue gas bypasses were dismantled from the de-$SO_2$ facilities of 203 mil. kW in-service thermal power generating units, as a consequence, the overall de-$SO_2$ efficiency had been improved from 82% to over 90%. Falsification and deception was cracked down during operation of de-$SO_2$ facilities. Electricity tariffs equivalent to 440 mil. yuan were either fined or confiscated, and nearly 100 mil. yuan $SO_2$ emission fee was recovered. De-$NO_X$ electricity price was enforced. The construction of de-$NO_X$ facilities made a breakthrough, the total capacity of de-$NO_X$ electricity generating units soared by 205 mil. kW all over the year, and de-$NO_X$ facility was made available to cement clinker production facilities with combined capacity at 570 mil. t. All in all, the $NO_X$ emission from electricity industry dropped by 11%. A total of 1.83 mil. outdated and used motor vehicles were taken out of street. Comprehensive check was carried out on $NO_X$ pollution charge in cement industry. Enhanced inspection was targeted at the installation, operation, and maintenance of the field terminal of online pollution source monitoring equipment.

**【Prevention and control of pollution by solid wastes】** Forty-one construction projects with regard to hazardous waste collection and disposal and 253 projects with regard to medical waste collection and disposal were concluded this year; the above projects were among those specified by *National Plan for Construction of Hazardous Waste and Medical Waste Disposal Facility*. Substantial progress was made in the implementation of the *Twelfth Five-Year Plan for Prevention and Control of Pollution by Hazardous Waste*, and thematic campaigns were initiated on treatment of hazardous wastes. The enforcement of *Measures on the Administration of Hazardous Waste Business License* proceeded, and the standardized evaluation of hazardous waste continued. Thematic campaigns were undertaken on management of imported solid wastes, collaborations with relevant countries were improved on the information sharing and joint verification of the transboundary movement and control of wastes, and 19 attempted illegal imports of solid wastes to China were thwarted. The *Circular on Delegating Powers for Accrediting Imported Scrap Metal Processors and Recyclers and Strengthening Accreditation*, and *Circular on Policy Improvements regarding Waste Electric Appliance and Electronic Product Processing Funds, etc.* were announced, and *Administrative Regulations on the Environmental Protection of Imported Waste Plastics* were promulgated. Model projects were initiated on municipal solid waste sorting and treatment of solid wastes in stock, aiming at promoting solid waste sorting and treatment of wastes in stock.

# Freshwater Environment

## General Situation

The surface water was mildly polluted in China this year, with certain urban river segments badly polluted.

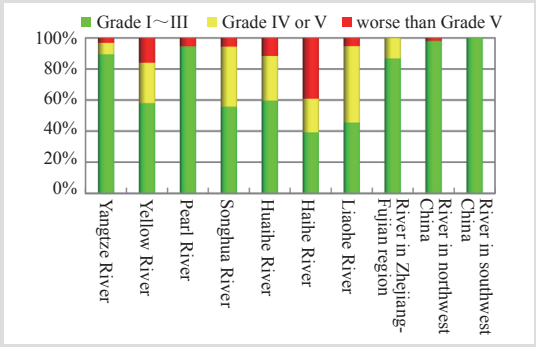
### Rivers

Among the national monitoring sections of 10 major river basins including Yangtze River, Yellow River, Pearl River, Songhua River, Huaihe River, Haihe River, Liaohe River, rivers in the Zhejiang-Fujian region, rivers in northwest and southwest China, 71.7% was found to have water quality at Grades I ~ III national standard, 19.3% at Grade IV or V, and 9.0% worse than Grade V. There were no notable changes to the water quality. The main pollution indicators were COD, $COD_{Mn}$, and $BOD_5$.

**Yangtze River Basin** enjoyed good water quality. 89.4% of the sections under national monitoring program were recorded with water quality ranging between Grades I and III, 7.5% at Grade IV or Grade V, and 3.1% worse than Grade V. There were no notable changes observed in the water quality of the basin compared with a year earlier.

The mainstream of the Yangtze River enjoyed excellent water quality, with all of the national monitoring sections attaining Grade I to Grade III national standard.

Good water quality was observed in primary tributaries




Percentage of graded water quality in 10 major river basins in 2013

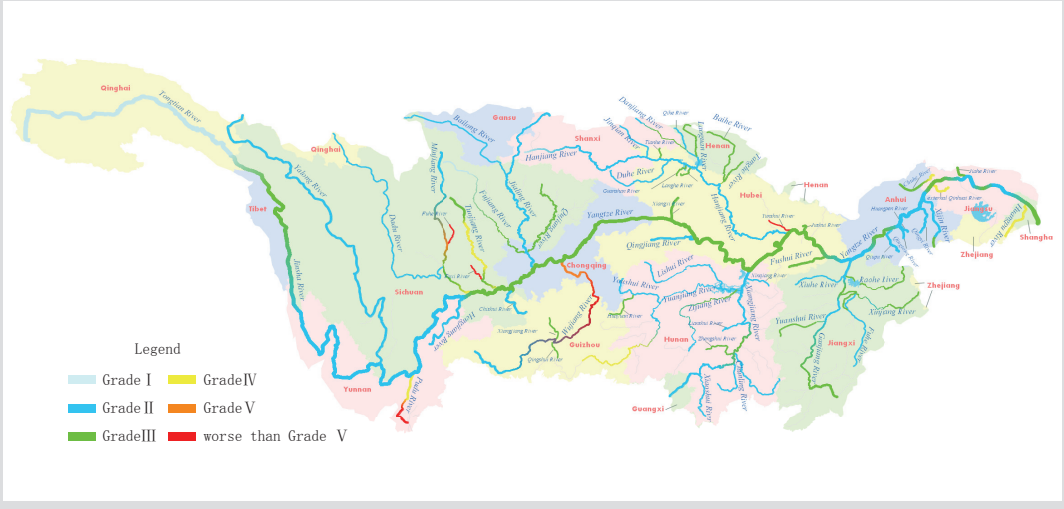



Diagram of graded water quality of Yangtze River Basin in 2013

of Yangtze River. 85.6% of the sections under national monitoring program attained Grade I to Grade III water quality standard, 10.2% Grade IV or V, and 4.2% failed Grade V.

Among the urban segments of the rivers within the basin, Kunming segment (Yunnan) of Tanglang River, Chengdu segment (Sichuan) of Fuhe River, and Zigong segment (Sichuan) of Fuxi River suffered serious pollution.

**Yellow River Basin** was mildly polluted. 58.1% of the sections under national monitoring program were recorded with water quality between Grades I and III, 25.8% at Grade IV or V, and 16.1% worse than Grade V. There were no notable changes to the water quality of the basin compared with a year earlier. The main pollution indicators were ammonia nitrogen, $BOD_5$, and COD.

The mainstream of the Yellow River enjoyed excellent water quality, with 92.3% of the national monitoring sections attaining Grade I to Grade III national standard, and 7.7% attaining Grade IV or V.

The primary tributaries of Yellow River were moderately polluted. 33.3% of the sections under national monitoring program attained Grade I to Grade III national standard, 38.9% attained Grade IV or V, and 27.8% failed Grade V. The main pollution indicators were ammonia nitrogen, $BOD_5$, and COD.

Among the urban segments of the rivers within the basin, the Bayannur segment (Inner Mongolia) of the Main Drainage Channel, Lvliang segment (Shanxi) of Sanchuan River, Taiyuan segment (Shanxi), Linfen segment (Shanxi), and Yuncheng segment (Shanxi) of Fenhe River, Yuncheng segment (Shanxi) of Sushui River, and Xi'an segment (Shaanxi) of Weihe River suffered serious pollution.

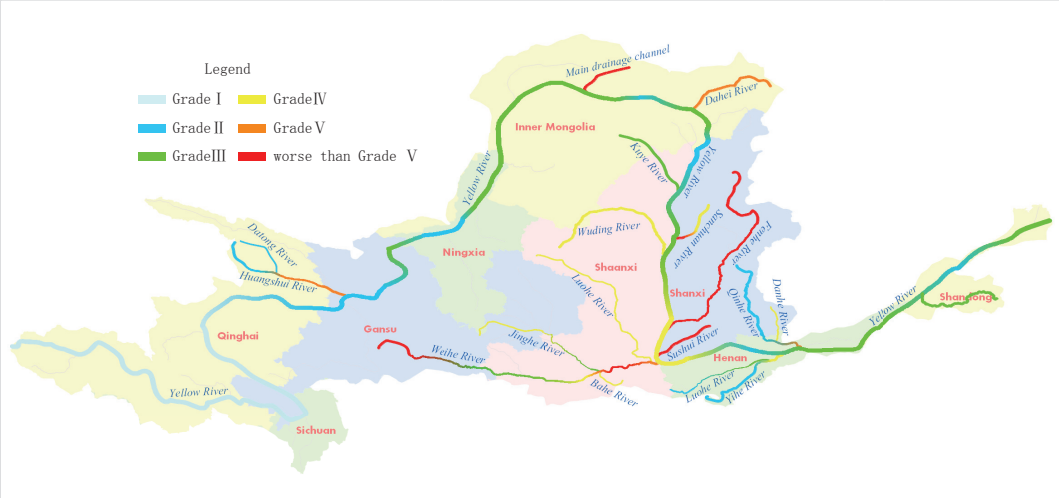



Diagram of graded water quality of Yellow River Basin in 2013

**Pearl River Basin** was found with excellent water quality. 94.4% of the sections under national monitoring program attained Grades I~III standard, and 5.6% failed Grade V standard. There were no notable changes to the water quality in the basin compared with last year.

The mainstream of the Pearl River enjoyed excellent water quality as well, with all of the national monitoring sections attaining Grade I to Grade III national standard.

The primary tributaries of the Pearl River saw good water quality, with 88.5% of the national monitoring sections attaining Grade II or III standard and 11.5% poorer than Grade V standard.

Among the four rivers running on Hainan Island, Nandu River, Wanquan River, and Changhua River enjoyed excellent water quality, and Shilu River was rated "good" with regard to water quality.

Among the urban segments of rivers within the basin, Shenzhen segment (Guangdong) of Shenzhen River was seriously polluted.


Diagram of graded water quality of Pearl River Basin in 2013

**Songhua River Basin** was mildly polluted. 55.7% of the sections under national monitoring program were recorded with water quality between Grades I and III, 38.6% at Grade IV or V, and 5.7% worse than Grade V. There were no notable changes to the water quality in the basin compared with last year. The main pollution indicators were $COD_{Mn}$, COD, and total phosphorus (TP).

The water quality of mainstream of Songhua River turned out to be good, and the percentages of national monitoring sections with differed water quality grading were as below, 81.3% at Grade I~III, 12.5% at Grades IV or V, and 6.2% poorer than Grade V.

The primary tributaries of Songhua River were mildly polluted. 58.8% of the sections under national monitoring program attained Grade I~III standard, 32.4% attained Grade IV or V, and 8.8% failed Grade V. The main contributors to the pollution were COD, $COD_{Mn}$, and ammonia nitrogen.

Heilongjiang River waters were mildly polluted as well. 40.9% of the national monitoring sections saw water quality between Grades I and III, 54.6% at Grade IV or V, and 4.5%

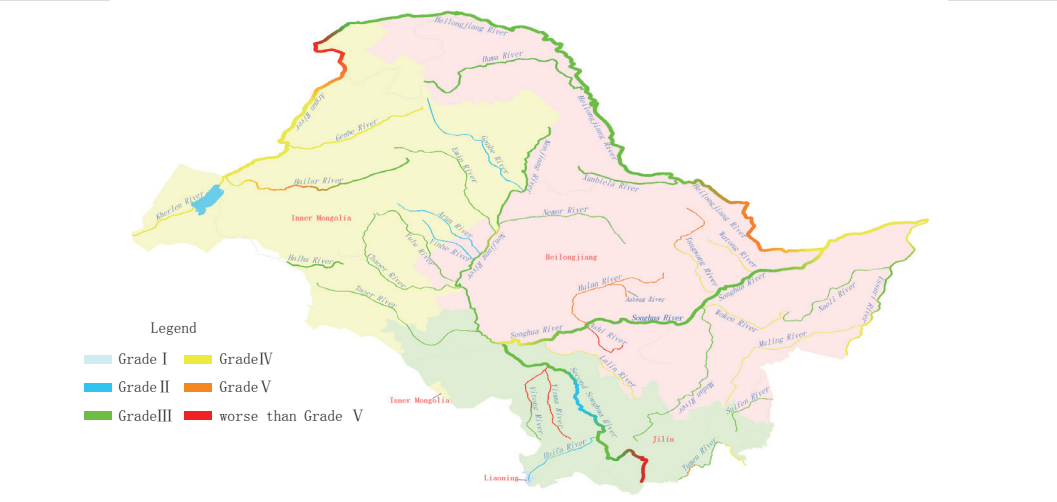



Diagram of graded water quality of Songhua River Basin in 2013

worse than Grade V. The main pollution indicators were $COD_{Mn}$ and COD.

Ussuri River waters were also mildly polluted. 33.3% of the national monitoring sections attained Grades I ~ III national standard, and 66.7% Grade IV or V. The main pollution indicators were COD, $COD_{Mn}$, and TP.

Tumen River waters had slight pollution. Half of the national monitoring sections attained Grades I~III national standard, and the other half Grade IV or V. The main pollution indicators were COD, $COD_{Mn}$, and TP.

Suifen River waters attained Grade III national standard with regard to surface water quality.

Among the urban segments of the rivers within the basin, Harbin segment (Heilongjiang) of Ashi River was seriously polluted.

**Huaihe River Basin** was mildly polluted. The percentages of national monitoring sections with differed water quality grading were as below- 59.6% at Grade I~III, 28.7% at Grades IV or V, and 11.7% failing Grade V. There were some improvements to the water quality compared with last year. The main contributors to pollution were COD, $BOD_5$, and $COD_{Mn}$.

The mainstream of Huaihe River enjoyed excellent water quality, with 90.0% of the national monitoring sections attaining Grade I~III standard, and 10.0% Grade IV.

The primary tributaries of Huaihe River were mildly polluted. The percentages of national monitoring sections with differed water quality grading were as below-38.1% at Grade I~III, 42.9% at Grades IV or V, and 19.0% poorer than Grade V. The main pollutants were COD, $BOD_5$, and $COD_{Mn}$.

Yihe River, Shuhe River, and Sishui River waters enjoyed excellent surface water quality. 90.9% of the sections under national monitoring program attained Grade I~III standard and 9.1% Grade IV. The water quality was obviously improved compared with last year.

Other waters in the Huaihe River Basin were mildly polluted. 67.7% of the sections under national monitoring program were recorded with water quality between Grades I and III, 22.6% at Grade IV or V, and 9.7% worse than Grade V. The water quality turned much better from a year earlier. The main pollutants were COD, $BOD_5$, and petroleum pollutants.

Among the urban segments of the rivers within the basin, Jinan segment (Shandong) of Xiaoqing River was badly polluted.

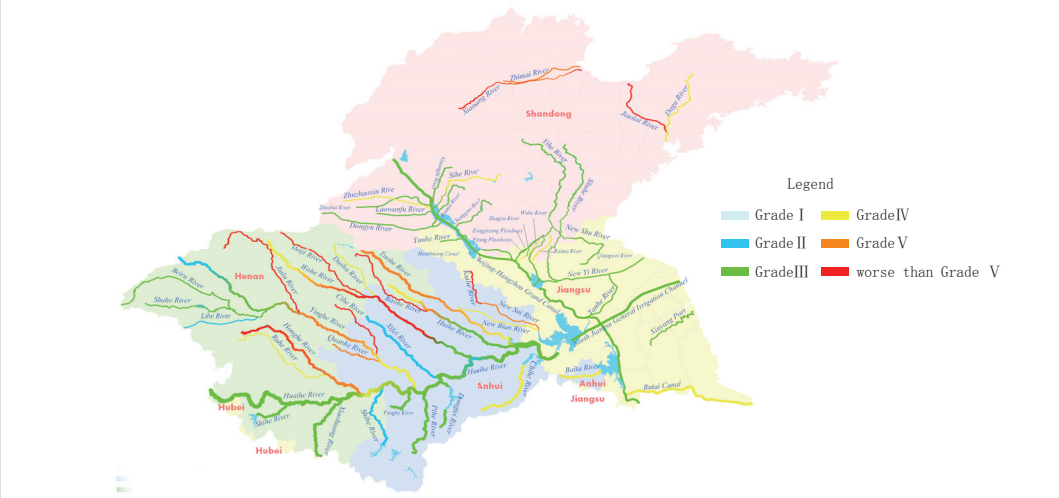



Diagram of graded water quality of Huaihe River Basin in 2013

**Haihe River Basin** was moderately polluted. 39.1% of the sections under national monitoring program were recorded with water quality between Grades I and III, 21.8 % at Grade IV and V, and 39.1% worse than Grade V. There weren't any notable changes to the water quality compared with a year ago. And, the main pollution indicators were COD, $BOD_5$, and TP.

One of the two national monitoring sections in the mainstream of Haihe River attained Grade IV standard, and the other failed Grade V standard. The main pollution indicators included ammonia nitrogen, TP, and $BOD_5$.

The primary tributaries of Haihe River were seriously

polluted. 40.0% of the sections under national monitoring program were recorded with water quality between Grades I and III, 18.0% at Grade IV and V, and 42.0% worse than Grade V. The main pollution indicators were COD, $BOD_5$, and ammonia nitrogen.

Luanhe River waters recorded good surface water quality, with 83.3% of the national monitoring sections attaining Grade I~III national standard and 16.7% attaining Grade IV national standard.

Tuhai-Majia River waters were seriously polluted. Half of the sections under national monitoring program attained Grade IV or V national standard, and the other half failed Grade V standard. The main pollution indicators were COD, $BOD_5$, and petroleum pollutants.

Among the urban segments of the rivers within the basin, Xingtai segment (Hebei) of Fuyang River, Dezhou segment (Shandong) of Chahe River, and Baoding segment (Hebei) of Fuhe River were seriously polluted.

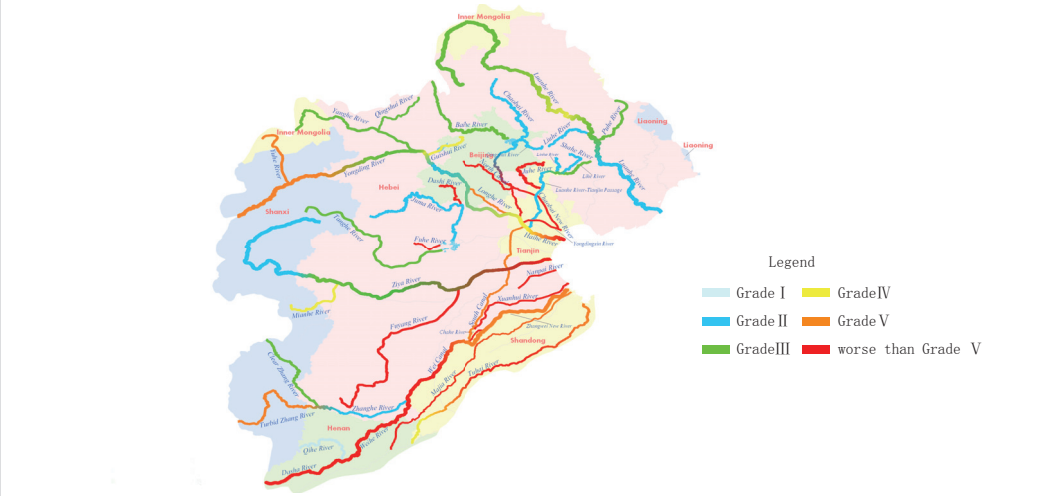



Diagram of graded water quality of Haihe River Basin in 2013

**Liaohe River Basin** was mildly polluted. 45.5% of the sections under national monitoring program were recorded with water quality between Grades I and III standard, 49.1% at Grade IV or V, and 5.4% worse than the Grade V. There were some improvements to the water quality compared with last year. The main pollution indicators were $BOD_5$, petroleum pollutants, and $COD_{Mn}$.

The mainstream of Liaohe River was mildly polluted as well. 28.6% of the sections under national monitoring program attained Grade II or III national standard with regard to surface water quality, 64.3% attained Grade IV or V, and 7.1% failed Grade V. The main pollution indicators included $COD_{Mn}$, $BOD_5$, and petroleum pollutants.

The main tributaries of Liaohe River were moderately polluted. The percentages of national monitoring sections with differed water quality grading were as below-16.7% at Grade III, 50.0% at Grades IV, and 33.3% poorer than Grade V. There were some improvements to the water quality compared with last year. The main contributors to pollution were $BOD_5$, petroleum pollutants, and $COD_{Mn}$.

Daliao River waters witnessed mild pollution. 18.8% of the sections under national monitoring program attained Grades II national standard, and 81.2% attained Grade IV or V. The water quality was somewhat improved compared with a year earlier. The main pollution indicators included petroleum pollutants, $BOD_5$, and ammonia nitrogen.

Daling River waters were mildly polluted as well. 60.0% of the sections under national monitoring program attained Grade II or III national standard, and 40.0% attained Grade IV standard. There were some improvements to the water quality compared with last year. The main contributors to pollution were $BOD_5$, ammonia nitrogen, and COD.

Yalu River waters enjoyed excellent water quality, and all of the national monitoring sections attained Grade I, II or III national standard.

None of the urban segments of rivers within Liaohe River basin was seriously polluted.

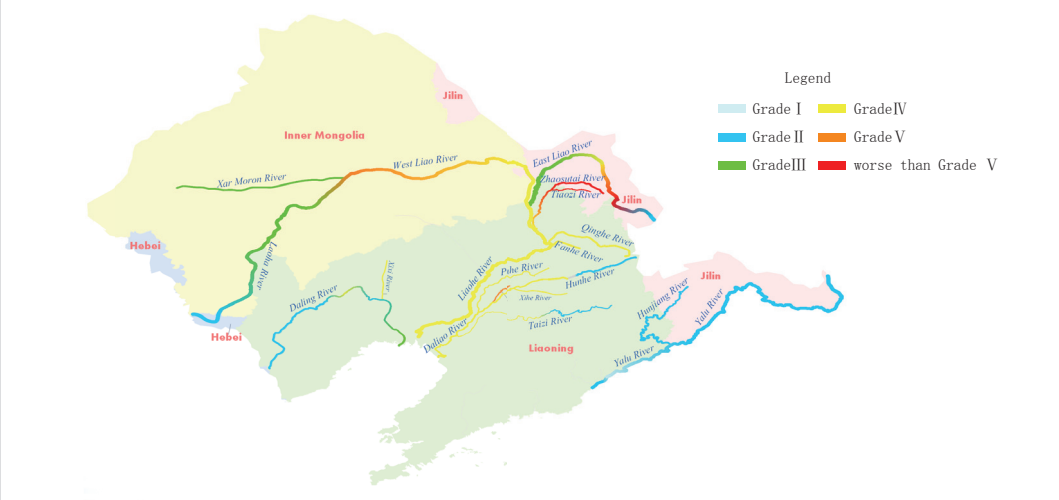



Diagram of graded water quality of Liaohe River Basin in 2013

**Rivers in Zhejiang–Fujian region** had good water quality. 86.7% of the sections under national monitoring program attained Grade I~III national standard, and 13.3% attained Grade IV. There were no notable changes to the water quality against the 2012 data.

Rivers in Zhejiang Province in east China enjoyed good water quality as well. 83.3% of the national monitoring sections were recorded with water quality between Grades I and III, and 16.7% at Grade IV. The water quality was improved compared with last year.

Rivers in Fujian Province in east China also witnessed good water quality. 88.2% of the national monitoring sections were recorded with water quality between Grades I and III, and 11.8% at Grade IV.

All of the four national monitoring sections in Anhui Province in east China attained Grade II or III national standard.

None of the urban segments of the rivers in Zhejiang-Fujian region suffered from serious pollution.


Diagram of graded water quality of rivers in Zhejiang–Fujian Region in 2013

**Rivers in northwest China** enjoyed excellent water quality. 98.0% of the sections under national monitoring program was recorded with water quality between Grades I and III, and 2.0% worse than Grade V standard. There were no notable changes to the water quality compared with last year.

Rivers in Xinjiang Autonomous Region enjoyed excellent water quality as well. 97.8% of the sections under national monitoring program saw water quality between Grades I and III, and 2.2% worse than Grade V standard.

All of the four national monitoring sections of rivers in Gansu Province attained Grade I, II or III national standard.

The only river section under national monitoring program in Qinghai Province attained Grade II national standard.

Among the urban segments of the rivers in northwest China, Kashi segment (Xinjiang) of Kezi River was badly polluted.

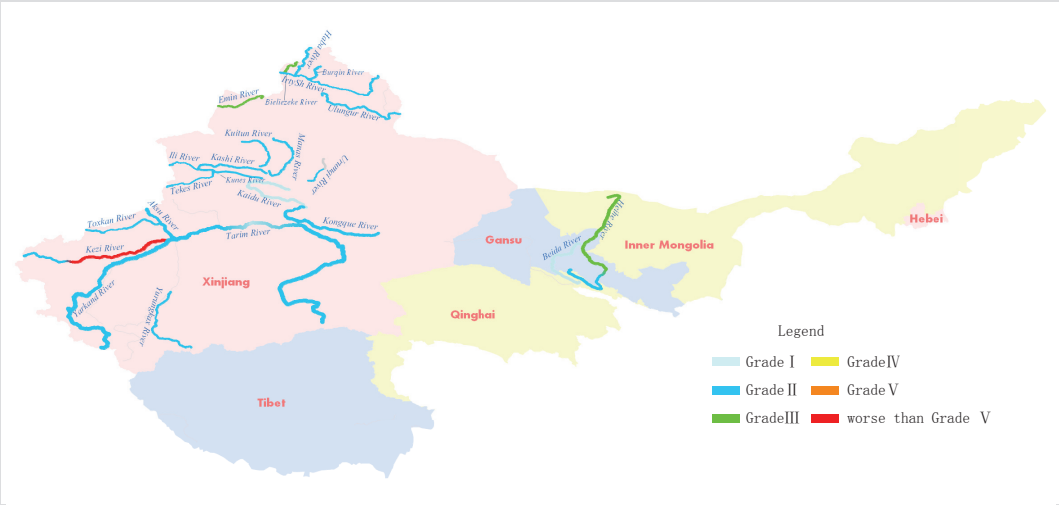



Diagram of graded water quality of rivers in northwest China in 2013

**Rivers in southwest China** enjoyed excellent water quality. All of the sections under national monitoring program attained Grade II or III national standard. There were no notable changes to the water quality compared with last year.

Rivers in Tibet Autonomous Region enjoyed excellent water quality as well. All of the national monitoring sections attained Grade II or III national standard.

Rivers in Yunnan Province also had excellent water quality. All of the national monitoring sections attained Grade II or III national standard.

None of the urban segments of the rivers in southwest China suffered from serious pollution.

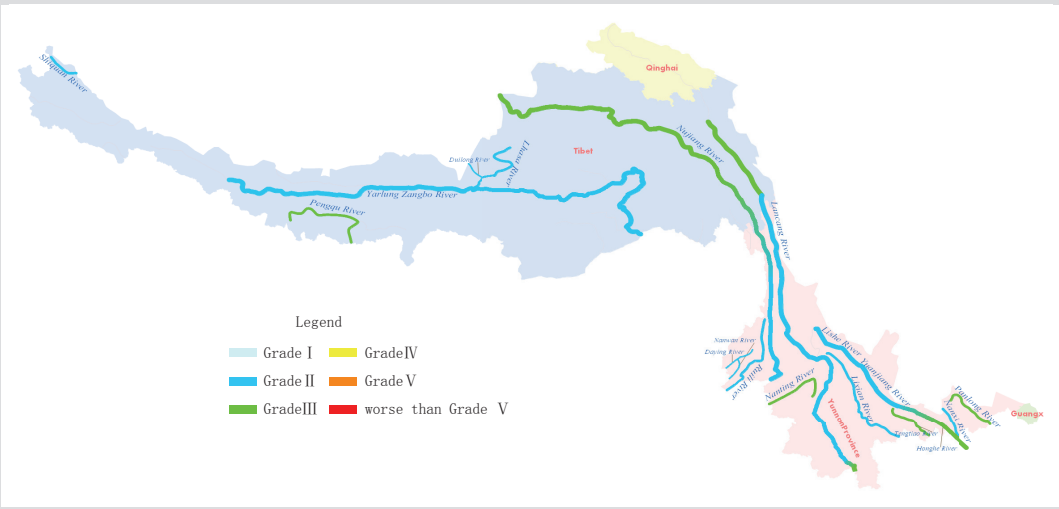
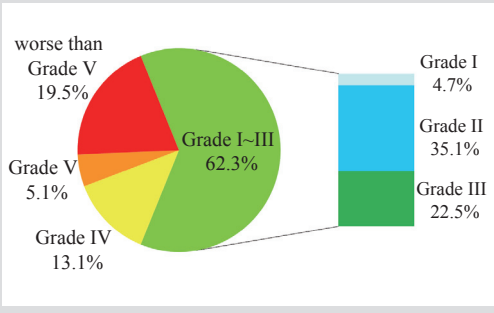



Diagram of graded water quality of rivers in southwest China in 2013

**Waters across provincial boundaries** had average water quality. The percentages of national monitoring sections with differed water quality grading were as below- 62.3% at Grade I~III, 18.2% at Grades IV or V, and 19.5% poorer than Grade V. There were no obivious changes to the water quality against 2012 baseline. The main contributors to pollution were ammonia nitrogen, COD, and $COD_{Mn}$.




Percentage of graded water quality of waters across provincial boundaries in 2013

Water quality of sections across provincial boundaries in 2013

| Basin | Section pct. (%) | | Geographical distribution of sections failing to attain Grade Ⅴ national standard with regard to surface water quality |
|---|---|---|---|
| | Grade Ⅰ~Ⅲ | Worse than Grade Ⅴ | |
| Yangtze River | 78.0 | 7.5 | Xinzhuang River section at Yunnan-Sichuan boundary; Wujiang River section at Guizhou-Chongqing boundary; Qingliu River section at Anhui-Jiangsu boundary; Niulang Lake section at Hubei-Hunan boundary; Huangqu River section at Henan-Hubei boundary; Liuhe River and Wusong River sections at Jiangsu-Shanghai boundary; sections of Fengjing Pond, Puze Pond, Mianzhanggang River, Huanggu Pond, Huigaojing River, Liuli Pond, and Shanghai Pond at Zhejiang-Shanghai boundary; as well as sections of Changsangang River and Dade Pond at Jiangsu-Zhejiang boundary. |
| Yellow River | 45.3 | 33.3 | Sections of Huangpu River, Gushan River, Kuye River, and Ziniu River at Inner Mongolia-Shaanxi boundary; sections of Hulu River, Yuhe River, and Ruhe River at Ningxia-Gansu boundary; sections of Weifen River, Qiushui River, Sanchuan River, Ehe River, Fenhe River, Sushui River, and Caohe River meeting Yellow River in Shanxi; sections of Huangpu River, Gushan River, Qingjian River, Yanhe River, Jinshuigou River, and Weihe River meeting Yellow River in Shaanxi; sections of Shuangqiao River and Hongnongjian River meeting Yellow River in Henan. |
| Pearl River | 85.1 | 6.4 | Shenzhen river Section at Guangdong-Hong Kong boundary; Wanzai Waterway section at Guangdong-Macau boundary. |
| Songhua River | 73.5 | —— | —— |
| Huaihe River | 31.4 | 25.5 | Sections of Hongru River, Nanming River, Huiji River, Dasha River (Xiaohong River), Tuohe River, and Baohe River at Henan-Anhui boundary; sections of Kuihe River, Guangou River, and Yanhe River at Jiangsu-Anhui boundary; sections of southern tributary of Guangou River and Fuxin River at Anhui-Jiangsu boundary; and sections of Huangnigou River, and Qingkou River at Shandong-Jiangsu boundary. |
| Haihe River | 27.1 | 62.7 | Sections of Chaobai River, North Canal, Juhe River, Fenggangjian River, Xiaoqing River, and Dashi River at Beijing-Hebei boundary; sections of Chaobai River, Jiyun River, North Canal, Juhe River, Huanxiang River, Shuangcheng River, Daqing River, Qingjinghuang Drainage Channel, Ziya River, Ziya New River, North Drainage River, and Canglang River at Hebei-Tianjin boundary; sections of Weihe River and Majia River at Henan-Hebei boundary; section of Tuhai River at Henan-Shandong boundary; sections of Weiyun River and Zhangwei New River at Hebei-Shandong boundary; and sections of Sanggan River and Nanyang River at Shanxi-Hebei boundary. |
| Liaohe River | 21.4 | 42.9 | Xinkai River section at Jilin-Inner Mongolia boundary; sections of Yinhe River and Laoha River at Hebei-Inner Mongolia boundary; section of East Liao River at Liaoning-Jilin boundary; and sections of Zhaosutai River and Tiaozi River at Jilin-Liaoning boundary. |
| Rivers in southeast China | 100.0 | —— | —— |
| Rivers in southwest China | 100.0 | —— | —— |

## Lakes (Reservoirs)

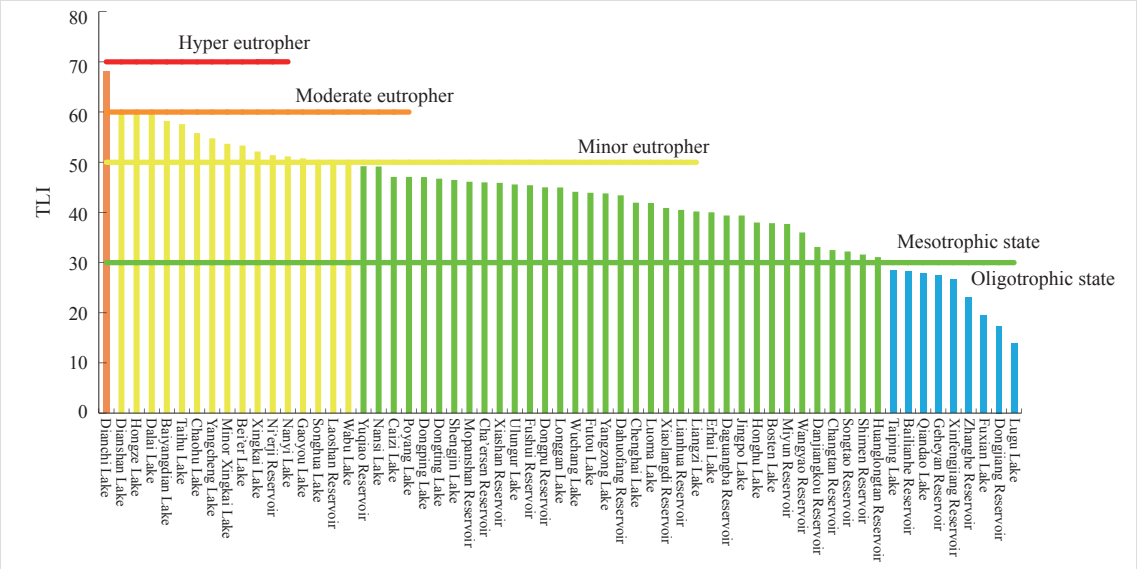
Up to 60.7% of the major lakes (reservoirs) under national monitoring program enjoyed excellent or good water quality, and 26.2% suffered from mild pollution, 1.6% from moderate pollution, and 11.5% from serious pollution this year. There were not any notable variations to the percentage distribution of the lakes (reservoirs) with differed water quality grading, compared with a year earlier. The main pollutant indicators were TP, COD, and $COD_{Mn}$.

Up to 27.8% of the monitored lakes (reservoirs) were in eutrophic state, 57.4% in mesotrophic state, and 14.8% in oligotrophic state.

Graded water quality of major lakes (reservoirs) in 2013

| Lake/reservoir type | Excellent | Good | Mild pollution | Moderate pollution | Serious pollution |
|---|---|---|---|---|---|
| Three lakes* | 0 | 0 | 2 | 0 | 1 |
| Major lakes | 5 | 9 | 10 | 1 | 6 |
| Major reservoirs | 12 | 11 | 4 | 0 | 0 |
| Total | 17 | 20 | 16 | 1 | 7 |

* i.e., Taihu Lake, Dianchi Lake, and Chaohu Lake.




Trophic Level Index (TLI) of major lakes (reservoirs) in 2013

**Taihu Lake** was mildly polluted. No notable changes were observed with regard to the lake's water quality compared with a year earlier. The main pollution indicators were TP and COD. Geographical analysis indicated that the western shore waters were moderately polluted, while the northern shore, lake center, eastern shore, and southern shore waters were mildly polluted.

Minor eutropher was recorded with the lake as a whole. Geographical analysis indicated moderate eutropher in the western shore waters and minor eutropher in the northern shore, lake center, eastern shore, and southern shore waters.

Among the major contributing rivers of the lake, Wuxi River, Chendonggang River, Hongxianggang River, Yincungang River, Baidugang River, Taige Canal, and Liangxi

River were mildly polluted, and others enjoyed excellent or good water quality. Among the major outflow rivers, Huguang River and Sudong River was observed with good water quality, while Xujiang River and Taipu River recorded with excellent.

**Chaohu Lake** was mildly polluted. No notable changes were observed with regard to the lake's water quality compared with a year earlier. The main pollution indicators were TP and COD. Geographical analysis indicated moderate pollution in the western half of the lake and mild pollution in the eastern.

Minor eutropher was recorded with the lake as a whole, and geographical analysis indicated moderate eutropher in the western half of the lake and minor eutropher in the eastern.

Among the major inflow rivers, Nanfei River, Shiwuli River, and Paihe River were recorded with serious pollution, and others enjoyed good water quality. The major outflow river Yuxi River had good water quality as well.

**Dianchi Lake** was seriously polluted. There were no notable changes to the lake's water quality compared with last year. The main pollution indicators were COD, TP, and $COD_{Mn}$. Geographical analysis showed Caohai Lake and Waihai Lake were also seriously polluted.

The lake as a whole was recorded with moderate eutropher, so did Caohai Lake and Waihai Lake.

Among the major contributing rivers of the lake, Panlong River, Xinhe River, Laoyunliang River, Haihe River, Wulong River, Jinzhi River, Chuanfang River, Daguan River, Laoyu River, and Xiba River were seriously polluted; Baoxiang River, Chaihe River, and Zhonghe River were moderately polluted; Maliao River and Dongda River were mildly polluted; and Luolong River enjoyed excellent water quality.

**Major lakes** Among the 31 large freshwater lakes in China, Dianshan Lake, Dalai Lake, Baiyangdian Lake, Bei'er Lake, Ulungur Lake, and Chenghai Lake were badly polluted; Hongze Lake was moderately polluted; Yangcheng Lake, Minor Xingkai Lake, Xingkai Lake, Caizi Lake, Poyang Lake, Dongting Lake, Longgan Lake, Yangzong Lake, Jingpo Lake, and Bosten Lake were mildly polluted; and the remaining 14 lakes enjoyed excellent or good water quality this year. Among others, Gaoyou Lake, Nansi Lake, Shengjin Lake, and Wuchang Lake had improved water quality, while Poyang Lake and Jingpo Lake saw deteriorating water quality compared with last year.

Dianshan Lake, Hongze Lake, Dalai Lake, Baiyangdian Lake, Yangcheng Lake, Minor Xingkai Lake, Bei'er Lake, Xingkai Lake, Nanyi Lake, Gaoyou Lake, and Wabu Lake experienced minor eutropher, and other lakes were in mesotrophic or oligotrophic state.

**Major reservoirs** Among the 27 major reservoirs, Ni'erji Reservoir was slightly polluted, with the main pollutants as TP and $COD_{Mn}$; Lianhua Reservoir, Dahuofang Reservoir, and Songhua Lake were slightly polluted as well, with the main pollutants being TP. The other 23 reservoirs enjoyed excellent or good water quality.

Minor eutropher was recorded in Laoshan Reservoir, Ni'erji Reservoir, and Songhua Lake, while other reservoirs were in either mesotrophic or oligotrophic state.

## Centralized Source Water Areas in Chinese Cities at or above Prefectural Level[①]

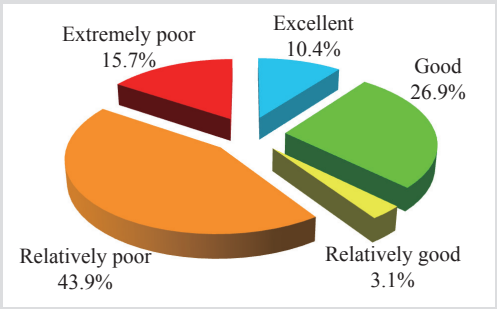
Statistical data on water intake were available this year for 835 centralized source water areas distributed in 309 cities at or above prefectural level. The combined water intake amounted to 30.67 bn. t the whole year, which had been supplied to 306 mil. people; among others, 29.84 bn. t attained national standard with regard to surface water quality, accounting for 97.3%. The main nonattainment indicators of surface source waters were TP, manganese, and ammonia nitrogen, whereas those of the underground source waters turned out to be iron, manganese, and ammonia nitrogen.

## Groundwater

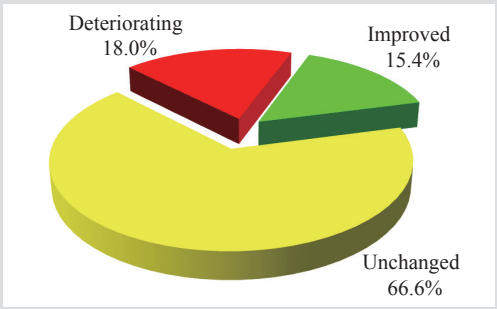
There were 4,778 sites designated for monitoring groundwater environment quality in China this year, 800 of which were state-level sites. Monitoring data found 10.4% of those monitoring sites with excellent, 26.9% with good, 3.1% with relatively good, 43.9% with relatively poor, and 15.7% with extremely poor water quality. The main nonattainment indicators were total hardness, iron, manganese, total dissolved solids, nitrite, nitrate, ammonia nitrogen, sulphate, fluoride, and chloride, etc.

There were 4,196 monitoring sites distributed in 185 cities for which continuous monitoring data were kept with regard to groundwater quality. Data showed the groundwater quality in most of the sites remained unchanged compared with last year. The groundwater quality in 15.4% of the monitoring sites was improved, in 66.6% remained unchanged, and in 18.0% was deteriorating.

① Some prefectures, autonomous prefectures, leagues, and province-governed cities included, sic passim.




Groundwater quality at monitoring sites in China in 2013




Year–on–year change of groundwater quality in China in 2013

## Major Water Conservancy Projects

**Three Gorges Project Area** The mainstream of the Yangtze River enjoyed good water quality. All of the three sections under national monitoring program attained Grade III national standard. Up to 90.7% of the sections of the primary tributaries failed to attain national standard with regard to total nitrogen (TN), and 77.9% of them failed to attain national standard for TP. The TLI of the tributary waters ranged between 28.8 and 73.0, and 26.6% of the monitored sections were found with eutropher. The dominant species of algal blooms included Cyclotella of Bacillariophyta, Oscillatoria and Microcystis of Cyanophyta, Peridinaceae of Pyrrophyta, and Cryptomonas of Cryptophyta.

**South-to-North Water Diversion Project (Eastern route)** Sanjiangying Section of Jiajiang River, the water intake of the eastern route from Yangtze River, attained Grade III national standard. Along the mainstream of the route, the Inner Canal, Baoying segment, Suqian segement, South Shandong segment, Hanzhuang segment, and Liangji segment of the Grand Canal enjoyed good water quality. Liangji segment saw improved water quality, while other segments remained unchanged in water quality.

Hongze Lake waters suffered moderate pollution, with the main pollutant as TP and the trophic state as minor eutropher. Luoma Lake, Nansi Lake, and Dongping Lake enjoyed good water quality and were in mesotrophic state. Yihe River which empties into Luoma Lake was recorded with good water quality as well. Among the 11 rivers emptying into Nansi Lake, Zhuzhao New River was mildly polluted with the main pollutants as COD and petroleum pollutants, and the rest saw good water quality. Dawen River which also flows into Dongping Lake was also recorded with good water quality.

**South-to-North Water Diversion Project (Middle route)** Taocha Section at the water intake of the middle route attained Grade II national standard with regard to water quality. Danjiangkou Reservoir enjoyed excellent water quality and was in mesotrophic state. All of the 9 tributary rivers that empty into Danjiangkou Reservoir were observed with excellent or good water quality. The water quality of Tianhe River, Guanshan River, and Laoguan River was deteriorating, while that of other rivers had no obvious changes against last year.

## Inland Fishery Waters

The main pollution indicators of valuable fishery waters in rivers were TN, TP, un-ionized ammonia (UIA), $COD_{Mn}$, and copper this year. The TN and TP concentration in some fishery waters of Yellow River, Yangtze River, Heilongjiang River and Pearl River basins; the UIA concentration in some fishery waters of Yellow River and Heilongjiang River basins; the $COD_{Mn}$ concentration in several fishery waters of Heilongjiang River and Yellow River basins; and the copper concentration in fishery waters of Yellow River exceeded the pollution limits by a relatively large margin. The concentration of copper slightly exceeded the upper limit in some fishery waters of Yangtze River. Excessive concentration of TP, UIA, $COD_{Mn}$, petroleum pollutants, and copper was observed in additional waters, while excessive concentration of TN and volatile phenol was recorded on a smaller scale compared with the previous year.

The main pollution indicators of valuable fishery waters in lakes (reservoirs) were TN, TP, $COD_{Mn}$, petroleum pollutants, and copper this year. The concentration of TP, TN, and $COD_{Mn}$ overshoot the upper limit by a larger margin than other pollutants. Excessive concentration of petroleum pollutants, copper, and $COD_{Mn}$ was recorded on a smaller scale, while excessive concentration of TN, TP, and volatile phenol was

observed in additional waters compared with a year earlier.

The main pollution indicator of national aquatic germplasm resources conservation areas (freshwater) was mostly TN, and in part of the areas, TP, $COD_{Mn}$, and copper.

### Municipal Drainage and Wastewater Treatment

Up to 89.21% of the municipal wastewater had been treated before being discharged into the environment by the end of the year. Municipal wastewater treatment plants were available to all of the municipalities that administer one or more county-level cities, except Xigaze Municipality of Tibet and Sansha Municipality of Hainan. Their combined wastewater treatment capacity amounted to 124 mil. $m^3$/d. Up to 0.17 mil. km rainwater drainage pipes, 0.191 mil. km sewage pipes, and 0.103 mil. km rainwater-sewage pipes were completed and put into operation this year. The environmentally sound sludge disposal capacity increased by 10.42 mil. t/d. The wastewater reclamation capacity went up 17.52 mil. $m^3$/d.

## Measures and Actions

**【Prevention and control of water pollution】** The State Council adopted and promulgated the *Work Programme on Prevention and Control of Groundwater Pollution in North China Plain*, and in accordance with the judicial interpretations of the Supreme Court and Supreme People's Procuratorate, worked harder on the intensive inspection on industrial wastewater discharge, and strictly investigated illegal activities including discharging and dumping toxic pollutants containing wastewaters through seepage wells, pits, cracks and karst caves. The *Regulations on Municipal Drainage and Wastewater Treatment* was promulgated as well, and *Opinions of the State Council on Strengthening Urban Infrastructure Development* and *Circular of the State Council General Office on Doing a Good Job in Municipal Drainage and Flood-proof Infrastructure Construction* were circulated, coming up with explicit requirements with regard to the municipal drainage and flood prevention, and wastewater treatment. The performances of 25 provinces (autonomous regions, and municipalities directly under the Central Government) in 2012 were evaluated with regard to their implementation of specific plans for water pollution control in key basins; those localities are located in 9 basins including Huaihe River, Haihe River, Liaohe River, Songhua River, Chaohu Lake, Dianchi River, Three Gorges Project area and its upstream, upstream and midstream of Yellow River, as well as midstream and downstream of Yangtze River. The report on evaluation of the environmental conditions of centralized source water areas in Chinese cities at or above prefectural level in 2012 was concluded, assessing the environmental conditions of 844 centralized source water areas distributed in 328 cities at or above prefectural level.

**【Progress in implementation of the National Major Science and Technology Program for Water Pollution Control and Governance】** Twenty-one projects and 33 research subjects were initiated this year under the framework of National Major Science and Technology Program for Water Pollution Control and Governance; they were integrated and demonstrated in key basins such as Taihu Lake basin, Liaohe River basin, Dianchi Lake basin, and Songhua River basin. Positive progress has been made in the research and development of key technologies with regard to ecological restoration of waters, pollution reduction and decontamination at the source, urban water pollution control, essential materials and devices for guarantee of safe drinking water, and water environment monitoring and policy decision-making.

# Marine Environment

## General Situation

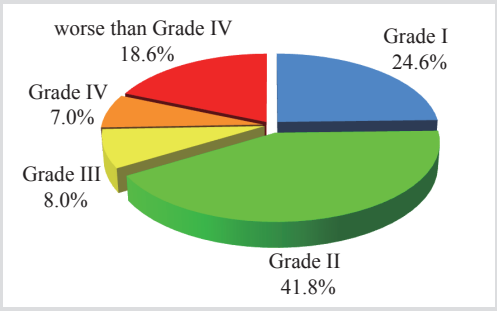
The marine environment condition of Chinese sea areas was good at large in 2013, whereas the water quality of nearshore sea areas was average.

### All Sea Areas

The marine environment of all of the sea areas in China was in good conditions, with about 95% of the sea areas attaining Grade I standard for seawater quality.

### Nearshore Sea Areas

The seawater quality of nearshore sea areas in China was average this year. Up to 66.4% of the monitoring sites attained Grade I or II national standard, down 3.0 percentage points from a year earlier; 15.0% attained Grade III or IV standard, up 3.0 percentage points from the previous year; and 18.6% failed the Grade V standard, the same as last year. The main pollutants were inorganic nitrogen and active phosphate.




Percentage of graded seawater quality in nearshore sea areas in China in 2013

**Bohai Sea** The seawater quality of nearshore sea areas was average. Up to 63.2% of the monitoring sites attained Grade I or II national standard, down 4.1 percentage points from a year earlier; 30.7% attained Grade III or IV standard, up 10.2 percentage points; and 6.1% failed Grade IV standard, down 6.1 percentage points. The main pollution indicators were inorganic nitrogen, lead, and nickel.

**Yellow Sea** The seawater quality of nearshore sea areas was good. Up to 85.2% of the monitoring sites attained Grade I or II national standard, down 1.8 percentage points from a year earlier; 14.8% attained Grade III or IV standard, also up 1.8 percentage points. None of the monitoring sites failed the Grade V standard, the same case as last year. The main pollution indicators were inorganic nitrogen and petroleum pollutants.

**East China Sea** The nearshore sea areas were recorded with extremely poor water quality. 30.5% of the monitoring sites attained Grade I or II national standard, down 7.4 percentage points from a year earlier; 20.0% attained Grade III or IV standard, up 4.2 percentage points; and 49.5% failed Grade IV standard, up 3.2 percentage points. The main pollution indicators were inorganic nitrogen, active phosphate, and BOD.

**South China Sea** The seawater quality of nearshore sea areas was good. Up to 91.3% of the monitoring sites attained Grade I or II national standard, up 1.0 percentage point from a year earlier; 2.9% attained Grade III or IV standard, down 1.0 percentage point; and 5.8% failed Grade IV standard, the same as last year. The main pollution indicators were inorganic nitrogen, active phosphate and pH value.

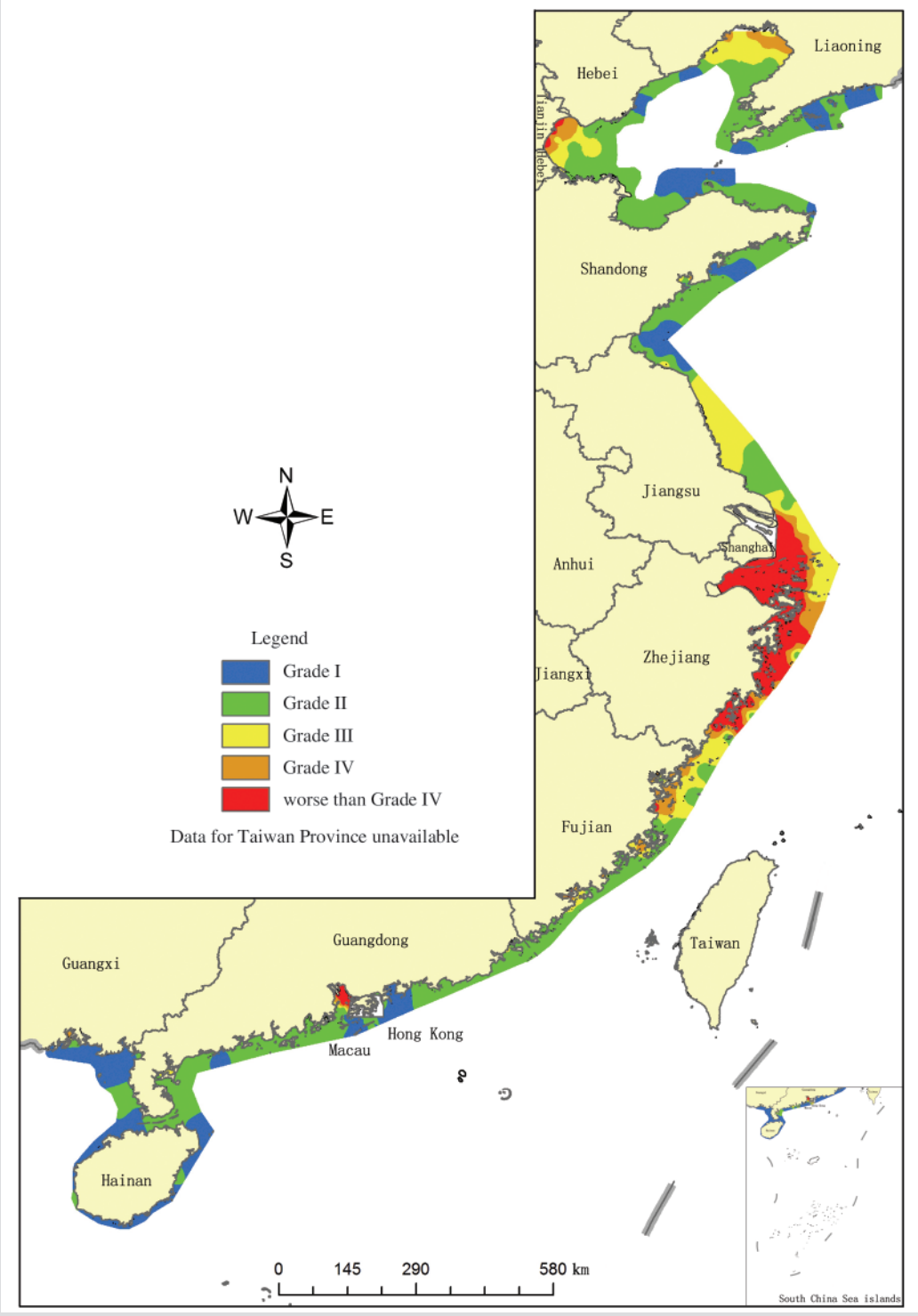
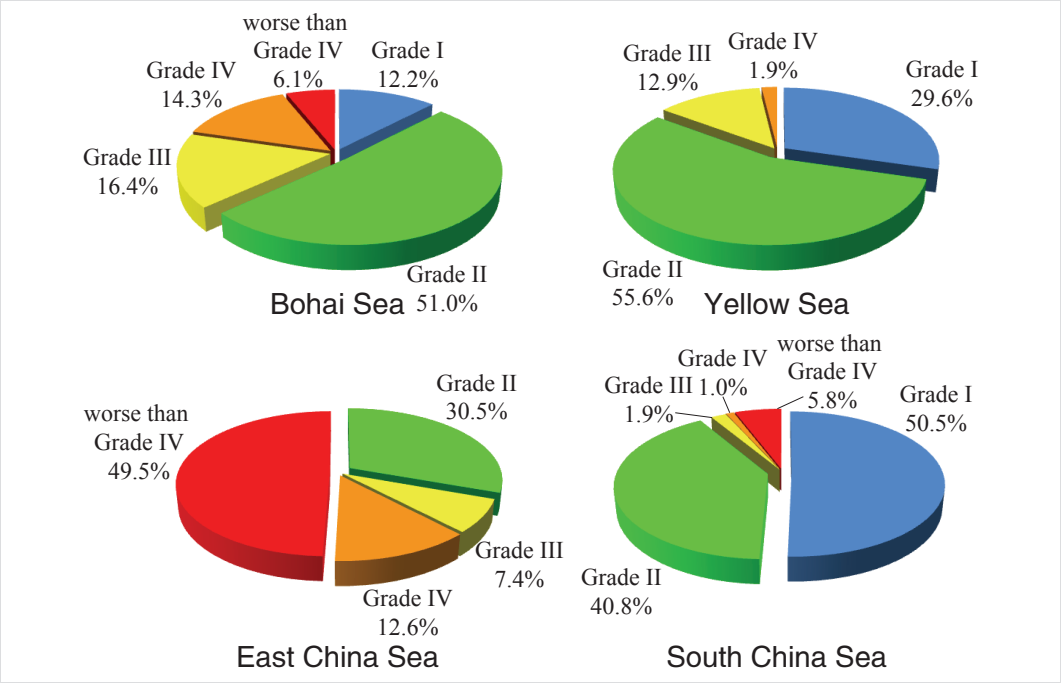


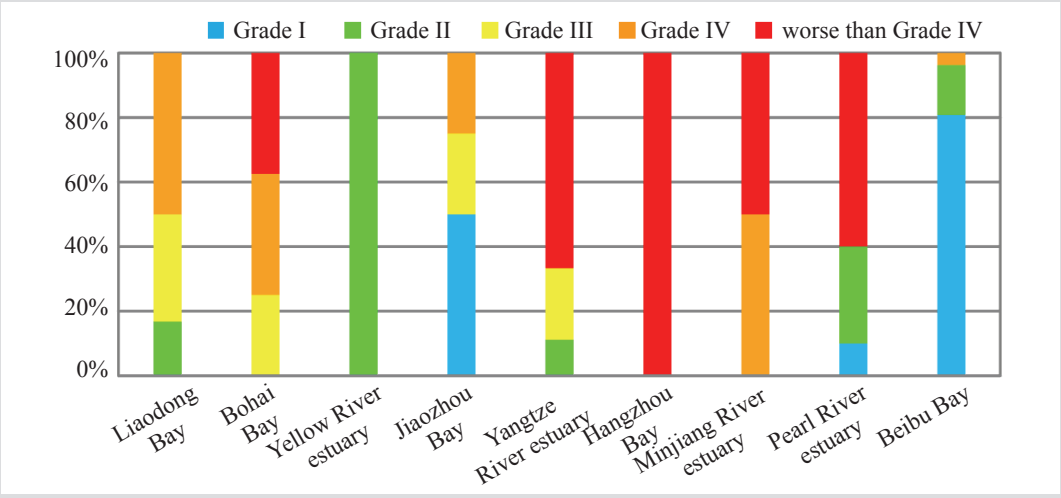

Diagram of graded nearshore seawater quality in China in 2013



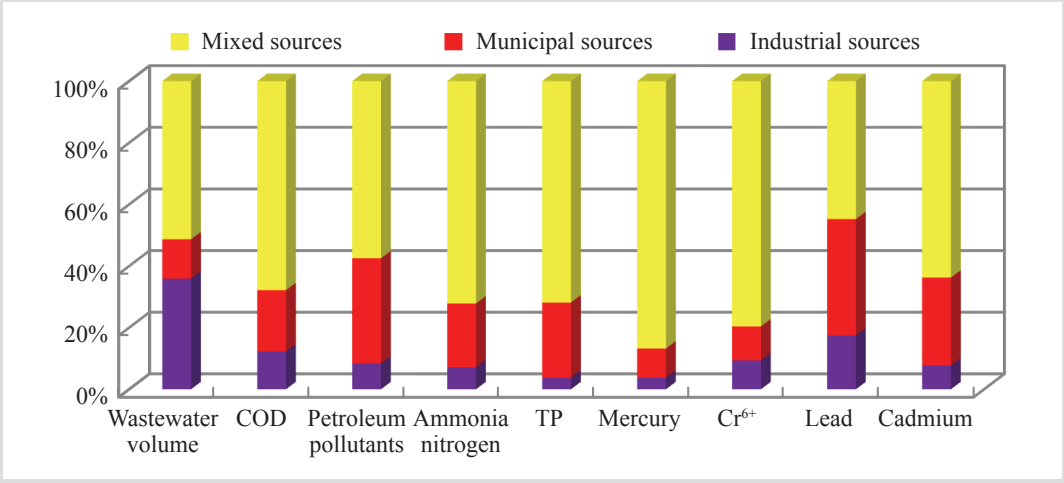

Percentage of graded nearshore seawater quality of four major seas in China in 2013

**Major bays** Among the nine major bays, Beibu Bay enjoyed excellent water quality, the Yellow River estuary was recorded with good water quality, Liaodong Bay, Bohai Bay, and Jiaozhou Bay with poor water quality, and the Yangtze River estuary, Hangzhou Bay, and the Minjiang River estuary and Pearl River estuary with extremely poor water quality. Beibu Bay and Bohai Bay had improved water quality, the estuaries of Yellow River and Minjiang River saw deteriorating water quality, and the water quality of other bays remained unchanged compared with last year.

**Land-based pollutants** Around 6.384 bn. t of wastewater was discharged altogether this year by 423 monitored pollution




Seawater quality of major bays in 2013




Main pollutants discharged directly into Chinese seas in 2013

Main pollutants discharged directly into four major Chinese seas in 2013

| Item / Sea | Wastewater ( 100 mil. t ) | COD ( 10,000 t ) | Petroleum pollutants ( t ) | Ammonia nitrogen ( 10,000 t ) | TP ( t ) |
|---|---|---|---|---|---|
| Bohai Sea | 2.06 | 1.2 | 36.2 | 0.2 | 180.4 |
| Yellow Sea | 11.04 | 5.5 | 235.8 | 0.4 | 662.0 |
| East China Sea | 37.45 | 11.9 | 861.6 | 0.8 | 1046.9 |
| South China Sea | 13.29 | 3.5 | 501.9 | 0.4 | 951.8 |

sources discharging directly into seas at a rate above 100 $m^3/d$; those sources are industrial sources, municipal sources and mixed sources. The discharged pollutants included 0.221 mil. t COD, 1,636 t petroleum pollutants, 16,900 t ammonia nitrogen, 2,841 t TP, 213 kg mercury, 1,908 kg $Cr^{6+}$, 7,681 kg lead, and 392 kg cadmium.

## Marine Sediments

The marine sediments of Chinese sea areas had good quality in 2013 at large. In nearshore sea areas, data from 89% of the monitoring stations showed the marine sediments attained Grade I national standard in respect of copper content, while data from over 95% of those stations showed marine sediments attained Grade I national standard in respect of other monitoring indicators.

## Marine Fishery Waters

The main pollution indicators for the spawn sites, feeding sites, migration passages and nature reserves of major sea fish, shrimp, and shellfish species were inorganic nitrogen and active phosphate in 2013. The concentration of inorganic nitrogen and active phosphate at Yangtze River estuary, of the inorganic nitrogen at Pearl River estuary, and of active phosphate at Hangzhou Bay exceeded the upper limit of relevant national standards by a relatively large margin. Excessive active phosphate, petroleum pollutants, and COD were observed on a smaller scale in Chinese sea areas than last year, while the extent of sea areas with excessive inorganic nitrogen, copper, zinc, and mercury varied little from a year earlier.

The main pollution indicators of the major marine aquaculture plots were inorganic nitrogen and active phosphate as well. The concentration of inorganic nitrogen and of active phosphate was farther beyond the upper limit set by relevant standards in some aquaculture waters in East

China Sea and South China Sea. Excessive inorganic nitrogen, active phosphate, and petroleum pollutants were observed on a smaller scale in Chinese sea areas than last year, while the extent of sea areas with excessive COD, copper, cadmium, and mercury varied little from a year earlier.

The main pollution indicators of the sediments of major marine fishery waters were petroleum pollutants and copper. The concentration of petroleum pollutants in some fishery waters of South China Sea and of copper in some fishery waters of East China Sea exceeded the upper limit of relevant national standards by a relatively large margin.

The main pollution indicators of national aquatic germplasm resources conservation areas (marine) were inorganic nitrogen and active phosphate.

## International Cooperation on Environmental Protection

The authority has held National Meeting on Environmental International Cooperation and printed out and distributed the *Outline of International Cooperation on Environmental Protection in the "12th Five-Year Plan" Period*, *Program on the Implementation of International Environmental Conventions in the "12th Five-Year Plan" Period* and the *Program of International Cooperation on Nuclear and Radiation Safety in the "12th Five-Year Plan" Period*. In 2013, President Xi Jinping witnessed twice the signing of environmental cooperation documents between China and France and between China and Kenya. Premier Li Keqiang officially put forward the Initiative for China-ASEAN Cooperation on Environmental Industry, which has been included in the outcomes of the 16th China-ASEAN Summit. The State Council officially approved the establishment of China-Shanghai Cooperation Organization Center for Environmental Cooperation. The Eighth Meeting of China-Russia Subcommittee on Environmental Protection, the Fourth Meeting of Sino-US Joint Commission on Environmental Cooperation, the Fifth China-EU Ministerial Dialogue on Environmental Policy and the Third Meeting of China-Kazakhstan Committee on Environmental Protection have been successfully held in China. China has successfully finished the activities of attending the 15th Tripartite Environment Ministers Meeting, the 12th ASEAN 10+3 Environment Ministers Meeting, 2013 UN South-South Development Expo and the Fourth China-Germany Environment Forum. Ministry of Environmental Protection has won the "United Nations South-South Cooperation Award" granted by United Nations Office for South-South Cooperation. The Fourth Meeting of the 12th NPC Standing Committee has reviewed and approved the New Nine POPs Amendment and New Endosilfan Amendment of the Stockholm Convention. China has successfully completed the negotiation on the Minamata Convention on Mercury and officially signed the convention at the Conference of Plenipotentiaries of Minamata Convention on Mercury. China is one of the first group of countries having signed the Convention. China has actively attended the joint COP of the Basel Convention, Rotterdam Convention and Stockholm Convention, the 25th Conference of Parties of the Montreal Protocol. It has taken part in the negotiations on multilateral environmental conventions such as SBSTTA meeting of the Convention on Biological Diversity and the Plenary Session of Intergovernmental Science-Policy Platform for Ecosystem Services. China has finished the compilation of the 6th National Report on the Convention on Nuclear Safety and submitted it to IAEA for review.

# Atmospheric Environment

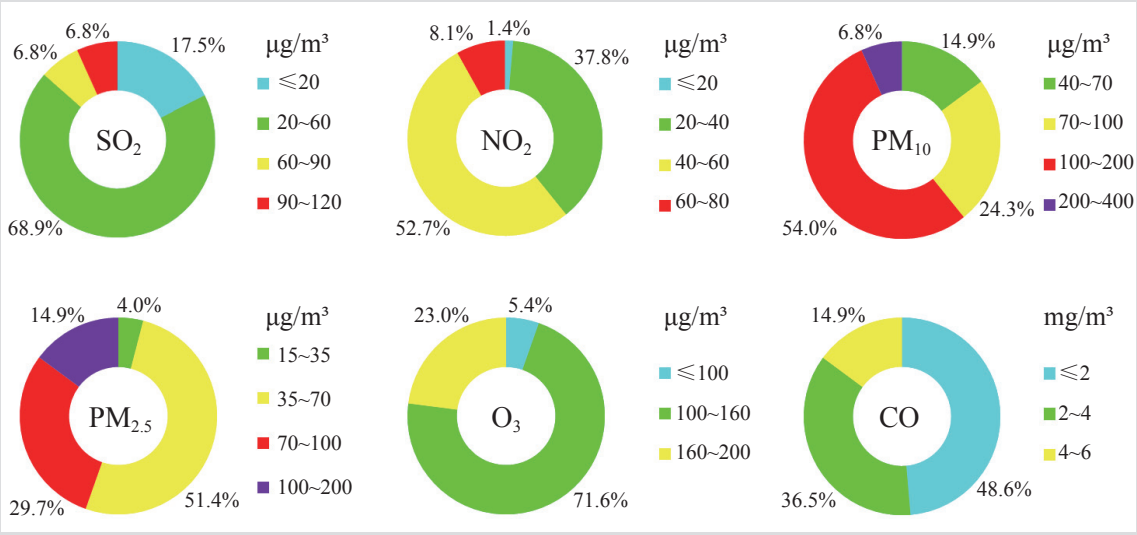
## General Situation

The ambient air quality was not optimistic in Chinese cities this year. The acid rain pollution situation remained unchanged but still serious.

### Air Quality

**Seventy-four cities scheduled to enforce new ambient air quality standards at Stage I** A total of 74 Chinese cities including cities seated in Beijing-Tianjin-Hebei region, Yangtze River delta, and Pearl River delta, as well as municipalities directly under the Central Government, provincial capital cities and cities listed separately in State plans, enforced the new ambient air quality standards in 2013 as scheduled. Among them, only three cities Haikou, Zhoushan, and Lhasa attained air quality standards, which accounted for 4.1%, the nonattainment cities reached 95.9%, based on the mean annual reading of $SO_2$, $NO_2$, $PM_{10}$, and $PM_{2.5}$, mean daily reading of CO, and the mean daily value of the maximum 8-hour $O_3$ reading measured in accordance with *Ambient Air Quality Standards (GB 3095-2012)*. According to the ranking of cities with good air quality, the top 10 cities were Haikou, Zhoushan, Lhasa, Fuzhou, Huizhou, Zhuhai, Shenzhen, Xiamen, Lishui, and Guiyang, and according to the ranking of cities with poor air quality, the top 10 cities were Xingtai, Shijiazhuang, Handan, Tangshan, Baoding, Jinan, Hengshui, Xi'an, Langfang, and Zhengzhou.

Analysis of specific indicators found the mean annual concentration of $SO_2$ ranged between 7 μg/m$^3$ and 114 μg/m$^3$ among those cities and averaged 40 μg/m$^3$, and 86.5% of those cities attained air quality standard with regard to $SO_2$; the mean annual concentration of $NO_2$ ranged between 17 μg/m$^3$ and 69 μg/m$^3$ and averaged 44 μg/m$^3$, and 39.2% of those cities attained air quality standard with regard to $NO_2$; the mean annual concentration of $PM_{10}$ ranged between 47 μg/m$^3$ and 305 μg/m$^3$ and averaged 118 μg/m$^3$, and 14.9% of those cities attained air quality standard with regard to $PM_{10}$; the mean

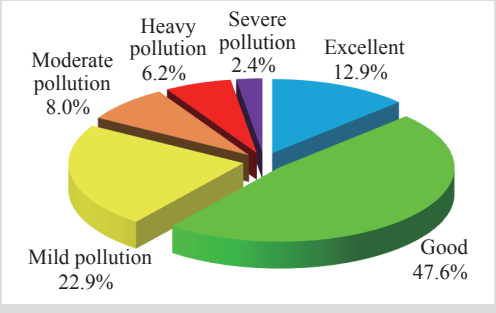



Percentage of ranges of pollution indicator readings among the 74 cities scheduled to enforce the new ambient air quality standards in 2013 at Stage I

annual concentration of $PM_{2.5}$ ranged between 26 μg/m$^3$ and 160 μg/m$^3$ and averaged 72 μg/m$^3$, and 4.1% of those cities attained air quality standard with regard to $PM_{2.5}$; the 90$^{th}$-percentile value of the mean daily value of the maximum 8-hour $O_3$ reading ranged between 72 μg/m$^3$ and 190 μg/m$^3$ among those cities and averaged 139 μg/m$^3$, and 77.0% of those cities attained air quality standard with regard to $O_3$; the 95$^{th}$-percentile value of the mean daily concentration of CO ranged between 1.0 mg/m$^3$ and 5.9 mg/m$^3$ among those cities and averaged 2.5 mg/m$^3$, and 85.1% of those cities attained air quality standard with regard to CO.

The percentage of ambient air quality attainment days averaged out at 60.5% among the 74 cities, and of nonattainment days at 39.5%. The percentage of attainment days ranged between 80% and 100% in 10 cities, between 50% and 80% in 47 cities, and below 50% in 17 cities.

**Three key regions** None of the cities seated in Beijing-Tianjin-Hebei region or Pearl River delta attained air quality standards this year. Among cities in Yangtze River delta, only Zhoushan attained air quality standards with regard to all of the six monitored pollutants.




Average percentage of the number of days with a certain air quality grading among the 74 cities scheduled to enforce the new ambient air quality standards in 2013 at Stage Ⅰ

Number of attainment cities with regard to the six pollutants in key regions in 2013

| Region | Total No. of cities | $SO_2$ | $NO_2$ | $PM_{10}$ | CO | $O_3$ | $PM_{2.5}$ | No. of all indicator attainment cities |
|---|---|---|---|---|---|---|---|---|
| Beijing-Tianjin-Hebei | 13 | 7 | 3 | 0 | 6 | 8 | 0 | 0 |
| Yangtze River delta | 25 | 25 | 10 | 2 | 25 | 21 | 1 | 1 |
| Pearl River delta | 9 | 9 | 5 | 5 | 9 | 4 | 0 | 0 |

For the 13 cities at or above prefectural level in Beijing-Tianjin-Hebei region, the percentage of ambient air quality attainment days ranged between 10.4% and 79.2%, and averaged 37.5% this year. Among the nonattainment days, 20.7% were recorded with heavy pollution or severe pollution. The percentage of attainment days was below 50% in 10 cities. In this region, the majority of the nonattainment days (66.6%) recorded $PM_{2.5}$ as the leading pollutant, seconded by 25.2% with $PM_{10}$ as the leading pollutant, and then 7.6% with $O_3$ as the leading pollutant.

In this region, the mean concentration of $PM_{2.5}$ registered 106 μg/m$^3$, and of $PM_{10}$ 181 μg/m$^3$, none of the cities was able to attain air quality standards with regard to the two indicators. The mean concentration of $SO_2$ was 69 μg/m$^3$ and 6 cities were unable to attain relevant standard. The mean concentration of $NO_2$ was 51 μg/m$^3$ and 10 cities failed relevant standard. Seven cities were unable to attain air quality standard in respect of CO according to the mean daily equivalent value. Five cities were unable to attain air quality standard in respect of $O_3$ according to the equivalent value of daily maximum 8-hour readings.

The number of attainment days accounted for 48.0%, and the number of days registered with heavy pollution or severe pollution accounted for 16.2% in Beijing. The main pollutants were $PM_{2.5}$, $PM_{10}$ and $NO_2$. The mean annual concentration of $PM_{2.5}$ was 89 μg/m$^3$, 1.56 times more than the standard; that of $PM_{10}$ was 108 μg/m$^3$, 0.54 time more than the standard; and that of $NO_2$ was 56 μg/m$^3$, 0.40 time more than the standard. The daily maximum 8-hour reading of $O_3$ exceeded the standard by 0.18 time. Moreover, the capital city attained air quality standard with regard to $SO_2$ and CO.

For the 25 cities at or above prefectural level in Yangtze River delta, the percentage of ambient air quality attainment days ranged between 52.7% and 89.6%, and averaged 64.2% this year. Among the nonattainment days, 5.9% were recorded with heavy pollution or severe pollution. The

percentage of attainment days ranged between 80% and 100% in Zhoushan and Lishui, and between 50% and 80% in the remaining 23 cities. In Yangtze River delta, the majority of the nonattainment days (80.0%) recorded $PM_{2.5}$ as the leading pollutant, seconded by 13.9% with $O_3$ as the leading pollutant, and then 5.8% with $PM_{10}$ as the leading pollutant.

In the delta, the mean concentration of $PM_{2.5}$ registered 67 μg/m$^3$, only Zhoushan, among others, was able to attain relevant standard, the remaining 24 cities were not. The mean concentration of $PM_{10}$ was 103 μg/m$^3$ and 23 cities were unable to attain relevant standard. The mean concentration of $NO_2$ was 42 μg/m$^3$ and 15 cities were unable to attain relevant standard. The mean concentration of $SO_2$ was 30 μg/m$^3$ and all of the local cities in the delta attained relevant standard. Four cities failed air quality standard in respect of $O_3$ according to the equivalent value of daily maximum 8-hour readings. All of the cities were able to attain air quality standard in respect of CO according to the mean daily equivalent value.

The number of attainment days accounted for 67.4%, and the number of days registered with heavy pollution or severe pollution accounted for 6.3% in Shanghai. The main pollutants were $PM_{2.5}$, $PM_{10}$ and $NO_2$. The mean annual concentration of $PM_{2.5}$ was 62 μg/m$^3$, 0.77 time more than the standard; that of $PM_{10}$ was 84 μg/m$^3$, 0.20 time more than the standard; and that of $NO_2$ was 48 μg/m$^3$, 0.20 time more than the standard. The municipality attained air quality standard with regard to $SO_2$, CO, and $O_3$.

For the 9 cities at or above prefectural level in Pearl River delta, the percentage of ambient air quality attainment days ranged between 67.7% and 94.0%, and averaged 76.3% this year. Among the nonattainment days, 0.3% were recorded with heavy pollution. The percentage of attainment days was above 80% in Shenzhen, Zhuhai, and Huizhou, and between 50% and 80% in the remaining cities. In the delta, the majority of the nonattainment days (63.2%) recorded $PM_{2.5}$ as the leading pollutant, seconded by 31.9% with $O_3$ as the leading pollutant, and then 4.8% with $NO_2$ as the leading pollutant.

In this delta, the mean concentration of $PM_{2.5}$ registered 47 μg/m$^3$, and none of the cities was able to attain air quality standards with regard to this indicator. The mean concentration of $PM_{10}$ was 70 μg/m$^3$ and 4 cities were unable to attain relevant standard. The mean concentration of $NO_2$ was 41 μg/m$^3$ and 4 cities failed relevant standard. The mean concentration of $SO_2$ was 21 μg/m$^3$ and all of the local cities in the delta attained relevant standard. Five cities were unable to attain air quality standard in respect of $O_3$ according to the equivalent value of daily maximum 8-hour readings. All of the cities were able to attain air quality standard in respect of CO according to the mean daily equivalent value.

The number of attainment days accounted for 71.0% in Guangzhou, and neither heavy pollution nor severe pollution was observed throughout the year. The main pollutants were $PM_{2.5}$, $PM_{10}$ and $NO_2$. The mean annual concentration of $PM_{2.5}$ was 53 μg/m$^3$, 0.51 time more than the standard; that of $PM_{10}$ was 72 μg/m$^3$, 0.03 time more than the standard; and that of $NO_2$ was 52 μg/m$^3$, 0.30 time more than the standard. Guangzhou attained air quality standard with regard to $SO_2$, CO, and $O_3$.

## Haze

The visibility-based observation data from China Meteorological Administration showed the number of days with haze averaged out at 35.9 in China this year, up 18.3 from a year earlier, and reaching a historic high since 1961. Fog and haze frequented the central and eastern regions of China, and the number of days with fog or haze ranged between 50 and 100 in most of the land stretching from the central and southern part of North China to the north of Jiangnan area (area to the south of Yangtze River), even over 100 in some places.

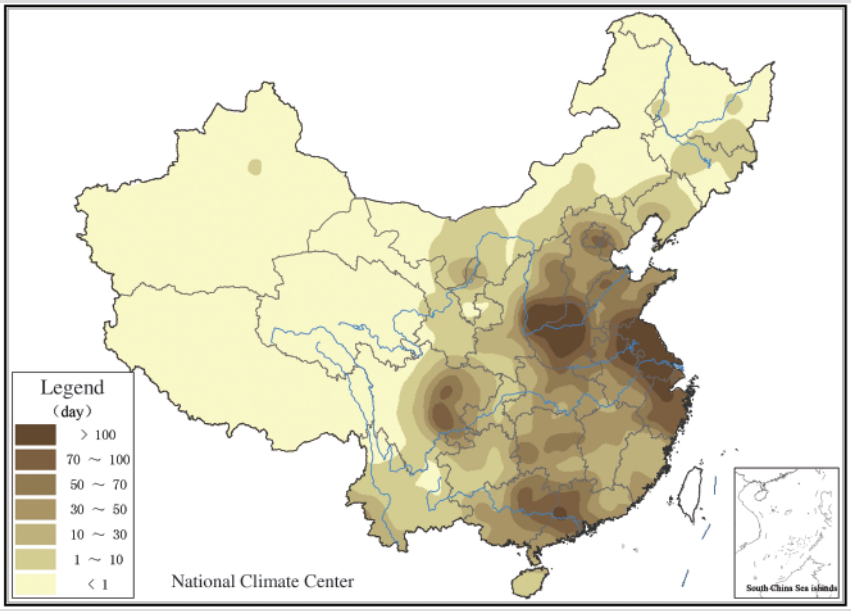



Diagram of the number of days with haze in China in 2013

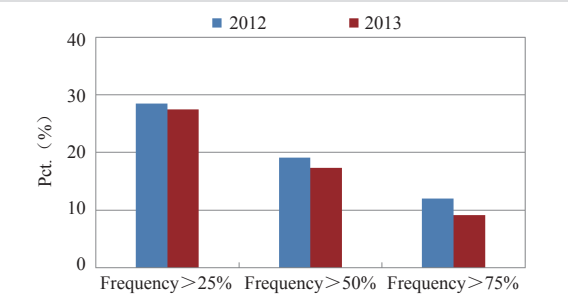
The air-quality based monitoring data from Ministry of Environmental Protection indicated two strikes of large-scale, regional haze pollution enveloping the central and eastern regions of China, one in January and the other in December. The haze pollution was geographically wide spread, prolonged, and causing high-severity pollution as well as skyrocketing pollutant density on both occasions; the leading pollutant was both mostly $PM_{2.5}$. The haze pollution in January lasted for 17 days straight, as a consequence, a total of 677 days (times) were reported with heavy pollution or severe pollution in the aforementioned 74 cities, including 477 days (times) with heavy pollution and 200 days (times) with severe pollution. Beijing-Tianjin-Hebei region and surrounding area were hit the hardest by the haze, the southern part of Hebei province in particular, with Shijiazhuang and Xingtai as the most polluted cities. The second round of large-scale severe haze pollution struck the central and eastern region of the country between December 1 and 9, resulting in 271 days (times) recorded with heavy or severe pollution in the 74 cities, including 160 days (times) of heavy pollution and 111 days (times) of severe pollution. Yangtze River delta, Beijing-Tianjin-Hebei region and surrounding area, and some places in northeast China suffered serious haze pollution, among which Yangtze River delta was hit the hardest.

**Two hundred and fifty-six cities at or above prefectural level yet to enforce the new ambient air quality standards** Up to 69.5% of the 256 cities attained ambient air quality standards this year, based on the mean annual concentration of three pollutants $SO_2$, $NO_2$ and $PM_{10}$ evaluated in accordance with *Ambient Air Quality Standards (GB 3095-1996)*. Up to 91.8% of those cities attained relevant standard with regard to mean annual concentration of $SO_2$, and 1.2% failed Grade III standard. All of those cities were able to attain relevant standard with regard to mean annual concentration of $NO_2$, and 86.3% managed to have attained Grade I national standard. Up to 71.1% of those cities attained relevant standard measured by mean annual concentration of $PM_{10}$, and 7.0% failed Grade III standard.

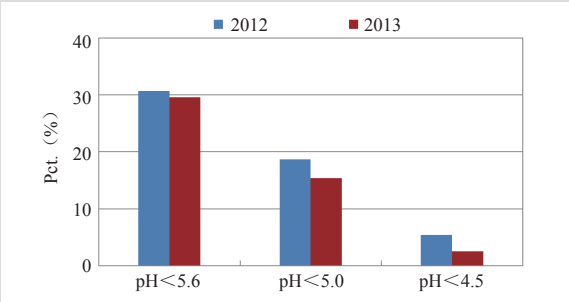
## Acid Rain

**Acid rain frequency** Up to 44.4% of the 473 cities under precipitation monitoring program reported acid rain this year. The acid rain frequency was above 25% in 27.5% of those cities, and above 75% in 9.1% of those cities.

**Acidity of precipitation** The mean annual pH value of rainfalls was below 5.6 (acid rain) in 29.6% of the monitored cities, below 5.0 (relatively serious acid rain) in 15.4% of them, and below 4.5 (serious acid rain) in 2.5% of them this year. The proportion of cities with records of acid rain, relatively serious acid rain, and serious acid rain this year was down 1.1 percentage points, 3.3 percentage points, and 2.9 percentage points respectively from the previous year.



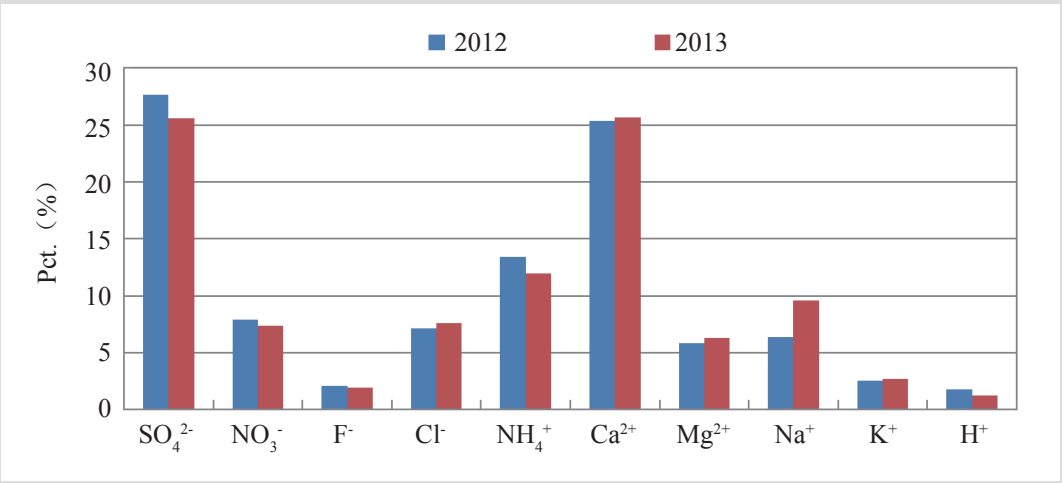

Year–on–year change of the percentage of cities with varied acid rain frequencies




Year–on–year change of the percentage of cities with varied mean annual pH values

**Chemical composition** The main positive ions in the precipitation were $Ca^{2+}$ and $NH_4^+$ this year, which accounted for 25.7% and 12.0% respectively of the total ion equivalent. The main negative ion was $SO_4^{2-}$, accounting for 25.6% of the total ion equivalent; $NO_3^-$ took up 7.4%. Sulphate was the leading acid-causing substance.

**Geographical distribution of acid rain** In 2013, the acid rain in China mainly spread along the mainstream of Yangtze River and to the south of the river's middle and lower reaches. The area included most parts of Jiangxi Province, Fujian Province, Hunan Province, and Chongqing Municipality, as well as Yangtze River delta, Pearl River delta, and southeast Sichuan Province. It was equivalent to around 10.6% of the national territory.




Year–on–year change of the percentage of normality of main ions in precipitation

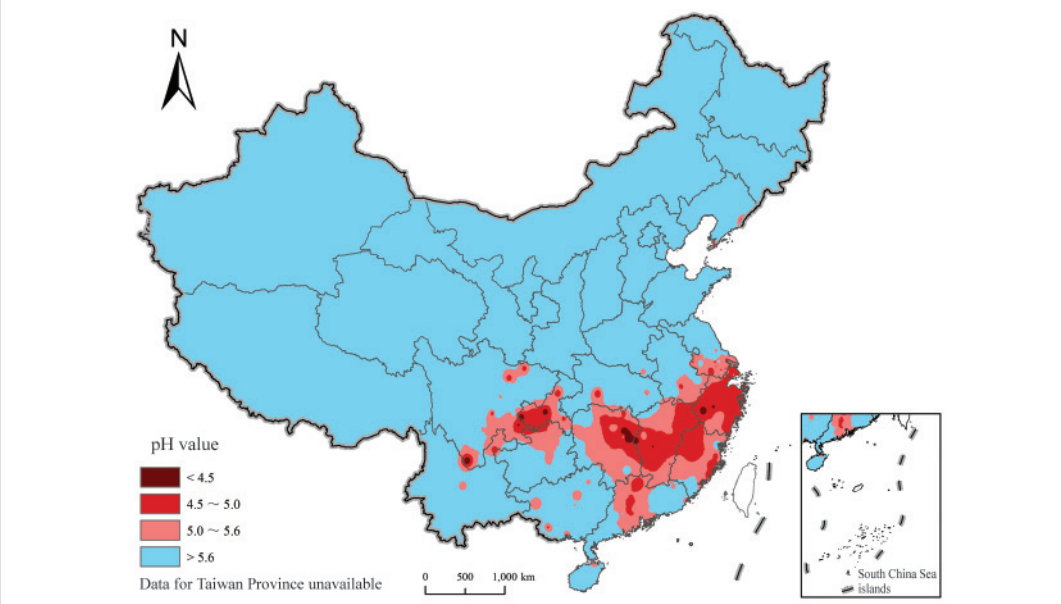



Diagram of the isoline of the mean annual pH value of precipitation in China in 2013

## Measures and Actions

**【Prevention and control of atmospheric pollution】** Substantial progress has been made in the implementation of the *Twelfth Five-Year Plan for Prevention and Control of Atmospheric Pollution in Key Regions*, the *Guidelines on Strengthening the Administration over Emergency Response to Heavy Pollution Weather Events* were promulgated, and the *Bulletin on Enforcing Special Emission Limits of Air Pollutants* and the *Guide to Preparation of Emergency Preparedness Plan for Heavy Air Pollution in Urban Areas* were circulated. Regulatory documents such as *Regulations on the Administration over Automobile Emission Inspection* were promulgated and implemented. The limits and measurement methods for exhaust pollutants from gas fuelled positive ignition engines of vehicles (Stage V) were effective as of January 2013. Thematic campaigns were carried out in key regions with regard to the inspection on efforts combating atmospheric pollution. The *Clean Air Research Initiative* was published, planning to break the technological bottlenecks in respect of the inventory of atmospheric pollution sources and integrated pollution reduction; air quality monitoring and pollution source apportionment; heavy pollution forecast, early warning, and emergency response regulation; regional air quality management; and environmental economic policies, and to establish State-level technical systems for prevention and control of atmospheric pollution. The establishment of "State Environmental Protection Key Laboratory of Sources and Control of Air Pollution Complex (SCAPC)", "State Environmental Protection Key Laboratory of Atmospheric Physical Simulation and Pollution Control", and "State Environmental Protection Key Laboratory of Vehicle Exhaust Control and Simulation" were under way.

**【Air quality monitoring capacity building and improved information sharing】** The real-time readings of the six pollutants as well as the AQI readings were being announced according to the data from the 496 monitoring sites in the 74 cities scheduled to enforce the new ambient air quality standards in 2013 at Stage I. The capacity building for air quality monitoring in accordance with the new standard was provided to the 388 monitoring sites located in 87 cities scheduled to enforce the new air quality standard at Stage II. The real-time air quality data from 884 monitoring sites in 161 cities applying the new standard will become available in 2014. The "State Center of Ambient Air Quality Monitoring, Forecast, and Early Warning" was set up within the year, the *Programme on Monitoring and Early Warning of Heavy Pollution Weather Events in Beijing-Tianjin-Hebei Region and Surrounding Area (on trial)* was released, and *Detailed Rules of Implementation on Monitoring and Early Warning of Heavy Pollution Weather Events in Beijing-Tianjin-Hebei Region and Surrounding Area (on trial)* was prepared. Regional ambient air quality forecast was provided in Beijing-Tianjin-Hebei region as of October 1, 2013.

# Acoustic Environment

## General Situation

The acoustic environment was basically stable in urban areas throughout the country this year.

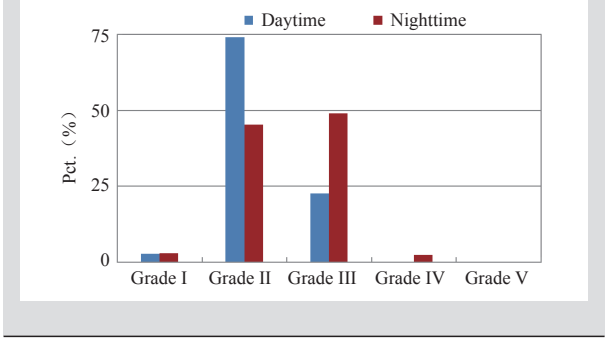
### Area–wide Acoustic Environment

**Cities at or above prefectural level** Among the 316 cities being monitored for daytime area-wide acoustic environment quality, 76.9% attained Grade I or II national standard, 22.8% Grade III, 0.3% Grade V, and 0 Grade IV. The percentage of cities attaining Grade II national standard went down 1.8 percentage points from a year earlier, and that of cities attaining Grade III went up 2.5 percentage points. There wasn't any notable change to the percentages of cities with other acoustic environment quality grading.

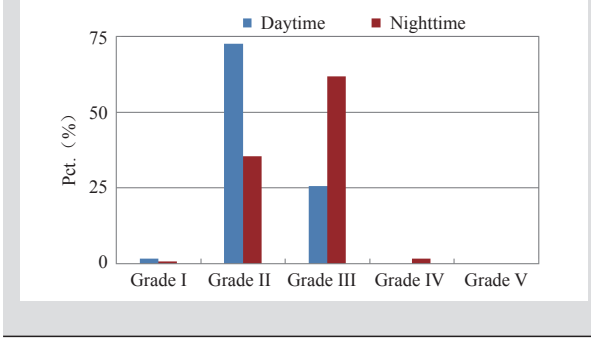
Among the 293 cities being monitored for nighttime area-wide acoustic environment quality, 48.5% attained Grade I or II national standard, 51.5% Grade III or IV, and 0 Grade V.

**National Major Cities Tasked with Environmental Protection** The 113 national major cities tasked with environmental protection were being monitored for the daytime area-wide acoustic environment quality, and the data showed the equivalent sound level ranged between 47.7 dB(A) and 58.7 dB(A). Up to 74.4% of those cities attained Grade I or II national standard, 25.6% Grade III, and 0 Grade IV or V.

One hundred and ten out of the 113 cities were being monitored for the nighttime area-wide acoustic environment quality, and the data showed the equivalent sound level ranged between 39.2 dB(A) and 50.4 dB(A). Up to 36.4% of those cities attained Grade I or II national standard, 63.6% Grade III or IV, and 0 Grade V.




Percentage of graded area–wide environmental quality of cities at or above prefectural level in 2013




Percentage of graded area–wide environmental quality of national major cities tasked with environmental protection in 2013

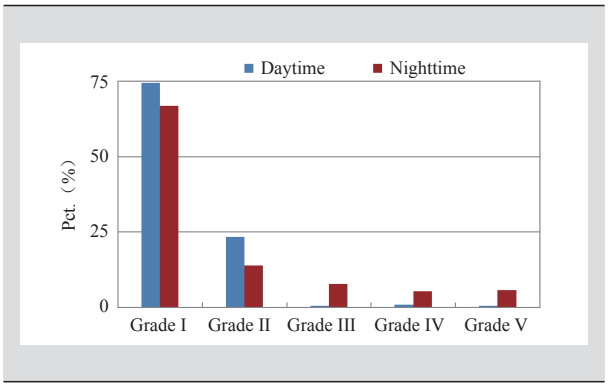
## Road Traffic Acoustic Environment

**Cities at or above prefectural level** Among the 316 cities being monitored for daytime road traffic acoustic environment quality, 97.8% attained Grade I or II national standard with regard to noise intensity, 1.6% Grade III or IV, and 0.6% Grade V. The percentage of cities attaining Grade III national standard went down 1.3 percentage points from a year earlier, and that of cities attaining Grade IV went up 1.0 percentage point. There wasn't any notable change to the percentages of cities with other noise intensity grading.

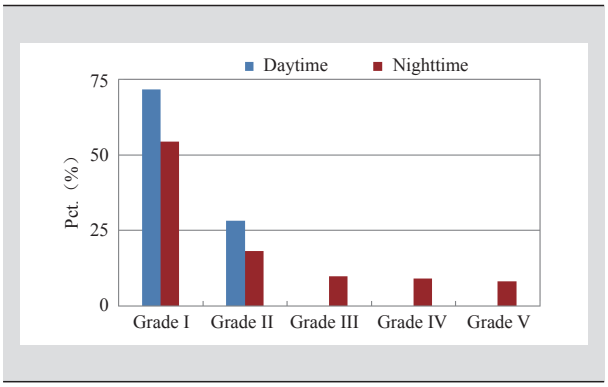
Among the 292 cities being monitored for nighttime road traffic acoustic environment quality, 80.8% attained Grade I or II national standard with regard to noise intensity, 13.4% Grade III or IV, and 5.8% Grade V.

**National Major Cities Tasked with Environmental Protection** The 113 national major cities tasked with environmental protection were being monitored for the daytime road traffic acoustic environment quality, and the data showed the equivalent sound level ranged between 62.0 dB(A) and 69.8 dB(A). All of those cities attained Grade I or II national standard with regard to noise intensity.

One hundred and ten out of the 113 cities were being monitored for the nighttime road traffic acoustic environment quality, and the data showed the equivalent sound level ranged between 49.6 dB(A) and 66.9 dB(A). Up to 72.7% of those cities attained Grade I or II national standard, 19.1% Grade III or IV, and 8.2% Grade V.




Percentage of graded road traffic acoustic environment quality of cities at or above prefectural level in 2013




Percentage of graded road traffic acoustic environmental quality of national major cities tasked with environmental protection in 2013

## Acoustic Environment of Urban Functional Zones

**Cities at or above prefectural level** The monitoring of all types of functional zones amounted to 17,696 sites (times), 8,848 at daytime and 8,848 at nighttime. Up to 91.1% of the daytime monitoring sites (times) attained national standard, the same as last year, and 71.7% of the nighttime monitoring sites (times) was able to do so, up 2.1 percentage points.

Acoustic environment quality attainment status of urban functional zones in cities at or above prefectural level in 2013

| Type of functional zone | Type 0 | | Type 1 | | Type 2 | | Type 3 | | Type 4 | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Day | Night | Day | Night | Day | Night | Day | Night | Day | Night |
| Attainment site (time) | 68 | 48 | 1838 | 1502 | 2556 | 2278 | 1677 | 1517 | 1923 | 997 |
| Monitored site (time) | 103 | 103 | 2112 | 2112 | 2816 | 2816 | 1724 | 1724 | 2093 | 2093 |
| Attainment rate (%) | 66.0 | 46.6 | 87.0 | 71.1 | 90.8 | 80.9 | 97.3 | 88.0 | 91.9 | 47.6 |

**National Magor Cities Tasked with Environmental Protection** The monitoring of all types of functional zones amounted to 8,668 sites (times), 4,334 at daytime and 4,334 at nighttime. Up to 90.7% of the daytime monitoring sites (times) attained national standard, and 67.9% of the nighttime monitoring sites (times) managed to do so.

Acoustic environment quality attainment status of urban functional zones in national magor cities tasked with environmental protection in 2013

| Type of functional zone | Type 0 | | Type 1 | | Type 2 | | Type 3 | | Type 4 | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Day | Night | Day | Night | Day | Night | Day | Night | Day | Night |
| Attainment site (time) | 36 | 26 | 792 | 626 | 1337 | 1148 | 859 | 757 | 907 | 387 |
| Monitored site (time) | 64 | 64 | 899 | 899 | 1463 | 1463 | 879 | 879 | 1029 | 1029 |
| Attainment rate (%) | 56.3 | 40.6 | 88.1 | 69.6 | 91.4 | 78.5 | 97.7 | 86.1 | 88.1 | 37.6 |

## Development of Environmental Legislation

The amendment of Environmental Protection Law has made active progress in 2013. NPC Standing Committee conducted second review in June and third review in October on Environmental Protection Law (draft amendment). With more intact and sound legal structure, the Law has made key progress in basic ideas, evident progress in specific systems and supervision measures and important breakthrough in cracking down violations. The government has released the Regulations on Prevention and Control of the Pollution from Scaled Livestock and Fowl Farms with 44 Articles in 6 chapters such as general provisions, prevention, comprehensive use and control, incentive measures, legal responsibility and supplementary provisions. It will play an important role in preventing and controlling pollution from breeding of livestock and fowls; facilitating comprehensive use and environment-friendly disposal of the waste from breeding of livestock and fowl, protecting and improving the environment and facilitating continuous and healthy development of animal husbandry. Relevant authority has actively conducted judicial explanations for environment pollution criminal cases. The Explanations of the Supreme People's Court and Supreme People's Procuratorate for Some Issues on Applicable Law for Criminal Cases of Environmental Pollution has been released. It has played an important role in unifying the criteria for condemnation and punishment of environmental pollution crime and made more efforts in cracking down environmental pollution crimes.

# Radiation Environment

## General Situation

The radiation environment was in good conditions in China this year.

**Ionizing Radiation** The environmental ionizing radiation level in China remained within the fluctuation range of natural background level in 2013. The real-time, consecutive air absorbed γ radiation dose rates were also within fluctuation range of local natural background levels, according to the monitoring data derived from local radiation environment automatic monitoring stations. The activity concentrations of gross α and gross β in aerosol and air sediment, and of airborne tritium were all within the normal range. There were no notable changes in the activity concentration of artificial radionuclides in the Yangtze River, Yellow River, Pearl River, Songhua River, Huaihe River, Haihe River, Liaohe River, rivers in Zhejiang and Fujian region, rivers in southwest and northwest China, and major lakes (reservoirs), compared with previous years; the activity concentration of natural radionuclides in those rivers was at the same level as monitored during the national survey on natural radioactivity levels between 1983 and 1990. The activity concentrations of gross α and gross β in underground drinking waters as well as in centralized drinking water sources monitored in some provincial capital cities were within the limits set by *Standards for Drinking Water Quality (GB5749-2006)*. The activity concentrations of artificial radionuclides Sr-90 and Cs-137 in seawaters of nearshore sea areas were below the limits specified by the *Sea Water Quality Standard (GB3097-1997)*. The activity concentration of artificial radionuclides in soils did not change much compared with monitoring data of previous years, whereas the activity concentration of natural radionuclides was at the same level as monitored during the aforementioned survey between 1983 and 1990.

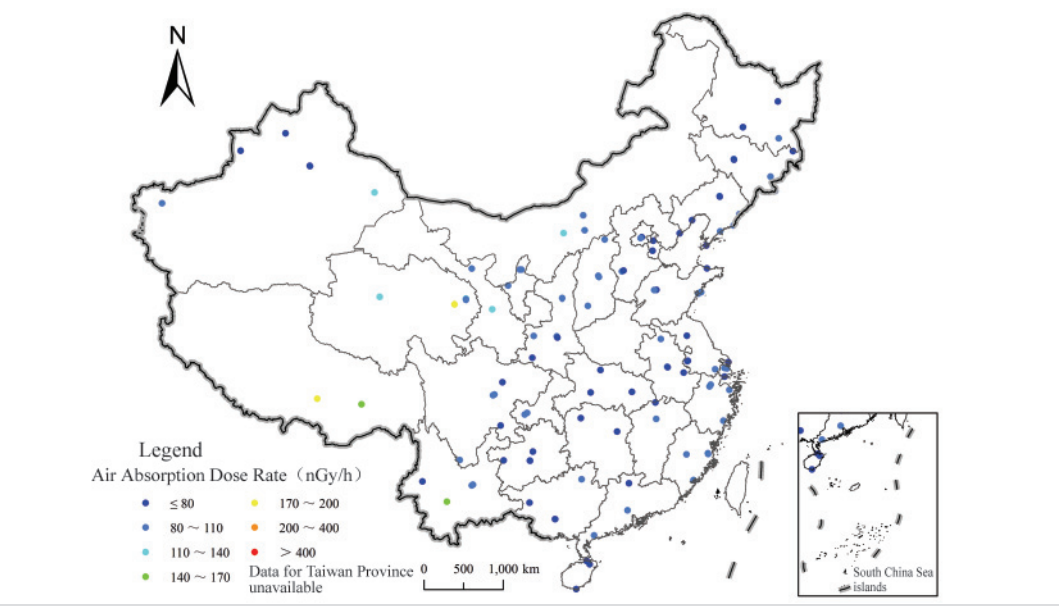
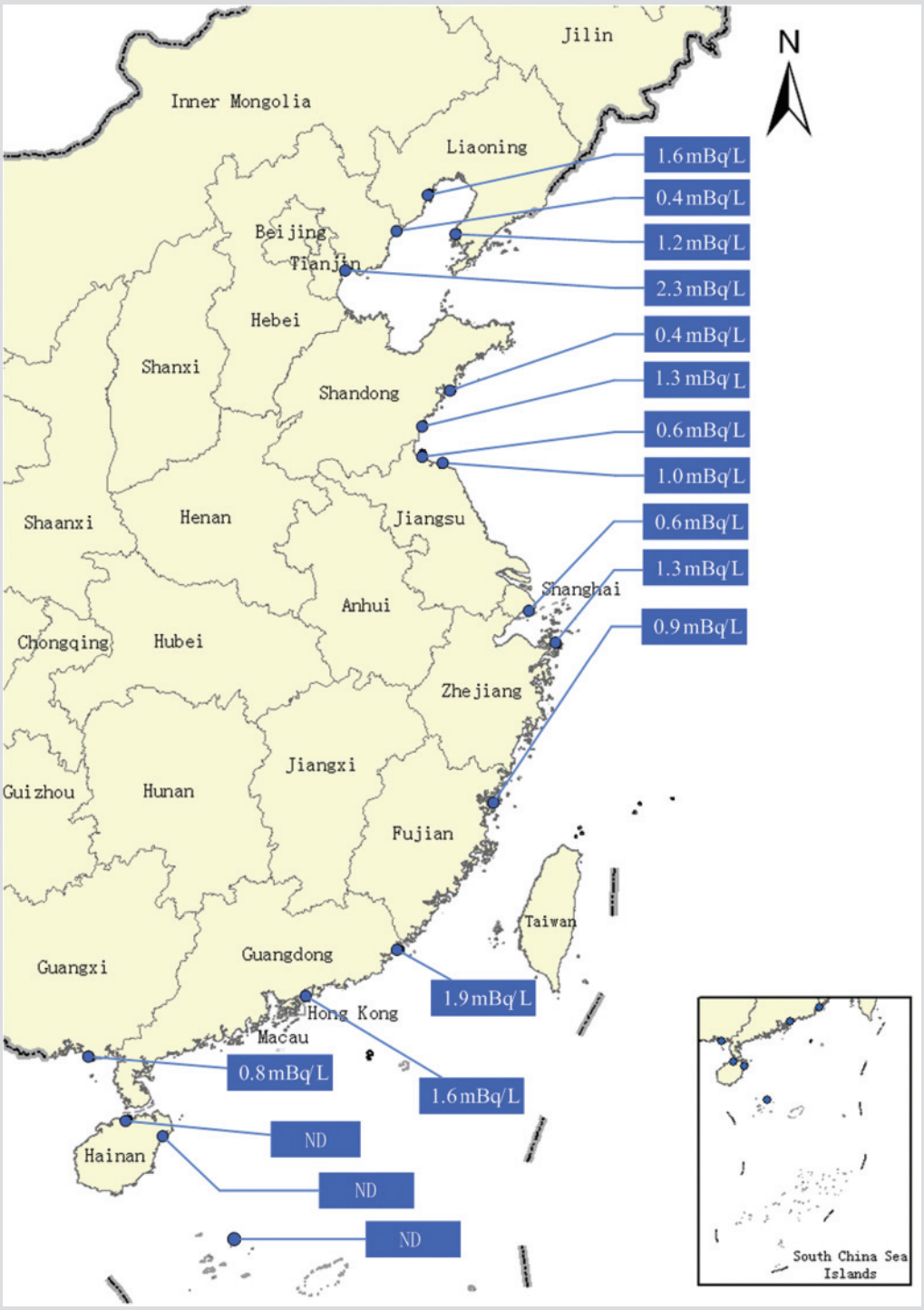



Diagram of the real–time, consecutive air absorbed γ radiation dose rate monitored at radiation environment automatic monitoring stations in China in 2013




Activity concentration of Cs–137 in seawaters of Chinese nearshore sea areas in 2013

**Environment ionizing radiation in the vicinity of in-service nuclear power plants** The Hongyanhe Nuclear Power Plant in Liaoning Province in northeast China and Ningde Nuclear Power Plant in Fujian Province in east China were put into commercial operation this year. The mean annual value of the real-time, consecutive air absorbed γ radiation dose rates (before deducting the response to the cosmic rays) registered 100.8 nGy/h, 123.7 nGy/h, 99.9 nGy/h, 76.8 nGy/h, and 98.1 nGy/h respectively in the vicinity of the nuclear power plants at Qinshan Nuclear Power Base, Dayawan/Ling'ao Nuclear Power Plant, Tianwan Nuclear Power Plant, Hongyanhe Nuclear Power Plant, and Ningde Nuclear Power Plant, which were all within the fluctuation range of local natural background levels, according to the data from autonomic monitoring stations in the perimeters of those plants. The activity concentrations of all radionuclides (except tritium) in the environment media such as aerosol, sediments, surface water, groundwater, and soils in the vicinity of nuclear power plants varied little compared with data of previous years. The activity concentrations of tritium in the ambient air, rainfalls, surface water, well water, and some biological samples taken from the vicinity of Qinshan Nuclear Power Base were higher than the natural background level measured before the Base was put into commercial operation; the same case applied to the activity concentration of tritium in seawaters near the sewage outlets of Dayawan/Ling'ao Nuclear Power Plant and Tianwan Nuclear Power Plant, but the radiation exposure to the general public was far below the dose limits specified by national standards.

**Environment ionizing radiation in the vicinity of civil research reactors** In the vicinity of China Institute of Atomic Energy Science, Institute of Nuclear and New Energy Technology with Tsinghua University, Nuclear Power Institute of China, Miniature Neutron Source Reactor (MNSR) with Shenzhen University, and other research facilities, the air absorbedγradiation dose rate, as well as the activity concentrations of radionuclides in aerosols, air sediment, surface water, groundwater, and soils were not obviously different from the data of previous years; the activity concentrations of gross α and gross β in underground drinking water were within the limit specified in the *Standards for Drinking Water Quality (GB5749-2006)*.

**Environmental ionizing radiation in the vicinity of nuclear fuel cycle facilities and waste disposal facilities** The air absorbed γ radiation dose rate varied little in the vicinity of nuclear fuel cycle facilities of CNNC like Lanzhou Uranium Enrichment Co., Ltd, Shaanxi Uranium Enrichment Co., Ltd, China North Nuclear Fuel Co., Ltd, Jianzhong Nuclear Fuel Components Plant, and the 404 Limited Company, as well as Northwest Disposal Site for Low- and Medium-level Radioactive Solid Wastes, Beilong Disposal Site for Low- and Medium-level Radioactive Solid Wastes, and radioactive landfill sites of the State-run No.221 Plant in Qinghai Province. There was no growth in the activity concentration of radionuclides in environmental media caused by the production, processing, storage, disposal, and transportation activities of these companies.

**Environment ionizing radiation in the vicinity of uranium mines and metallurgical plants** The radiation environment was in stable condition in the vicinity of uranium mines and metallurgical plants. There were no notable changes to the activity concentration of radon in the air, of gross αin the aerosol, and of radionuclides Uranium and Radium-226 in the surface and ground water.

**Electromagnetic Radiation** The environmental electromagnetic radiation this year was good at large. The comprehensive electromagnetic field strength was far below the derived limit to public exposure as specified by *Regulations for Electromagnetic Radiation Protection (GB8702-88)*. The environmental electromagnetic radiation levels varied little in the vicinity of electromagnetic facilities. They were below the derived limit to public exposure as specified the aforementioned regulations, in environmentally sensitive sites around the antennas of mobile communication stations being monitored. The power frequency electric field strength and magnetic induction intensity in the environmentally sensitive sites close to the power transmission lines and transformers being monitored were below the power frequency electric field evaluation standard of residential areas as well as the power frequency limits set for "24/7" public exposure by the *Technical Regulations on Environmental Impact Assessment of Electromagnetic Radiation Produced by 500kV Ultra-high Voltage Transmission and Transfer Power Engineering (JH/T24-1998)*.

## Measures and Actions

**【Radiation environment monitoring】** The evaluation of the radiation environment monitoring capacity of 31 provinces (autonomous regions and municipalities directly under the Central Government) was concluded, and the *Work Programme on Developing National Radiation Environment Monitoring System in the Twelfth Five-Year Plan Period (2010-2015)* was circulated in an effort to guide local environmental protection departments to carry out radiation environment monitoring capacity building. The *2013*

*National Radiation Environment Monitoring Programme* was printed and circulated, the sites and items of national monitoring program were improved for local provinces (autonomous regions, and municipalities directly under the Central Government), and a good job had been done with regard to the collection, evaluation, feedback and reporting of monitoring data derived from national monitoring program. The national training plans on radiation environment monitoring were all carried out and concluded, offering 41 training sessions under two kinds of programs, general training program and operating skill training program, to 560 people.

**【Program on Survey and Assessment of Radiation Environment Status quo of National Nuclear Bases and Facilities】** The first working meeting of the leading team was held this year, and the following regulations were developed and circulated, including *Administrative Measures of the Program on Survey and Assessment of Radiation Environment Status quo of National Nuclear Bases and Facilities, Technical Specifications for Environmental Monitoring for the Survey and Assessment Program, Quality Assurance Criteria for the Survey and Assessment Program, and Technical Specification for the Evaluation of the Survey and Assessment Efforts, etc.* The survey on Lincang Mine of Yunnan had already been concluded. The data collection as well as most of the on-site monitoring, sampling, and experimental analysis had been basically completed with the CNNC 404 Limited Company, China Institute of Atomic Energy Science, and Qinshan Nuclear Power Base. The implementation plans for the survey and assessment of four organizations including Institute of Nuclear and New Energy Technology with Tsinghua University were prepared, and those of another 6 organizations including Tianwan Nuclear Power Base were being developed or under scrutiny.

## Monitoring, Assessment and Examination on County–wide Eco– environment of National Key Ecological Function Areas

In order to assess the improvement of eco environment quality at county level and protection outcomes of transfer payment of the central government on key national ecological function areas, Ministry of Environmental Protection and Ministry of Finance started the examination on county eco environment quality of national key ecological function areas in 2009. The current status and change of eco environment quality of 492 counties (26 counties of them were new in 2013, only for assessment of current status of eco environment quality) of national major ecological function areas in 2013 were as the followings:

**Current status of eco environment quality** Among 492 counties, 79 counties had "fragile" eco environment, accounting for 16.1%, they mainly concentrated on windbreak and sand fixing areas (taking up 39.2%) and water and soil conservation areas (taking up 38.0%). 192 counties had "ordinary" eco environment, accounting for 39.0%. Among them, 43.8% concentrated on water reservation function areas. A total of 221 had "good" eco environment quality, accounting for 44.9%. They were distributed in three kinds of functional areas except windbreak and sand fixing areas. They mainly concentrated on water reservation areas (taking up 51.1%) and biodiversity conservation areas (taking up 38.5%).

**Change of eco environment quality** In 466 counties, the eco environment of 26 counties "became better", taking up 5.6%; 424 had "basically stable" eco environment, taking up 91.0%; 16 of them "became worse", taking up 3.4%. Among the 26 counties with eco environment "becoming better", the eco environment of 3 counties "generally became better" and 23 had "slightly better" eco environment. The "becoming-worse" eco environment of all the 16 counties had "slightly worse" eco environment.

# Natural and Ecological Environment

## General Situation

The overall eco-environmental quality was stable in China.

### Eco-environmental Quality

The eco-environmental quality was "average" in China in 2012[②]. Among the 2,461 counties monitored for eco-environmental quality assessment, the county-wide eco-environmental quality was "excellent" in 346 counties, "good" in 1,155, "average" in 846, "relatively poor" in 112, and "poor" in 2. Most of the counties were observed with "good" or "average" eco-environmental quality, and the area totaled around 67.2% of the national territory.

Counties with "excellent" or "good" records are mainly distributed to the south of Tsinling Mountains and Huaihe River, and in the Greater and Lesser Khingan Mountains and Changbai Mountain in northeast China; those with "average" records are mainly distributed on the North China Plain, western part of Northeast China Plain, central part of Inner Mongolia, and Qinghai-Tibet Plateau; and those with "relatively poor" or "poor" records are mostly in northwestern region of China.

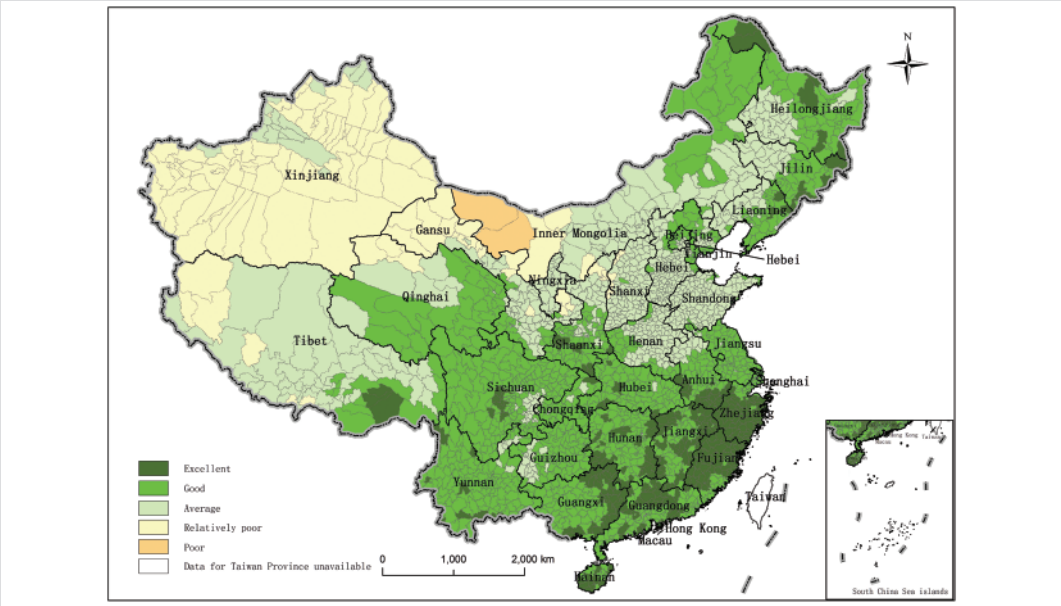



Diagram of graded county-wide eco-environmental quality in China in 2012

② As the interpretations of the monitoring data from using satellite remote sensing technology were considerable amount of work, and the data collection is time-bound, so the assessment of eco-environmental quality is one year behind that of other environmental elements.

## Biodiversity

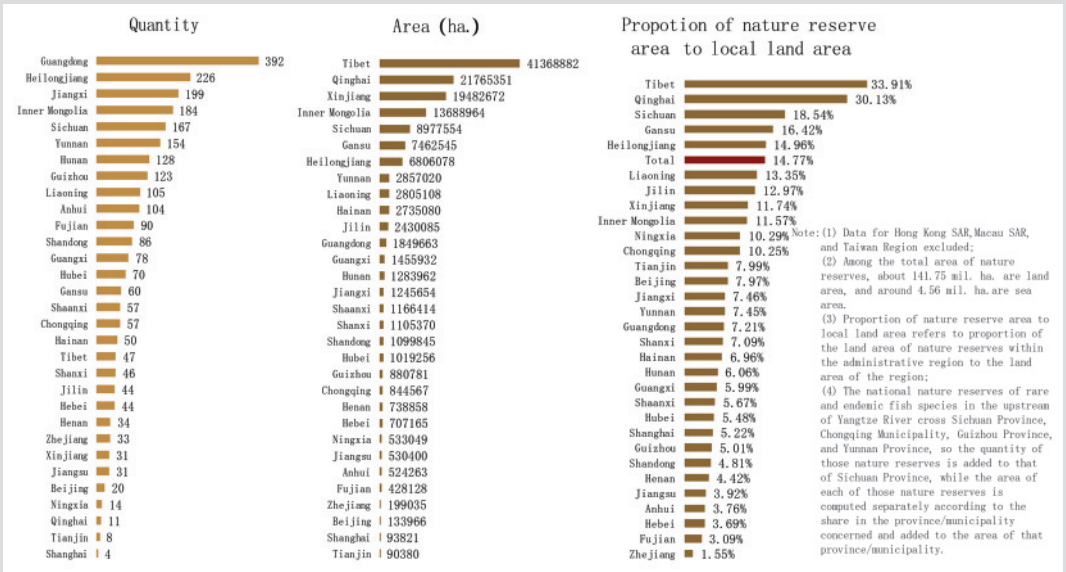
In terms of ecosystem diversity, China boasts various types of terrestrial ecosystems, with 212 types of forest ecosystems, 36 types of bamboo wood ecosystems, 113 types of shrubbery ecosystems, 77 types of meadow ecosystems, and 52 types of desert ecosystems. The freshwater aquatic ecosystems are complex. There are five types of wetlands found in China altogether, that is, the inshore and coastal wetlands, river wetlands, lake wetlands, marsh wetlands, and constructed wetlands. Also, China has four major marine ecosystems in inshore waters of the Yellow Sea, the East China Sea, the South China Sea and Kuroshio Current Basin. Typical marine ecosystems can be found in China's nearshore sea areas, such as coastal wetlands, mangroves, coral reefs, estuaries, bays, lagoons, islands, upwelling currents and seaweed beds, along with natural sceneries and natural monuments such as under-sea ancient forests, and marine abrasion and sea deposition landforms. With regard to artificial ecosystems, there are farmland ecosystems, planted forest ecosystems, constructed wetland ecosystems, artificial grassland ecosystems, and urban ecosystems, etc.

In terms of species diversity, China has 34,792 species of higher plants, including 2,572 species of Bryophytes, 2,273 species of Pteridophyta, 244 species of Gymnosperms, and 29,703 species of Angiosperms. In addition, China owns almost all of the woody plant species that can be found in temperate zone. China also boasts about 7,516 species of vertebrate animals, including 562 species of mammals, 1,269 species of Aves, 403 species of reptiles, 346 species of amphibians and 4,936 species of fish. A total of 420 species of rare and endangered wild animals are included in the List of Wild Animals under Special State Protection in China. Hundreds of animal species such as giant panda, crested ibis, golden monkey, South China tiger, and Chinese alligator are endemic to China. The identified fungi amount to above 10,000 species.

In terms of genetic resources diversity, China has cultivated crops of 1,339 cultivars in 528 classes, and boasts more than 1,000 species of economic trees, up to 7,000 species of ornamental plants which are of Chinese origin, and 576 species of domestic animals.

## Nature Reserves

A total of 2,697 nature reserves of various types and at different levels had been established nationwide by the end of the year, with overall coverage of about 146.31 mil. ha., including 141.75 mil. ha. land area which accounts for 14.77% of the land area of national territory. There are 407 national nature reserves, the combined area of which is around 94.04 mil. ha.




Nature reserves in local provinces (autonomous regions and municipalities directly under the Central Government) in 2013

Nature reserves of various types in China in 2013

| Type | Quantity | | Area | |
|---|---|---|---|---|
| | Total quantity | Pct. (%) | Total area (10,000 ha.) | Pct. (%) |
| Natural ecosystems | 1906 | 70.67 | 10385.07 | 70.98 |
| Forest ecosystem | 1410 | 52.28 | 3013.32 | 20.60 |
| Grassland and meadow ecosystem | 45 | 1.67 | 216.52 | 1.48 |
| Desert ecosystem | 37 | 1.37 | 4087.23 | 27.94 |
| Inland wetlands and aquatic ecosystems | 344 | 12.75 | 2991.25 | 20.44 |
| Marine and coastal ecosystems | 70 | 2.60 | 76.75 | 0.52 |
| Wildlife | 672 | 24.92 | 4084.65 | 27.92 |
| Wild animals | 525 | 19.47 | 3891.44 | 26.60 |
| Wild plants | 147 | 5.45 | 193.22 | 1.32 |
| Natural monuments | 119 | 4.41 | 161.26 | 1.10 |
| Geological monuments | 85 | 3.15 | 106.10 | 0.73 |
| Paleontology monuments | 34 | 1.26 | 55.16 | 0.38 |
| Gross | 2697 | 100.00 | 14630.98 | 100.00 |

**Marine nature reserves** In 2013, the structure of lancelet populations was normal but their habitats degraded in Changli Golden Coast National Nature Reserve of Hebei Province in north China. The Jiushan Islands National Nature Reserve of Xiangshan County in Zhejiang Province in east China attracted new residents including 3,000 plus *Thalasseus bergii* and 19 *Sterna bernsteini*, and over 600 fledging of *Thalasseus bergii* and several fledging of *Sterna bernsteini* had been born and survived. In Nanji Islands National Nature Reserve of Zhejiang, the plantation area of wild narcissus increased by 0.8 ha. on Dalei Island through transplantation, and the plant height averaged out at 12 cm. The common seabird species include egrets, *Bubulcus ibis, Ardeola bacchus*, Grey Heron, *Phalacrocorax carbo*, and *Scolopacidae sp*. The summer migrant birds are mainly *Larus crassirostris* and Sterna species, which are distributed on Xiama'an Island, Poyu Island, and Jianyu Island. The lancelet and *Sousa chinensis* populations remained stable in Xiamen Rare Marine Species National Nature Reserve. The live coral coverage ranged between 10% and 46% and averaged 21% in Guangdong Xuwen Coral Reef National Nature Reserve, and ranged between 5% and 42% and averaged 22% in Hainan Sanya Coral Reef National Nature Reserve. In Changli Golden Coast National Nature Reserve, the maximum elevation of the coastal dunes registered 37.1 m, up 1.6 m, and that of the saddles was 21.3 m, up 0.8 m from a year earlier; the location of the vertex of the ridge line moved about significantly by 12.0 m to the northwest. All of the shell dykes captured were newly formed in Binzhou Shell-Dyke Island and Wetland National Nature Reserve in Shandong Province in east China, and they are mainly distributed on Dakouhe Island, Gaotuozi Island-Laijiapuzi Island, and Wangzi Island. The area of shell dykes amounted to 38.6 ha., up 4.0 ha. from a year earlier.

**Wetlands** Fifty-nine wetland protection projects were carried out, and 122 projects received subsidies from the Central Government with regard to wetland protection. Five wetlands were designated this year as wetlands of international importance, adding the total number in China up to 46. One hundred and thirty-one new places were approved as (pilot) national wetland parks, and the wetland protection area in China grew by 0.3 mil. ha.

**Typical marine ecosystems** The typical estuary ecosystems monitored this year were all in sub-health conditions. The seawaters were in eutrophic state, the phytoplankton density was above the normal range and the density of fish roes and larva was relatively low in most of the estuary ecosystems. The zooplankton density was below the normal range at the estuaries of Shuangtaizi River and Pearl River. The density of large benthic organisms was above normal range, whereas the biomass was below normal

range at the Yangtze River estuary. The density of large benthic organisms was below normal range in Yellow River estuary. The mangrove ecosystems were found in healthy conditions in Beihai Municipality and estuary of Beilun River, Guangxi Autonomous Region in South China. The habitats of the monitored mangrove ecosystems were in good shape, and the area of mangrove forests remained unchanged. The density and biomass of large benthic organisms found in the monitored mangrove forests at the estuary of Beilun River had some increase. In the mangrove monitoring area in Shankou Town of Beihai Municipality, the invasion of *Spartina alterniflora* Loisel. was fairly fast, threatening the growth of mangrove. The shallow tidal flat wetland ecosystems were in sub-health conditions in north Jiangsu. As the enclosure of the shallow tidal flats was fast in north Jiangsu, there was very little vegetation left, the area of which was cut almost by half from a year earlier. The phytoplankton density and zooplankton biomass there were both above normal range.

**Scenic and historic interest areas** A total of 225 national parks and 737 provincial scenic and historic interest areas had been established throughout the country by the end of the year. The coverage totaled around 195,600 $km^2$, equivalent to about 2.03% of the national territory. Among others, the area of national parks covered around 103,600 $km^2$, and provincial scenic and historic interest areas around 92,000 $km^2$. Thirty-four national parks and eight provincial scenic and historic interest areas of China were inscribed by UNESCO on the World Heritage List.

### Invasive Alien Species

There are around 500 invasive alien species in China. In the recent decade, more than 20 worst alien species have invaded China. Over 100 alien species wrecked perennial damage on a large scale. The distribution area of *Spartina alterniflora* Loisel. along Chinese coastline amounted to 35,995.2 ha.

## Measures and Actions

**【Integrated management of nature reserves nationwide】** The State Council printed and circulated the *Administrative Regulations on the Alterations to National Nature Reserves*, and gave consent to the establishment of 44 new national nature reserves this year. The monitoring of human activities using satellite remote sensing technology along with field verifications were concluded in 384 national nature reserves. China conducted surveys and assessments of the fact sheets of nature reserves nationwide, and wrapped up the fact sheet surveys of 27 provinces (autonomous regions, and municipalities directly under the Central Government) including Beijing and Tianjin. China also undertook collaboration and communications with Russia with regard to the transboundary nature reserve and biodiversity conservation. Thematic campaigns were carried out to inspect on the development and management of the 15 national marine nature reserves. Nine model zones were set up to demonstrate the aquatic organism wetland protection. Also, 60 national aquatic germplasm resources conservation areas were established.

**【Biodiversity conservation】** China printed and circulated the *2013 China Action Plan for United Nations Decade on Biodiversity (2011-2020)*, kicking off a series of publicity activities with regard to the "Six Ones" initiative under the framework of China action for *United Nations Decade on Biodiversity (2011-2020)*. The "Six Ones" initiative aims to advance biodiversity conservation in China by organizing one public welfare campaign, donating one popular science book, showing one theme movie, hosting one knowledge lecture, passing on one alternative skill for poverty reduction, and filming one people interview every year. Work has started on finalizing the biodiversity conservation priority area demarcations. *China Biodiversity Red List-Higher Plants* were officially published. The *Measures on the Supervision and Administrative over the Environmental Safety of Invasive Alien Species* were prepared, and the *List of Invasive Alien Species under Special State Management (1st batch)* was released. Technical guidelines were developed with regard to the emergency prevention and control of 40 species of major agricultural invasive alien species. Seventeen technical specifications were promulgated with regard to the monitoring, evaluation, prevention and control of invasive alien species.

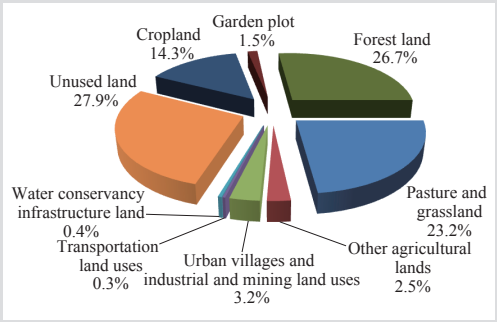
# Land and Rural Environment

## General Situation

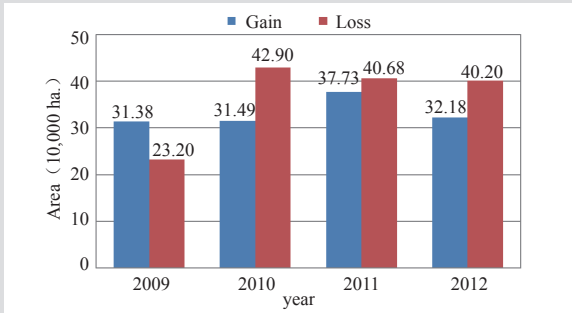
The problems concerning farmland quality were pressing, regional land degradation problems were serious, and the rural environmental situation remained grave.

**Land Resources and Farmlands** According to the second national census for land, by the end of 2012, there had been 646.4656 mil. ha. agricultural land uses which includes 135.1585 mil. ha. croplands, 253.3969 mil. ha. forest lands, and 219.5653 mil. ha. pastures and grasslands; as well as 36.907 mil. ha. construction lands, of which 30.1992 mil. ha. are urban villages and industrial and mining land uses.

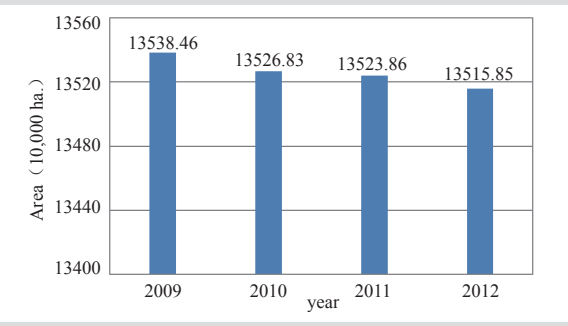
Up to 0.402 mil. ha. croplands were lost to construction projects, disasters, and ecological conversions in 2012, while 321,800 ha. croplands were gained through land improvement and agricultural restructuring, resulting net loss of cropland by 80,200 ha.




Percentage of different land uses in China in 2012




2009–2012 cropland gains and losses in China




2009–2012 year–on–year change of cropland area in China

**Water Loss and Soil Erosion** According to the water and soil conservation findings of the first national census for water, the soil erosion in China totaled 2.9491 mil. km$^2$, which equals to 30.72% of national territory. Among others, 1.2932 mil. km$^2$ is caused by water erosion, and 1.6559 mil. km$^2$ by wind erosion.

**Living environment of small towns and villages** By the end of 2013, water supply had been available in 81.7% of the designated towns nationwide and gas available in 45.1% of them; the percentage of greenery coverage registered 15.4%, and per person road area amounted to 12.2 m$^2$ in those towns. Up to 59.4% of the rural areas in China had access to water supply; 61.3% of the incorporated villages had access to centralized water supply; 9.0% of the incorporated villages

had domestic sewage treated before discharged into the environment; and 35.9% of the incorporated villages had their solid wastes disposed.

## Measures and Actions

**【Rural environment governance】** The investment of the Central Government using the special fund for rural environmental protection was up to 6 bn. yuan this year. Jiangsu Province and Ningxia Autonomous Region were selected as pilot province/region for province-wide, intensive, and integrated rural environment management projects which started this year. The list of major designated towns was adjusted and extended, adding a batch of designated towns which have developmental priorities. The construction projects of sewage pipes in support of municipal wastewater treatment facilities in 908 designated towns seated in key basins were covered by the Central Government subsidy program during the "12$^{th}$ Five-Year Plan" period from 2010 to 2015; and the combined length of those pipes is 18,258 km. The national monitoring network for agricultural non-point pollution was basically established, consisting of 270 sites for monitoring farmland non-point sources and 210 sites for monitoring farmland agro-film residues according to the national monitoring program. Agricultural cleaner production demonstration projects were carried out in 80 counties from 10 provinces (autonomous regions) including Xinjiang, Gansu, Hebei, and Jilin, with the focus on agro-film recovery and reuse. A total of 1,600 plus villages had been developed into demonstration villages for rural cleaner production projects. Moreover, rural environmental sanitary conditions was monitored through 14,000 monitoring sites distributed in 700 counties nationwide, and the monitoring items included environmentally sound treatment of rural wastewater, solid wastes, and feces; soil sanitary conditions; and prevention and control of vectors.

**【Safe drinking water supply in rural areas】** The Central and local governments earmarked 32.435 bn. yuan this year for safe drinking water supply projects in rural areas, 22.5 bn. yuan of which was contributed by the Central Government, and 9.935 bn. yuan by local governments. As a result, almost 50,000 centralized water supply projects and 40,000 separate water supply projects were concluded, enabling 63.43 mil. rural residents including faculties and students in rural schools to have access to safe drinking water.

# Forest Environment

## General Situation

Forest resources of China enter the steady development period with amount increase and quality improvement.

**Forest Resources** According to the findings of the Eighth National Investigation on Forest Resources (2009-2013), the total forest area of the country was 208 mil. ha., forest coverage at 21.63%, total growing stock of stumpage at 16.433 bn. $m^3$, and forest reserve was 15.137 bn. $m^3$. The forest area of China ranked No.5 and its forest reserve ranked No.6 in the world, and artificial forest area ranked No.1 in the world. Compared with the findings of the Seventh National Investigation on Forest Resources (2004-2008), forest area increased by 12.23 mil. ha., forest coverage went up by 1.27 percentage points. There was 1.520 bn. $m^3$ net increase of total growing stock of stumpage and 1.416 bn. $m^3$ net increase of forest stock. With increase of total forest resources and improvement of structure and quality, forest ecological functions have been further enhanced. The total biomass of forests in the country was 17.002 bn. t, and total carbon reserve reached 8.427 bn. t. There was 580.709 bn. $m^3$ for annual water conservation, 8.191 bn. t for annual soil fixation, 430 mil. t for annual conservation of nutrients, 38 mil. t for annual adsorption of pollutants and 5.845 bn. t for annual dust retention.

**Forest Biological Hazards** In 2013, a total of 7.205 mil. ha. forests across the country were under prevention and control of major forest biological hazards. The disaster rate of major forest hazardous organisms was controlled under 5‰, over 85% forests had been under prevention and control of biological hazards. The threat of major forest biological hazards such as pinewood nematode disease and fall webworms had been under effective control.

**Forest Fire** There were 3929 forest fires across the country in 2013, affecting 13700 ha. forest with 55 deaths. There was 31.6%, 52.5% and 25.0% reduction respectively of the three indicators compared with the average of the same period of 2010-2012, achieving five-consecutive-years reduction of both the amount of fires and affected forest area.

## Measures and Actions

**【Implementation of key projects on ecological restoration】** In 2013, 6.104 mil. ha. afforestation had been completed across the country. Among them, the key project on ecological restoration had finished afforestation of 2.569 mil. ha., accounting for 42.1%. Stage II of natural forest conservation project finished afforestation of 460,300 ha. in the whole year. 114 mil. ha. forests were under maintenance. The Grain for Green Project had finished afforestation of 629,800 ha. in the whole year. The Project on the Control of Sand Sources to Beijing and Tianjin finished afforestation of 626,100 ha. in the whole year. The project on comprehensive control of stonification of karst regions had completed afforestation of 355,800 ha. in the whole year. Key projects such as the development of shelter forests in North China, Northeast China and Northwest China and the shelter forests in Yangtze River Basin had completed afforestation of 853,700 ha. in the whole year. Up to the end of 2013, the project on conservation of natural forests, grain for green project, project on the control of sand and dust sources to Beijing and Tianjin, project on comprehensive control of stonification, project on the development of shelter forests in North China, Northeast China and Northwest China and the shelter forests in Yangtze River Basin have completed accumulated afforestation of 15.0578 mil. ha., 25.8767 mil. ha., 7.4806 mil. ha., 1.153 mil. ha. and 49.4264 mil. ha. respectively.

**【Prevention and control of sand】** The authority has released the *National Plan for Prevention and Control of Desertification (2011-2020)*. It has commenced trial on subsidizing the enclosed desertified land banning grazing for protection. The central government arranged 300 mil. yuan subsidy for the trial in 30 counties of 7 provinces (autonomous regions) such as Inner Mongolia, Tibet, Shaanxi, Gansu, Qinghai, Ningxia and Xinjiang. It conducted trial on the development of National Desert Park. The authority has commenced the the Fifth National Monitoring on Desertification.

## 2013 Annual General Meeting of China Council for International Cooperation on Environment and Development

2013 Annual General Meeting of China Council for International Cooperation on Environment and Development was held in Beijing during November 13-15 with the theme "Environment and Society towards Green Development". The meeting listened to the briefings of the findings of 5 policy study programs such as "Environmental Protection and Social Development", "Sustainable Consumption and Green Development", "Media and Public Participation Policy for Promoting Green Development", "Corporate Social Responsibility in Green Development" and "Policy Promoting Green Travel in Cities". Meanwhile, CCICED has organized three forums with the themes such as "Green Development and Social Harmony", "Public Participation and Green Development" and "Practice and Innovation for Development of Ecological Civilization" and discussed and finalized the policy recommendations to the Chinese Government. Premier Li Keqiang met with CCICED International Members and had a discussion with them. He pointed out that China is in the critical period when only with transformation and upgrading can China maintain continuous and healthy economic development. Environmental protection becomes an important public welfare issue. The Chinese Government attaches importance to the coordination and balance between development and environmental protection, carries out measures on prevention and control of pollution as well as supervision, greatly develops energy-saving and environmental protection industries, promotes economic development and better protects the environment. When attending CCICED AGM and meeting with CCICED international members, Mr. Zhang Gaoli, Vice Premier of the State Council and CCICED Chairman said, China will accelerate the development of systematic and intact ecological civilization system, improve asset property system and use regulation system for natural resources, identify red line for ecological conservation, carry out the system of compensated use of resources and ecocompensation system, and reform the management system for protection of eco environment.

# Grassland Environment

## General Situation

**Grassland Resources** Grassland area across the country was about 400 mil. ha. in 2013, accounting for about 41.7% of total land area. The grassland area of 12 provinces (autonomous regions, municipalities) in western part of China was 331 mil. ha., accounting for 84.2% of total grassland area of China. The total grassland area of six big pasture regions such as Inner Mongolia, Xinjiang, Tibet, Qinghai, Gansu and Sichuan was 293 mil. ha., about 75.0% of total grassland area of the country. The grassland in southern part of China was dominated by grass hills and grass slope, most of them were distributed at mountain areas and hills with total area about 67 mil. ha.

**Grassland Productivity** In 2013, the total fresh grass output of natural grassland across the country reached 1055.8121 mil. t, up by 0.59% compared with that of last year, equivalent to about 325.4292 mil. t dry grass. The carrying capacity for livestock was about 255.792 mil. sheep, up by 0.48% compared with that of last year. The total fresh grass yield of 23 major provinces (autonomous regions, municipalities) across the country reached 983.3337 mil. t, taking up 93.14% of total national yield, up by 0.41% compared with that of last year; equivalent to about 307.817 mil. t dry grass, up by 0.41%. The livestock carrying capacity was about 242.0409 mil. sheep, up by 0.45% compared with that of last year.

**Grassland Disaster** There were 90 grassland fires across the country in 2013. Among them, 76 were ordinary fires, 13 were relatively big grassland fires and 1 was major grassland fire. A total of 35077.3 ha., grassland were affected with 7.59 mil. yuan economic loss, one injured and no livestock loss. The amount of grassland fires across the country had 20 times reduction compared with that of last year. A total of 4 relatively big fires, 2 major fires and 2 extremely big fires were avoided. The fire affected grassland area went down by 72.4%. A total of 36.955 mil. ha. grassland across the country were subject to rats, about 9.2% of total grassland area of the country, basically same as that of last year. 15.306 mil. ha. grassland were subject to insects, accounting for 3.8% of total grassland area, down by 12.0% compared with that of last year.

## Measures and Actions

**【Implementing the subsidy and reward policy for grassland ecological conservation】** In 2013, the central government arranged 15.946 bn. yuan as subsidy and reward for grassland ecological conservation and kept on the implementation of subsidy and reward mechanism for conservation of grassland ecology in 13 provinces (autonomous regions) such as Inner Mongolia, Xinjiang, Gansu and Qinghai. According to the basic principle of "identifying target, task, responsibility and funds of each province" and "identifying the tasks, subsidy, service and guidance, supervision and file or card for each household", the government has carried out policy measures for herdsman such as subsidy for grassland grazing prohibition, award for grass-livestock balance and subsidy for means of production of herdsman.

**【Implementation of the project on grassland protection and development】** In 2013, the central government invested 2 bn. yuan on the "pasture for grassland" project in Inner Mongolia, Sichuan, Gansu, Ningxia, Tibet, Qinghai, Xinjiang, Guizhou, Yunnan, Heilongjiang and Xinjiang Production and Construction Corps. The central government has invested 425 mil. yuan for the program on the control of sand and dust in grassland of Beijing, Tianjin, Shanxi, Hebei and Shaanxi. In addition, the central government invested 1.9 bn. yuan for the herdsman settlement project in Sichuan, Tibet, Gansu, Qinghai, Xinjiang and Xinjiang Production and Construction Corps.

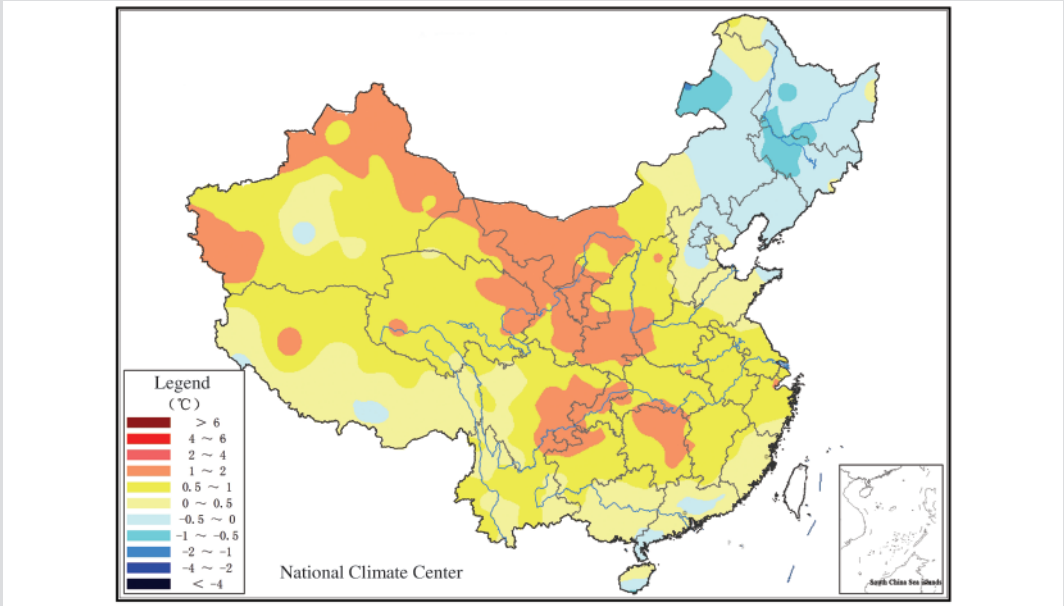
# Climate and Natural Disasters

## General Situation

The overall climate across the country was normal in 2013.

### Air Temperature

In 2013, the average air temperature across the country was 10.2℃, 0.6℃ higher than historical average and 0.8℃ higher than that of last year, the fourth warmest year since 1961. In time distribution, the air temperature of each month was higher than that of the average of the same month except January and April. In spatial distribution, the temperature of most part of Northeast China, northeastern part of North China, eastern part of Inner Mongolia and southern part of Hainan was lower than the historical average, while the temperature of other regions was higher than the historical average.



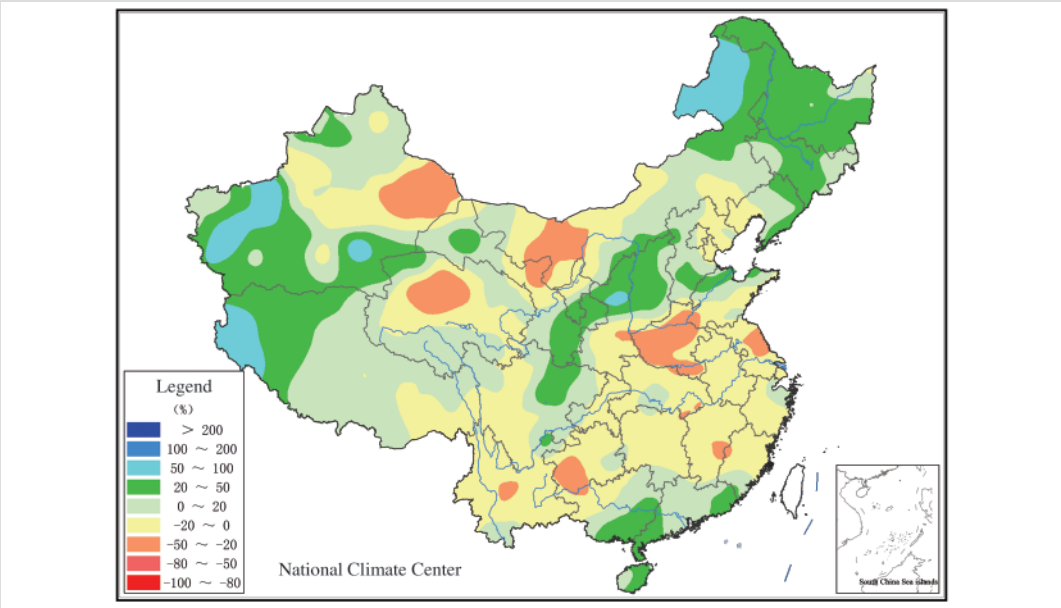

Annual average air temperature distribution in China in 2013

### Precipitation

In 2013, the precipitation across the country ranged from 7.4 mm (Tulufan in Xinjiang) to 3488.9 mm (Dongxing in Guangxi) with the average at 653.5 mm, 23.6 mm more than the historical average and 15.8 mm less than that of last year. In time distribution, the precipitation of January~April, August and October was less than the historical average, but the precipitation of other months was more than the historical average. In spatial distribution, most parts of Guangdong, southeastern part of Guangxi and most parts of Hainan had more precipitation, while southern part of Xinjiang, northwestern part of Qinghai, northwestern part of Inner Mongolia and western part of Gansu had relatively less

precipitation.

In 2013, the precipitation of most part of Northeast China, western and southeastern parts of North China, northeastern part of Inner Mongolia, northern part of Shaanxi, eastern part of Gansu, northeastern part of Sichuan, western part of Tibet, western part of Xinjiang, eastern part of Guangxi, southwestern parts of Guangdong and most part of Hainan was more than the historical average; while the precipitation of most part of Henan, central and eastern part of Jiangsu, southwestern part of Guizhou, western part of Inner Mongolia, northeastern part of Xinjiang and northwestern part of Qinghai was less than that of normal years.




Geographical distribution of precipitation in China in 2013

## Meteorological Disaster

In 2013, there were relatively prominent meteorological disasters such as storm, typhoon, high temperature and heat wave across the country. Some areas had serious disaster.

**Storm** In 2013, there were concentrated regional storms in wet season across the country. Northeast China, Northwest China and Sichuan Basin had serious storm and flood disasters. There were 27 storms in wet season (May~September) and the storm and flood disasters were more than the average of 1991-2010 but with less missing and deaths.

**Typhoon** There were more generated and landed typhoons in 2013 with stronger on-land intensity and serious disaster. There were generation of 31 tropical cyclones, 3.6 more than the historical average; 9 of them landed in China, 2.2 more than that of normal years. Typhoons have caused 179 deaths and 63 missing with direct economic loss of 126.03 bn. yuan. The amount of death was less than the average of 1990-2012 but with the maximum direct economic loss since 1990.

**High temperature** There was large scale continuous high temperature in most southern parts of China during the summer of 2013. In particular during July~August, there was the strongest high temperature and heat wave in South China since 1951, aggravating summer drought of parts of the region, affecting crop growth. Electricity consumption hit new record high several times with more people suffering sunstroke. There was relatively high risk of forest fire with several forest fires in provinces like Hunan Province.

**Drought** In 2013, there was obvious regional and staged droughts across the country but with less impacts. There was another continuous drought during the winter and spring in Southwest China. Regions like the provinces south to the Yangtze River and Guizhou had serious drought in the summer. However, these droughts did not affect the main bases of grain production and key period of grain production.

**Snow disaster** There were several regional snow disasters in 2013 but with less impacts. The main snow disasters included the snow disaster in part of North China in January.

The snowfall in Pulan of Tibet early this year hit the historical record. The economic loss of snow disaster in provinces such as Jiangsu and Anhui in February went beyond 100 mil. yuan. The snow fall in April in Hebei Province and Shanxi Province hit the record. There was the strongest snow in Northeast China in November since the beginning of the winter.

**Low temperature** There were frequent rain and snows in Northeast China in the winter and spring of 2013 with average precipitation of 164.6 mm, 65.7 mm more than the historical average and the biggest since 1952. Meanwhile, the air temperature of 5 months in the winter and spring was continuously low with the average temperature 3.1℃ lower than the historical average of the same period of normal years, the lowest in the same period since 1958.

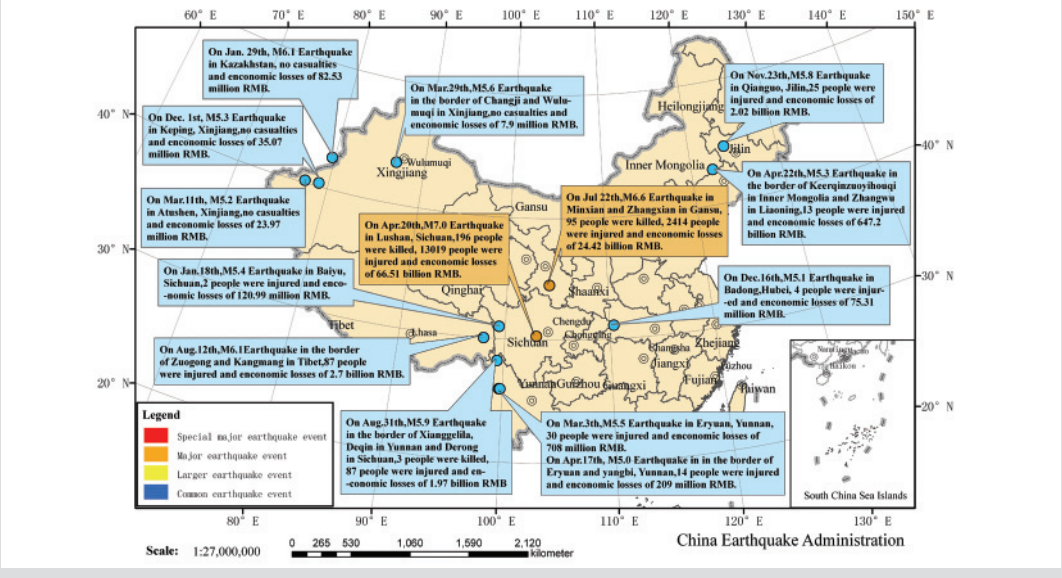
**Sand and dust weather** There were less sand & dust weather with weak intensity, late occurrence and less overall impacts in 2013. There were a total of 7 sand & dust weather in northern part of China, 5.8 times less than the average of the same period of 2000-2012, the least in the same period of this century. There were twice sandstorm and strong sandstorm, 6 times less compared with the average of 2001-2010. The first sand & dust weather in 2013 occurred on February 24, over half month later than the average time of the first sand & dust weather of 2000-2012.

**Flood** In 2013, the overall flood disaster across the country was relatively slight but with serious disaster in part areas. The Songhua River and Heilong River had the biggest flood at river-basin level. The water level of Nenjiang River, mainstream of Songhua River and mainstream of Heilong River exceeded the warning level one after another. Strong precipitation triggered disasters such as floods of small and medium sized rivers, mountain torrent, landslide and mud-stone flow, leading to 560 deaths, taking up 72% of total death by disasters.

## Earthquake Disasters

There were 14 earthquake disasters in mainland China in 2013; 2 of them were major earthquake disasters and 12 were ordinary earthquake disasters (including the disaster in Xinjiang resulting from the earthquake at 6.1 Richter scale in Kazakhstan occurred on January 29, 2013). The earthquake disasters in the whole year affected about 6.05 mil. people, led to 294 deaths and 15671 injured, destruction of 6.0346 mil. $m^2$ of houses, damage of 85.5942 mil. $m^2$ houses with 99.536 bn. yuan direct economic loss in mainland China.

Western part of China is the main places of destructive earthquakes. Most of the 14 earthquake disasters occurred in West China except the earthquakes at border area between Horqin Left Wing Rear Banner in Inner Mongolia and Zhangwu County in Liaoning, Qianguo County (earthquake swarm) in Jilin Province and Badong County in Hubei Province. The proportion of death and direct economic loss was 100% and 97% respectively of the total of whole year. Among them, Sichuan and Gansu suffered the most serious earthquake disasters.




Distribution of earthquake disasters in mainland China in 2013

The earthquake loss of mainland China in 2013

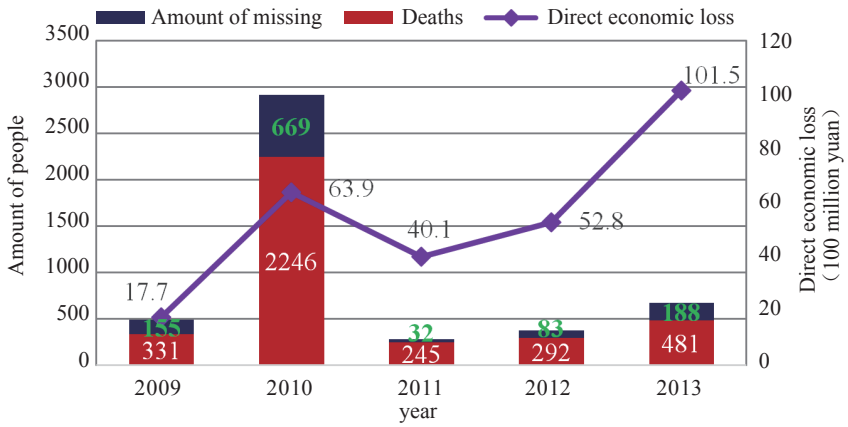
| No | Time | | Venue | Richter scale | Casualty | | House damage ( $m^2$ ) [1] | | | | Direct economic loss ( 10,000 yuan ) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Date | Hour | | | Death | Injury | Destruction | Serious | Intermediate | Slight | |
| 1 | Jan. 18 | 20:42 | Baiyu County in Sichuan | 5.4 | 0 | 2 | 1108 | 0 | 168901 | 7242 | 12099 |
| 2 | Jan. 29 | 0:38 | Kazakhstan | 6.1 | 0 | 0 | 3580 | 35580 | 142260 | 0 | 8252.79 |
| 3 | Mar. 3 | 13:41 | Eryuan County in Yunnan | 5.5 | 0 | 30 | 112372 | 0 | 1511715 | 125060 | 70800 |
| 4 | Mar. 11 | 11:01 | Atushen City in Xinjiang | 5.2 | 0 | 0 | 8700 | 0 | 70500 | 5430 | 2397 |
| 5 | Mar. 29 | 13:01 | Border area between Changji City and Urmuqi County in Xinjiang | 5.6 | 0 | 0 | 20 | 3200 | 29792 | 5248 | 791.16 |
| 6 | Apr. 17 | 9:45 | Border area between Eryuan County and Yangbi County in Yunnan | 5.0 | 0 | 14 | 47699 | 0 | 398580 | 23694 | 20878 |
| 7 | Apr. 20 | 8:02 | Lushan County in Sichuan | 7.0 | 196 | 13019 | 2522354 | 0 | 12885770 | 41177625 | 6651370 |
| 8 | Apr. 22 | 17:11 | Border area between Horqin Left Wing Rear Banner in Inner Mongolia and Zhangwu County in Liaoning | 5.5 | 0 | 13 | 1547 | 102147 | 354123 | 1944669 | 64720.26 |
| 9 | Jul. 22 | 7:45 | Border between Min County and Zhangxian County in Gansu | 6.6 | 95 | 2414 | 2937431 | 0 | 9559738 | 8980786 | 2441600 |
| 10 | Aug. 12 | 5:23 | Border area between Zogang and Markam County in Tibet | 6.1 | 0 | 87 | 82094 | 3553 | 1655496 | 101245 | 270714.6 |
| 11 | Aug. 31 | 8:04 | Border area between Shangri-La County and Deqin County of Yunan and Derong County in Sichuan | 5.9 | 3 | 63 | 115804 | 1823 | 1315245 | 352697 | 196670.00 |
| 12 | Nov. 23 | 6:04 | Qianguo County in Jilin (swarm) | 5.5 | 0 | 25 | 21460 | 0 | 1150040 | 2948420 | 202300.00 |
| 13 | Dec. 1 | 16:34 | Keping County in Xinjiang | 5.3 | 0 | 0 | 26922 | 0 | 247022 | 0 | 3507.15 |
| 14 | Dec. 16 | 13:04 | Badong County in Hubei | 5.1 | 0 | 4 | 5210 | 2044 | 49836 | 383071 | 7531 |
| Total | | | | | 294 | 15671 | 5886301 | 148347 | 29539018 | 56055187 | 9953630.96 |

[1] The following three categories on buildings are employed when investigating earthquake disaster on simple buildings in rural areas: destruction (including destruction and serious damage), damage (including intermediate damage and slight damage) and basically good.

## Geological Disaster

There were 15,403 various kinds of geological disasters across the country in 2013. Among them, 9849 were landslide, 3313 were collapses, 1541 were mud-stone flow, 371 were settling, 301 were cracks, 28 were earth subsidence; leading to 481 deaths, 188 missing, 264 injured and 10.15 bn. yuan direct economic loss. The amount of geological disasters, the amount of resulting death and missing and direct economic loss went up by 7.5%, 78.4% and 92.2% respectively as compared with that of last year.

There were geological disasters with different amount in 29 provinces (autonomous regions, municipalities) except Shanghai and Tianjin, which mainly occurred in provinces such as Gansu, Sichuan, Guangdong, Hunan, Zhejiang and Guangxi.



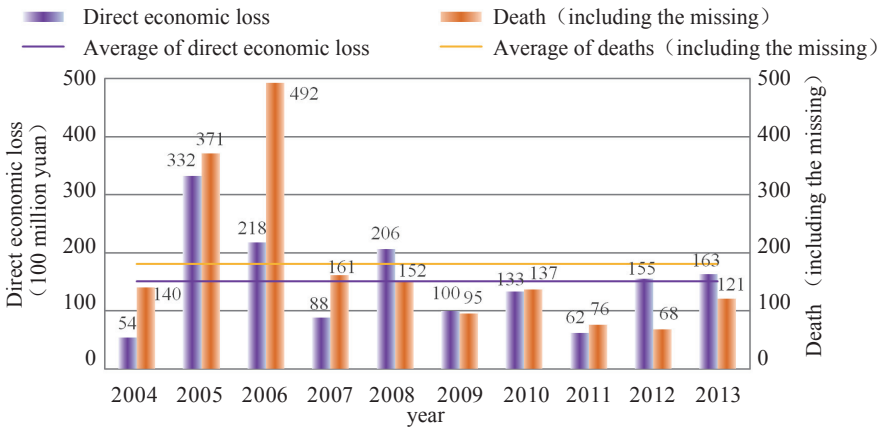

Death and direct economic loss of geological disasters during 2009–2013

## Marine Disaster

In 2013, marine disasters across the country were dominated by storm surge, sea waves, sea ice and red tides. The disasters such as green tide, coastal erosion, sea water invasion, soil salinization and saltwater intrusion occurred at different degrees. All kinds of marine disasters have caused 16.348 bn. yuan direct economic loss and 121 deaths (including missing).

There were 46 times of red tides in 2013 with accumulated area of 4070 km$^2$. The East China Sea had most (25 times) red tides. The Bohai Sea had the biggest accumulated area of red tide at 1880 km$^2$. Enteromorpha prolifra green tide occurred in coastal marine waters of the Yellow Sea during March ~ August with the biggest covering area at 790 km$^2$ and biggest distribution area at 29733 km$^2$.

The beach area of the Bohai Sea had serious sea water invasion and soil salinization. The range of sea water invasion




Direct economic loss and deaths (including the missing) resulting from various kinds of marine disasters during 2004–2013

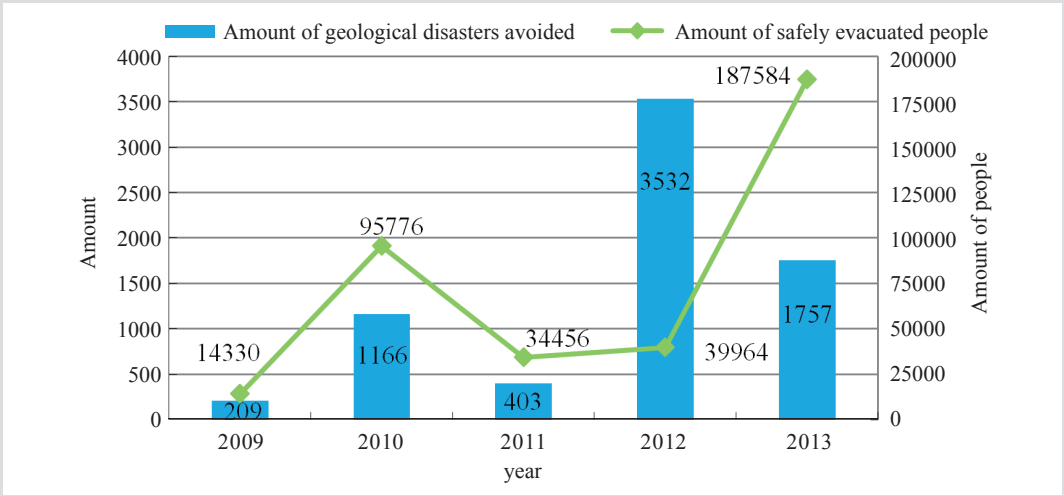
and soil salinization at the beach area of the Yellow Sea and East China Sea was relatively small. However, the chlorine concentration of coastal monitoring sites of some monitoring areas had evident increase. In the beach area of the South China Sea, the scope of seawater intrusion was small with relatively slight soil salinization.

The erosion of sandy coast and silt coast was still serious, the erosion of part of coastal sections was worsening.

## Measures and Actions

**【Flood control and drought relief】** In 2013, a total of 11.12 mil. people were evacuated under emergency. A total of 1.95 mil. people were evacuated from floods, avoiding 365,000 person-time casualties, flood of 156 cities at or above county level, inundation of 3.978 mil. ha. arable land and 20.29 mil. t loss of grain. The economic benefits of flood prevention and disaster relief reached 236.2 bn. yuan. The drought relief has saved 39.93 mil. t of grain, 50.7 bn. yuan cash crops and overcome the temporary difficulty of 20.07 mil. rural residents and 9.36 mil. livestock in getting access to drinking water.

**【Prevention and control of geological disaster】** In 2013, the central government arranged 4.5 bn. yuan special fund for prevention and control of very big geological disasters and successfully predicted 1757 geological disasters, avoiding 187,584 causalities and 1.9 bn. yuan direct economic loss. The authority has organized 22,000 times of emergency response drills for geological disasters at different scales with over 1.28 mil. participants. A total of over 400,000 person-times training were conducted in the whole year for the workers engaged in mass monitoring and prevention of geological disasters.




Avoidance of geological disasters during 2009–2013

# Transportation

## General Situation

Up to the end of 2013, the total highway length was 4.3562 mil. km across the country, 104,400 km of them were superhighway. The navigable inland river channels across the country was 125,900 km. There were 31,760 berths in all ports and harbors across the country. Among them, the berths of coastal production ports and berths of production harbor of inland rivers accounted for 17.9% and 82.1% respectively.

There were 15.0473 mil. commercial vehicles across the country; 94.3% of them were trucks and 5.7% were passenger vehicles. There were 172,600 transport ships across the country. Among them, 92.2% were inland river transport ships, 6.4% were coastal transport ships and 1.4% were ocean transport ships. The annual average daily traffic flow of vehicles of national roads across the country was 14,564 vehicles (standard car equivalent). The annual average daily flow of standard ship of the trunk channel of Yangtze River was 628.0 ship•times in the year.

Commercial passenger vehicles across the country finished the transport of 18.535 bn. highway passengers with passenger turnover at 1,125.094 bn. person•km. A total of 235 mil. people were transported by waterway across the country with turnover of 6.833 bn. person•km. Commercial trucks across the country finished 30.766 bn. t freight transport and 5,573.808 bn. t•km turnover of goods. The transport of freight by waters across the country was 5.598 bn. t with turnover of 7,943.565 bn. t•km.

There were 509,600 in-service buses and trolley buses in all cities (including county cities) across the country. Among them, diesel vehicles, natural gas vehicles and petrol vehicles accounted for 59.3%, 24.3% and 3.4% respectively of the total. There were a total of 14,366 vehicles for rail transport operation. Among them, 90.3% were subway vehicles and 8.7% were light rail vehicles. There were 1.34 mil. taxis in the country. Urban passenger transport system had transported 128.335 bn. passengers in the whole year. Among them, buses and trolleys transported 77.117 bn. people with mileage of 34.896 bn. km; rail transport system transported 10.919 bn. people with mileage of 274 mil. train•km, and taxis finished the transport of 40.194 bn. people with mileage of 159.321 bn. km.

## Measures and Actions

**【Promote the development of green transport】** The authority printed out and distributed the *Guidelines for Accelerating the Development of Green, Circular and Low Carbon Transport* in 2013, which identifies specific measures for promoting transformation and green development of transport industry in areas such as construction of green and low-carbon transport infrastructure, application of transport equipment that saves energy and protects the environment, development of intensified and high-efficiency transport organization system, scientific innovation and information development. China has established the "inter-ministry/ministry-province joint development" cooperation mechanism for the development of green transport.

**【Strengthen environmental protection of transportation】** China continuously put more input in facilities and funds for environmental protection of highway and waterway in 2013. Among them, 12.5 bn. yuan were invested in highway environmental protection, 75% of them for ecological conservation facilities. A total of 3.2 bn. yuan was invested for port environmental protection, 68% of them for pollution prevention and control facilities. The authority has facilitated the compilation of the plan for environmental monitoring network of transport industry and development of trial projects. The authority has carried out 4 trial projects on ecological development and restoration of built highway as well as two trial projects on recycled utilization of clean energy and water in expressway service areas. The authority has strengthened capacity building in emergency response to oil spill, developed national inter-ministry meeting system for emergency response to key marine oil spill accidents and started the compilation of *National Plan for the Capacity Building in Emergency Response to Major Marine Oil Spills* and *National Emergency Response Program for Major Marine Oil Spills*.

**【Promote energy saving and emission reduction of transport industry】** In 2013, the authority organized 10 cities including Wuxi to conduct regional trial on low-carbon transport city. It organized the topic trial on Low Carbon Port in 4 ports including Lianyungang. In addition, it has organized the trial on Low Carbon Highway in 7 highway construction projects including the double line of Chengdu-Chongqing Highway (in Chongqing). The authority has printed out and distributed the *Guidelines of Ministry of Transport on Promoting the Application of Liquified Natural Gas in Water Transport Industry*.

## Environmental Pollution Accidents across the Country and Safety Guarantee

There were 712 environmental pollution accidents across the country in 2013, up by 31.4% compared with that of last year. Among them, 3 were big environmental pollution accidents, 12 were relatively big pollution accidents, and 697 were ordinary environmental pollution accidents. There was no very big environmental pollution accident. In terms of the causes, production safety accident, transport accident, corporate pollution discharge, natural disaster and other factors have caused 291, 188, 31, 39 and 163 environmental pollution accidents respectively, accounting for 40.9%, 26.4%, 4.4%, 5.5% and 22.9% of the total. Production safety accidents and transport accidents were still main factors triggering sudden environmental pollution accidents. In terms of pollution type, 45.2% sudden environmental accidents involved in water pollution and 30.1% involved in air pollution.

In 2013, "010-12369" hotline had received 48,749 telephone calls or emails on environmental complaints. A total of 1,960 cases were accepted and finished handling. The authority has adopted the measures such as on-site supervision, rejection of EIA documents of new construction project in region with excessive pollution load and interviews with relevant local leaders to urge the corrections for the cases that the public was not satisfied. 100% cases have been handled according to schedule. The authority has established the system making public the reported cases and made public 1,488 cases of public report, 39 cases of them were exposed at media. The authority has punished enterprises with the reported environmental infringements at different degrees according to law, and addressed a group of environmental problems affecting public health as well as production and everyday life.

# Energy

## General Situation

The overall energy situation of China in 2013 was smooth with stable demand and supply.

**Production** In 2013, the total energy output was 3.4 bn. t coal equivalent, up by 2.4% compared with that of last year. Among them, raw coal output was 3.68 bn. t, up by 0.8% compared with that of last year; crude oil output was 209 mil. t, up by 1.8% compared with that of last year; natural gas output was 117.05 bn. $m^3$, up by 9.4% compared with that of last year; the electric energy production was 5.39 tril. kW•h, up by 7.5% compared with that of last year. Coal import was 327 mil. t, up by 13.4% compared with that of last year. The import of crude oil was 282 mil. t, up by 4.0% compared with that of last year. The import of oil product was 39.59 mil. t, down by 0.6% compared with that of last year.

Output and growth rate of primary energy in 2013

| Product name | Unit | Output | more than that of last year (%) |
|---|---|---|---|
| Total ouput of primary energy | 100 mil. t coal equivalent | 34.0 | 2.4 |
| Coal | 100 mil. t | 36.8 | 0.8 |
| Crude oil | 100 mil. t | 2.09 | 1.8 |
| Natural gas | 100 mil. $m^3$ | 1170.5 | 9.4 |
| Power generation | 100 mil. kW•h | 53975.9 | 7.5 |
| Among them: thermal | 100 mil. kW•h | 42358.7 | 7.0 |
| Hydro | 100 mil. kW•h | 9116.4 | 5.6 |
| Nuclear power | 100 mil. kW•h | 1106.3 | 13.6 |

Note: Natural gas includes natural gas from gas field, natural gas of oil fields (including natural gas in gas layer and associated dissolved gas in oil field) and coal field natural gas (i.e. coal associated gas).

**Consumption** According to primary estimate, the total energy consumption across the country in 2013 was 3.75 bn. t coal equivalent, up by 3.7% compared with that of last year. Among them, there was 3.7% increase of coal consumption, 3.4% increase of crude oil consumption, 13.0% increase of natural gas consumption, and 7.5% rise of electricity consumption. The energy consumption per 10,000 yuan GDP of the country went down by 3.7%.

## Measures and Actions

**【Employ comprehensive measures to steadily reduce coal consumption】** In 2013, coal consumption took up 66.0% of total energy consumption, down by 0.6 percentage point compared with that of last year. There were 29.93 mil.

kW increase of installed capacity of hydropower in the whole year with total hydropower installed capacity at 280 mil. kW. Three nuclear power generating units began construction, 31 nuclear power generating units were under construction with installed capacity of 33.85 mil. kW. Two nuclear power generating units were newly put into operation. A total of 17 nuclear power generating units were under operation and the total installed capacity of nuclear power reached 14.61 mil. kW. There were 14.06 mil. kW increase of on-grid installed capacity from wind power, the total on-grid installed capacity from wind energy reached 75.48 mil. kW with generated electricity at 140.1 bn. kW•h, up by 36.4% compared with that of last year. There were 11.38 mil. kW increase of on-grid installed capacity from solar energy. The total on-grid installed capacity of electricity from solar energy reached 14.79 mil. kW with generated energy exceeding 8.7 bn. kW•h, up by 143.0% compared with that of last year. The installed capacity of electricity from biomass reached 8.50 mil. kW with generated electricity at 32 bn. kW•h. The proportion of installed capacity of electricity generated from non-fossil fuel reached 30.9% of the total installed capacity. The generated electricity from non-fossil energy sources was 1,157.1 bn. kW•h.

**【Promote transformation and upgrading of energy industry】** In 2013, 4.47 mil. kW capacity of small thermal power generating units have been shut down. A total of 1,874 outdated coal mines with production capacity of about 200 mil. t have been phased out. The amount of coal mines across the country went down by 1,200 with total amount less than 6,300. The contribution rate of modern, scaled and intensified large energy bases has evidently gone up. The output of large coal production bases took up over 90% of the total output of the country. The proportion of on-grid installed capacity of large bases of coal fueled electricity accounted for 7.6% of total thermal installed capacity. About 237 bn. kW•h electricity was transmitted across different regions in the country, up by 17.5% compared with that of last year. About 779 bn. kW•h electricity was transmitted across provinces, up by 8.7% compared with that of last year.

# Data Sources and Explanations for Assessment

The data on the state of environmental quality in the current Report is dominated by the monitoring data of National Environmental Monitoring Network. Meanwhile, it absorbs the environmental data provided by relevant ministries and commissions. Among them, the information about groundwater quality, land resources and arable land as well as geological disasters is provided by the Ministry of Land and Resources. The information such as disposal of urban domestic garbage, urban drainage and sewage treatment as well as scenic and historic spots is provided by Ministry of Housing and Urban-Rural Development. The information about living environment of small cities, towns and villages is also provided by Ministry of Housing and Urban-Rural Development and National Health and Family Planning Commission. The information about transport is provided by Ministry of Transport. The information about transboundary water quality, water & soil erosion and flood disasters is provided by the Ministry of Water Resources. The information on the status of inland and marine fishery waters as well as grassland environment is provided by the Ministry of Agriculture. Energy data is provided by National Bureau of Statistics and National Energy Administration. The information on forest environment is provided by State Forestry Administration. Information about haze, climate and meteorological disasters is provided by China Meteorological Administration. The information on earthquake disasters is provided by China Seismological Bureau. The information such as marine water environment of the whole sea, marine sediments, marine nature reserves, typical marine ecosystems and marine disasters is provided by State Oceanic Administration. Individual data is primary statistic data. The final data is based on the official annual report or Report of relevant department.

National environment monitoring networks include national ambient air monitoring network composed of 1,436 monitoring sites in 338 cities at or above prefecture level, national surface water monitoring network composed of 972 water sections (sites) involving 423 rivers and 62 lakes (reservoirs), national acid precipitation monitoring network composed of over 1,000 sites covering 487 cities (districts, counties), water environment monitoring network of drinking water source areas composed of 835 collective drinking water source areas covering 309 cities at or above prefecture level, coastal sea environment monitoring network composed of 301 monitoring sites covering all coastal marine waters of the country, urban noise monitoring network composed of nearly 80,000 sites covering all cities at or above prefecture level and so on.

In the current Report, two national standards are implemented for urban ambient air quality. Among them, the assessment of urban ambient air quality for Stage I implementation of the new standard is based on the *Ambient Air Quality Standard (GB 3095-2012)* with assessing indicators including $SO_2$, $NO_2$, $PM_{10}$, $PM_{2.5}$, CO and $O_3$. The assessment of urban air quality of other cities at or above prefecture level is based on the *Ambient Air Quality Standard (GB 3095-1996)* with assessing indicators including $SO_2$, $NO_2$ and $PM_{10}$. The assessment of surface water quality is based on *Environmental Quality Standard for Surface Water (GB 3838-2002)* and *Measures for Assessing Environmental Quality of Surface Water (Trial)* with assessing 21 indicators such as pH, dissolved oxygen, $COD_{Mn}$, COD, $BOD_5$, ammonia nitrogen, TP, copper, zinc, fluoride, selenium, arsenic, mercury, cadmium, chromium (6 valence), lead, cyanide, volatile phenol, petroleum pollutants, anionic surfactant and sulfide. Lake (reservoir) trophic status assessing indicators include chlorophyll-a, TP, TN, SD and $COD_{Mn}$. The assessment of water quality of collective drinking water source areas of cities at or above prefecture level is based on the *Environmental Quality Standard for Surface Water (GB 3838-2002)* and *Quality Standard for Groundwater (GB/T 14848-93)*. The assessment of off-shore marine water quality is based on *Marine Water Quality Standard (GB 3097-1997)* and *Specification for Offshore Environmental Monitoring (HJ 442-2008)* with 28 assessing indicators such as pH, dissolved oxygen, COD, $BOD_5$, inorganic nitrogen, nonionic ammonia, active phosphate, mercury, cadmium, lead, six valance chromium, total chromium, arsenic, copper, zinc, selenium, nickel, cyanide, sulfide, volatile phenol, petroleum, benzene hexachloride, DDT, malathion, methyl parathion, benzo [a] pyrene, anionic surfactant and E-coli. The assessment of acoustic environment quality is based on *Technical Specifications for Environmental Noise Monitoring-Routine Monitoring for Urban Environmental Noise (HJ 640-2012)* and *Environmental Quality Standard for Noise (GB 3096-2008)*.

*Note: National data in the current Report does not cover Taiwan Province, Hong Kang SAR and Macao SAR except administrative zoning, national land area and earthquake disasters.*

# Contributors to the 2013 Report on the State of the Environment in China

## Leading Department

Ministry of Environmental Protection

## Contributing Ministries and Administrations

Ministry of Land and Resources

Ministry of Housing and Urban–Rural Development

Ministry of Transport

Ministry of Water Resources

Ministry of Agriculture

National Health and Family Planning Commission

National Bureau of Statistics

State Forestry Administration

China Meteorological Administration

China Earthquake Administration

National Energy Administration

State Oceanic Administration