I. STATUS OF LAND DESERTIFICATION AND SANIFICATION IN CHINA

1. Status of land desertification and sandification

By the end of 2014, the desertification area in China was 2,611,600 square kilometers making up 27.20% of the national territory and relevant to 528 counties (banners, cities) of 18 provinces (autonomous regions, municipalities) of Beijing, Tianjin, Hebei, Shanxi, Inner Mongolia, Liaoning, Jilin, Shandong, Henan, Hainan, Sichuan, Yunnan, Tibet, Shaanxi, Gansu, Qinghai, Ningxia and Xinjiang

(1) Desertification of the provinces (autonomous regions). The desertification occurred largely in Xinjiang, Inner Mongolia, Tibet, Gansu and Qinghai, with the respective desertification areas of 1,070,500 square kilometers, 609,200 square kilometers, 432,600 square kilometers, 185,000 square kilometers and 190,400 square kilometers. The accumulative desertification area of the five provinces (autonomous regions) makes up 95.64% of the total desertification acreage of the country while the other 13 provinces (autonomous regions, municipalities) represent 4.36% of the total (Fig 1-1).

(2) Climatic types of desertification. Of the total desertification acreage of the country, the area of arid desertification is 1,171,600 square kilometers making up 44.66%, the area of semi-arid desertification 935,900 square kilometers or 35.84% while the sub-moist for 504,100 square kilometers or 19.3% (Fig 1-2).

(3) Desertification types. Of the total desertification acreage of the country, wind erosion desertification represents 1,626,300 square kilometers or 69.93%; water erosion desertification 250,100 square kilometers or 9.58%; salinization 171,900 square kilometers or 6.58%; and freeze-thawing desertification for 363,300 square kilometers or 13.91% (Fig 1-3).

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1. The desertification in the bulletin refers to land degradation in the arid, semi-arid or sub-moist regions as result of factors inclusive of climatic changes and human impact. The degraded lands of these regions are desertification lands.

2. The sandification in the bulletin refers to the land degradation characterized by incidence of sand or gravel on ground surface as result of various reasons under different climatic conditions. The degraded land with obvious characteristics as above is sandified land.
2. Sandification

By 2014, China had an accumulative sandification area of 1,721,200 square kilometers making up 17.93% of the national territory and relevant to 920 counties (banners, cities) of the 30 provinces (autonomous regions, municipalities) or all provinces (autonomous regions, municipalities) except Shanghai, Taiwan, Hong Kong and Macao.

(1) Sandification at the provincial level. Sandification occurred mainly in the 5 provinces (autonomous regions) of Xinjiang, Inner Mongolia, Tibet, Qinghai, Gansu with the acreages respectively of 747,100 square kilometers, 407,900 square kilometers, 215,800 square kilometers, 124,600 square kilometers, 121,700 square kilometers. The sandification land area of the 5 provinces (autonomous regions) makes up 93.95% of the total sandification area of the country and the remaining 25 provinces (autonomous regions, municipalities) for 6.05% (Fig 1-5).

(2) The sandification types. Of the total sandification area of the country, the area of shifting dune (land) is 396,900 square kilometers making up 23.17%; The area of semi-fixed dune (land) 164,300 square kilometers or 9.55%; Fixed dune (land) 203,400 square kilometers or 17.05%; bare dune (land) 91,000 square kilometers or 5.29%; sandified cropland 48,500 square kilometers or 2.82%; wind eroded inferior (residual mound) land 63,800 square kilometers or 3.71%; Gobi desert 660,800 square kilometers or 38.17%, non-biological treated project sandy land 89 square kilometers or 0.01% (Fig 1-6).

(3) Degrees of sandification. Of the total sandification acreage of the country, light sandification area is 261,100 square kilometers or 15.17%; Moderate sandification area is 253,600 square kilometers or 14.74% ; Severe sandification area 333,500 square kilometers or 19.36 %; Very severe sandification area 872,900 square kilometers or 50.71% of the total. Refer to Fig. 1-7.
(4) Sandification land vegetation cover. The vegetation on the sandified land are mainly grasses and shrubs. Of the total sandification area of the country, the sandification area of herbaceous type is 719,960 square kilometers or 41.77%; The area with bushes 385,100 square kilometers or 22.37%; The area with arbor-bush-grass 60,800 square kilometers or 3.53%; The area with arbor vegetation coverage 5,200 square kilometers or 0.30% only. The area with no vegetation coverage (vegetation coverage less than 5% and sandified cropland) is 551,300 square kilometers comprising 32.03% of total sandification land area of the country. Refer to Fig. 1-8.

3. Situation of the lands with obvious sandification tendency

This land type refers to such land with the degradation extent between sandified land and unsandified land as the result of excessive land use or water resource scarcity, that is, it is currently not sandified land but has had obvious desertification tendency.

Up till 2014, the accumulative land area of obvious sandification tendency is 300,300 square kilometers representing 3.13% of territorial area. These lands are located in Inner Mongolia, Xinjiang, Qinghai and Gansu provinces (autonomous region) with the land areas of obvious sandification tendency respectively for 174,000 square kilometers, 47,100 square kilometers, 41,300 square kilometers, 17,800 square kilometers that combine to represent 93.3% of the total land area of obvious sandification tendency of the country. Refer to Fig. 1-9.

II. DYNAMIC CONDITION OF LAND DESERTIFICATION AND SANDIFICATION

1. Desertification

Compared with 2009, the desertification area for the whole country decreased by 12,120 square kilometers with the annual reduction of 2,424 square kilometers.

(1) Desertification dynamic condition at the provincial level. Compared with 2009, 18 desertification provinces (autonomous regions) had their desertification net areas decreased of which Inner Mongolia reduced by 4,169 square kilometers, Gansu reduced by 1,914 square kilometers, Shaanxi reduced by 1,443 square kilometers, Hebei reduced by 1,156 square kilometers, Ningxia reduced by 1,097 square kilometers, Shaanxi reduced 622 square kilometers, Xinjiang reduced by 529 square kilometers, and Qinghai reduced by 507 square kilometers (Fig. 2-1).

(2) Dynamic condition of desertification types. Compared with 2009, the wind erosion desertification decreased by 5,671 square kilometers, water erosion desertification decreased by 5,109 square kilometers, salinzation decreased by 1,100 square kilometers and freeze-thawing desertification decreased by 240 square kilometers (Fig. 2-2).
2. Sandification

Compared with 2009, the net sandification area of China decreased by 9,902 square kilometers with the annual reduction of 1,080 square kilometers.

(1) Dynamic condition of sandification at the provincial level. Compared with 2009, 29 provinces (autonomous regions, municipalities) of Inner Mongolia had their sandification areas decreased to different extents, with Inner Mongolia by 3,432 square kilometers, Shandong by 858 square kilometers, Gansu by 742 square kilometers, Shaanxi by 533 square kilometers, Jiangsu by 368 square kilometers, Qinghai by 370 square kilometers, Sichuan by 307 square kilometers (Fig. 2-4).

(2) Dynamic condition of sandification land types. Compared with 2009, the area of shifting dune (land) decreased by 7,282 square kilometers, semi-fixed dune (land) decreased by 12,841 square kilometers, fixed dune (land) increased by 15,506 square kilometers, bare sandy land decreased by 8,772 square kilometers. And sandified cropland area increased by 3,905 square kilometers (Fig. 2-5).

(3) Dynamic condition of sandification degrees. Compared with 2009, the light sandification increased by 41,900 square kilometers, moderate sandification increased by 4,100 square kilometers, severe sandification increased by 18,900 square kilometers and very severe sandification decreased by 74,800 square kilometers (Fig. 2-6).
III. STATUS AND DYNAMIC CONDITION OF LAND WITH OBVIOUS SANIFICATION TENDENCY

Compared with 2009, the acreage of land with obvious sandification tendency decreased by 10,723 square kilometers with the annual reduction of 2,145 square kilometers, of which Inner Mongolia reduced by 3,966 square kilometers, Gansu reduced by 3,978 square kilometers, Ningxia reduced by 669 square kilometers, Xinjiang reduced by 471 square kilometers, Hebei reduced by 404 square kilometers, Qinghai reduced by 338 square kilometers and Shaanxi reduced by 329 square kilometers (Fig. 2-7).

Fig 2-7 Dynamic condition of land with obvious sandification tendency

III. General tendency of land desertification and sandification

The monitoring results show that the general situation of land desertification and sandification condition has been obviously improved as compared with that in 2009. There has been a positive satisfactory situation featured by deterioration generally restrained, desertification and sandification acreage decreased continuously, land function strengthened, obvious achievements made.

(1) Desertification and sandification acreage further decreased, and successful treatment to sandification accelerated. Compared to that of 2009 and accumulatively, desertification area decreased by 12,120 square kilometers and sandification area decreased by 9,902 square kilometers. This has been the third "dual decreases" since 2004 when the first decreases was identified at the 3rd inventory monitoring conducted. The sandification area decreased annually by 1,960 square kilometers. Compared to the annual reduction of 1,717 square kilometers for the 4th monitoring, the reduction has speeded up.

(2) The severity of desertification and sandification was further alleviated with very severe desertification and sandification acreage obviously declined. The severity of desertification and sandification tended to decrease. For the desertification, the very severe desertification, severe desertification and moderate desertification decreased by 26,300 square kilometers, 24,400 square kilometers and 42,900 square kilometers respectively, and the light desertification acreage increased by 83,600 square kilometers. For the sandification, the very severe degree acreage decreased by 74,800 square kilometers, light sandification increased by 41,900 square kilometers while the very severe desertification and very severe sandification decreased by 5.03% and 7.90% respectively.

(3) The vegetation coverage of sandy area increased and the related carbon sequestration capability strengthened. The average vegetation coverage of the sandy area went up from 17.63% in 2009 in 18.33% in 2014. Specifically, the average vegetation coverage of the Beijing-Tianjin Sandstorm Source Control Project (Phase I) increased by 7.7%. The average vegetation coverage of the sandy lands in eastern part of China (i.e., Hulun Buir Sandy Land, Ordos Sandy Land, Horqin Sandy Land, Mu Us Sandy Land, Kubuqi desert) increased by 8.3% with the carbon sequestration capability raised by 8.5%.

(4) The wind-checking and sand-fixing capability enhanced and sand-dust incidence decreased. From 2009 to 2014, the wind erosion to soil tended to reduce in fluctuation in the sandy areas of the eastern part of the country, with the wind erosion quantity dropped by 33%, the land surface dust incidence quantity reduced by 37% for which the vegetation contribution to sediment control was estimated at 18%–20%. The incidence of sand-dust decreased obviously. During the five years, there happened in average sand dust of 9.4 times annually, 2.4 times or 20.3% less than last monitoring. In Beijing, for example, the sand dust times has reduced by 63.0% indicating obvious alleviation of harms from dust storms.

(5) About 38% treatable sandified land was efficiently treated bringing about improved ecological quality in priority areas. Up till 2014, the effectively treated sandifaction acreage reached 203,700 square kilometers making up 38.4% of the total treatable sandification acreage of 530,000 square kilometers, and the ecological condition of the Beijing-Tianjin Sandstorm Source Control Project areas and the four major Sandy Lands of the country got obviously improved. The sandification area of the Beijing-Tianjin Sandstorm Source Control Project (phase I) decreased by 1,466 square kilometers with vegetation coverage increased by 7.7% in average; in the four Sand Lands, the sandification decreased by 1,685 square kilometers with the vegetation coverage increased by 5% to 15%.

(6) The local special industries of the sandy areas in gradual formation adding income significantly to the local residents. A number of local special sandy industries have come into being along with the efforts of sand
IV. CAUSE ANALYSIS OF NET AREA OF DESERTIFICATION AND SANDBIFICATION IN CONTINUOUS REDUCTION

The desertification and sandification in China have been in continuous reduction tendency for the following main reasons: the prime direction by the CPC Central Committee and the State Council to desertification and sandification prevention and control; high attention of the local CPC committees and governments with close coordination among their line agencies; adoption of a series of protection strategies and improvement policy actions; the wide public participation and arduous efforts made by the local people.

(1) Priority attention and supervision from the central level is the important guarantee for desertification and sandification prevention and control. The 18th CPC National Congress decided to incorporate Ecological Civilization into the five-in-one oriented master plan layout of the construction of socialist country with Chinese characteristics. The layout prioritized ecological construction to an unprecedented level. For times President Xi Jinping made important instructions and remarks regarding ecological construction which have clarified the direction of sand combating. At the provincial level, the practice of job responsibility of sand prevention and control for government leaders along with the practical plans and actual actions by the CPC party committees and governments at different levels contributed at field level to the continuously improved situation of desertification and sandification prevention and control.

(2) Prevention and control according to the law as well as strict protection are the important foundation for continuous improvement of desertification and sandification condition. In line with the “Law of sand prevention and control of PRC”, “Forest law of PRC”, “Grassland law of PRC”, such activities of open herding, excessive wasteland reclamation, excessive firewood collection were prohibited and sandy land development underwent environmental impact assessments. In addition, the natural forest protection policy has been all-sidedly implemented with the established policies measures of closing of sandified land, establishment of warning lines for vegetation utilization of sandy land. Furthermore, there has enacted responsibility investigation system for the local CPC party committee and government leaders for damaging ecological conditions. These stern measures have helped protect efficiently the site vegetation of the sandy areas.

(3) Increased input for quickened improvement is the effective means for successfully combating desertification and sandification. In recent years, the central government has adopted consistent polices to implement the Beijing-Tianjin Sandstorm Source Control Project, the Three-north Shelterbelt Forest Protection Project, the Grazing Land Conversion for Vegetation Rehabilitation Project, the Soil and Water Conservation Project. In the meanwhile the second round Cropland Conversion into Revegetation Project kicked off. The inputs from these national projects have increased the intensity of efforts of sand prevention and control therefore promoting the improvement of sandy area ecological condition.

(4) Deepened reformation and flexible mechanism are the motivation for continuous improved performance for combating desertification and sandification. The central government promulgated prime policies in succession regarding collective forest tenure right reform, the state-owned forest farm reform and in particular enacted the regulation of “Decisions of sandy land prevention and control”. In addition, the central government established the public welfare ecological forest subsidization policy, the grassland protection awards and subsidy policy, as well as protection subsidy policy for closing off the sandification land. All these policies aroused the enthusiasm of all circles in combating sandy land for improved work performance.

(5) Land use transformation is an effective measure for continuously improving the desertification and sandification land condition. This has been obvious especially in the policy execution of conversion of cropland into forest vegetation, grazing land conversion for grass vegetation rehabilitation, grassland balancing with domestic animals. Such changes of production measures of captive livestock raising, grazing rest or shift, expanded use of coal, electricity, wind power as alternative energy form in the sandy rural areas for less consumption of firewood, optimized planting structure and allowed more rural surplus labor for urban employment which jointly alleviated land use pressure and thereby reducing the damages to site vegetation of the sandy land.

Additionally, the precipitation of the main desertification areas have increased in general during the past 10 years. Compared with that for the fourth monitoring, the total rainfall for the fifth monitoring period increased by 14.8%, which was helpful for natural ecological rehabilitation and conduction of the forest vegetation construction activities.