**Case Study 2.10 Restoration of Typical Vegetation of the Loess Plateau in China and Its Impacts on Ecosystem Services**

Vegetation restoration is the main approach to the restoration of terrestrial ecosystems worldwide and is widely used. Returning farmlands to forests (grasslands) is a typical approach representative of China's major ecological protection and restoration projects, and it has been extended from the Loess Plateau region to the whole country. Since the implementation of the projects, the returning of farmlands to forests (grasslands) has produced significant ecological benefits and extensive impacts on vegetation restoration (Zhang et al., 2017).

(1) The range of forest lands and grasslands has increased significantly. From 2000 to 2010, the area of forest lands and grasslands in typical areas increased by 1.2% and 9.8%, respectively, and the area of farmlands decreased by 16.3%. The conversion of farmlands to forest lands and grasslands is the main reason for the reduction of farmlands, which together accounted for 94.2% of the total area of farmlands transformed, indicating that the implementation of the project of returning farmlands to forests (grasslands) has achieved remarkable results.

(2) The improvement trend of vegetation is obvious. The proportion of vegetation restoration during 2000-2005, 2000-2010 and 2000-2014 is 5.8%, 49.1% and 79.0% respectively. After 15 years of implementation of the project of returning farmlands to forests (grasslands), 79.0% of the area in the typical region showed a clear trend of net increase in vegetation, and the increase rate reached 6338.6 km2 per year, and its distribution range was close to covering the whole area of the ​​typical region.

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**Changing Trends in Typical Vegetation of Loess Plateau**

(3) Soil conservation services increased. In 2014, the soil erosion rate decreased by 17.5% compared with 2000, the moderate erosion area decreased by 53.7%, and the soil retention rate during 2000-2014 was kept above 84%, with fluctuating increase.

(4) Hydrological regulation service is enhanced. From 2000 to 2010, the area of ​​surface evapotranspiration (ET) increased to 48094.1km2, accounting for 39.6% of the total area of the typical region.

(5) Vegetation carbon sequestration service increased. The net primary productivity (NPP) of typical vegetation during 2000-2014 was in an increasing trend. The NPP increased significantly, accounting for 60.3% of the total area and the total carbon sequestration increased by 45.4%.

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**ET during 2000-2010 (left) and NPP changes during 2000-2014 (right) in Typical Loess Plateau**