Energy and Environment

A New Regionalization Scheme for Ecological Restoration on China's Loess Plateau

During vegetation restoration, guidelines that can help decide where to plant trees, grasses or shrubs are very important for effective ecological restoration. A research group led by CHEN Pengfei at the Institute of Geographic Sciences and Natural Resources Research, Chinese Academy of Sciences recently proposed a new regionalization method and corresponding regionalization scheme for the proper selection of vegetation types for particular locations on China's Loess Plateau during ecological restoration.

When it comes to selecting the right type of vegetation for ecological restoration in a given location, previous studies had identified vegetation restoration zones by theoretically matching plant characteristics to local climate and soil properties that were recorded long time ago, before the national restoration projects began.

"However, the situation has changed. In recent years the Chinese government has implemented a number of national restoration projects, such as the Grain for Green Program (GTGP). If we can investigate the actual growing status of vegetation in these projects, we will be able to use it as a reference to develop a better plan for vegetation recovery," CHEN said.

To look into the GTGP project, CHEN's team collected remote sensing data from before and after the project's implementation (the 1980s and 2001–2013), along with related soil, meteorological, and topographic data. Then they calculated the net primary production (NPP) values for 2001–2013 using the Carnegie-Ames-Stanford Approach model.

The researchers identified the locations representing the native vegetation and the restored vegetation using long term maps of vegetation cover. They compared the NPP value of the corresponding vegetation type in the native vegetation area with the NPP value in the site under consideration, and found the places suitable for planting the covered vegetation type for the restored vegetation area.

They also combined meteorological, soil, topographic data and the vegetation growth status in each parcel of land in the restored vegetation area, and divided the Loess Plateau into five different restoration zones which are suitable for planting tree, woody grass/bush, grass, xerophytic shrub, and semi-shrub, respectively.

They validated the proposed regionalization scheme with independent data and by comparing it with existing Chinese eco-geographical regionalization scheme and other small scale studies. The result showed the new scheme had good accuracy and has great potential to be used in the Loess Plateau to help guide vegetation restoration activities.

Their work was published in *RemoteSensing*. The study involved collaboration with researchers from Ottawa Research and Development Centre, Agriculture and Agri-Food Canada.