



Multi-pollutant approach needed to halt soil degradation

A new study highlights the need for new policies to stop the rise of nitrogen oxide emissions in China. The researchers suggest that the positive impact of policies to reduce sulphur dioxide emissions are not enough in themselves to avoid soil acidification, as they will be outweighed over the next decade by the impact of nitrogen emissions.

Soil acidification is a type of soil degradation that is mainly caused by sulphur dioxide and nitrogen oxide pollution. Burning coal for energy is one of the biggest sources, along with the transport sector. Acidified soils can lose their ability to support ecosystems and, importantly, once degraded in this way, are particularly difficult to restore. Reducing emissions of acidifying pollutants will not only benefit soil, but also human health, forests and water.

However, rapid rises in electricity consumption and numbers of vehicles on the roads in China mean that policy has yet to catch up with current emissions. Although sulphur dioxide emissions have dropped slightly as a result of policies, the authors of the new study stress that a more integrated pollution control strategy is needed to address soil acidification. Under China's "Eleventh Five Year" plan, a target has been set to reduce sulphur dioxide emissions by 10 per cent by 2010 (from 2005 levels). Regulations introduced to achieve this target include fitting flue gas desulphurisation (FGD) systems to thermal power units. However, the corresponding regulations for nitrogen emissions are lacking.

Based on updated estimates of recent emissions and simulations produced by computer modelling, the researchers predicted how emissions and deposits of sulphur and nitrogen will progress up to the year 2020 in China. According to the results, sulphur dioxide emissions will decrease by around 8 per cent by the 2010 deadline, thus failing the Eleventh Five Year plan target, but will decrease by a further 4 per cent to achieve a total 12 per cent reduction by 2020.

Without further action on nitrogen pollution, nitrogen oxide emissions will increase by a predicted 57 per cent by 2020. Thus, while sulphur deposition is expected to fall in most areas of China, nitrogen deposition is expected to increase – by more than 40 per cent in some regions.

The researchers conclude that the benefits provided by the current policy measures are therefore insufficient to mitigate against a serious risk of soil acidification. The problem is one of investment in technology as well as of policy. For instance, although most new power plants in China are now fitted with burners that emit lower levels of nitrogen, more advanced, more efficient technology is available. The east of China is predicted to be most heavily affected by soil acidification.

Source: Zhao, Y. Duan, L., Xing, J. *et al.* (2009). Soil Acidification in China: Is Controlling SO₂ Emissions Enough? *Environmental Science & Technology*. 43(21): 8021-8026.

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