

The status and suggestion of fertilization

Suggestion

China has become a world power of fertilization, and the problem of excessive fertilization in farmland is prominent, has become an important source of non-point source pollution, eutrophication, and greenhouse gas emissions. It is suggested that the Ministry of Agriculture regularly publish the national farmland nutrients (mainly NPK) balance data, so the agricultural science and technology personnel and administrators across the country can understand the overall surplus of China's farmland nutrient status and existing problems in order to take appropriate technical measures to correct deviations.

Background

On July 25, 2013, the Department of Food, Environment and Rural Affairs (Defra) announced the 2012 UK soil nutrient balance data. The main points are as follows:

Nitrogen

In 2012, Nitrogen surplus was 92 kg / ha, 3 kg/ha higher than in 2011 (up 3%), 19 kg/ha lower than in 2000 (down 17%). In the long term, nitrogen surplus is falling. Since 2000, the decline was mainly due to the reduction of fertilizer use and manure production (decrease in the number of livestock).

N surplus increase from 2011 to 2012 was mainly due to the fact that the weather in 2012 made the uptake of crops down, especially grain crops and grazing pasture. As a result, the effect of nitrogen input reduction was offset.

Phosphorus

In 2012 the British agricultural land phosphorus surplus was 7.5 kg/ha, 0.9 kg/ha higher than in 2011 (14%). As with Nitrogen, because of the similar driving factors, long-term trend of phosphorus balance was falling. Phosphorus surplus declined 25%, compared with 10 kg/ha of the year 2010. The increase of phosphorus surplus from 2011 to 2012 was also due to the reduction of absorption by crops, including grain crops and grazing pasture.

Fertilization in developed countries

Developed countries have small population pressures, advanced environmental protection ideas, and attach importance to the research on the utilization of nutrient resources in grain production. Comparing the changes of nutrient inputs and food production of the developed country, the United Kingdom, Germany and the United States (Figure 1 - Figure 3) had a sharp increase in the amount of fertilizer from 1950 to 1970, leading to a wide range of eutrophication. Fertilizer legislation and efficient fertilization technology promotion, in the 1980's, saw these countries decrease the amount of fertilizer year by year, but the food production had not declined. It greatly improved the utilization of

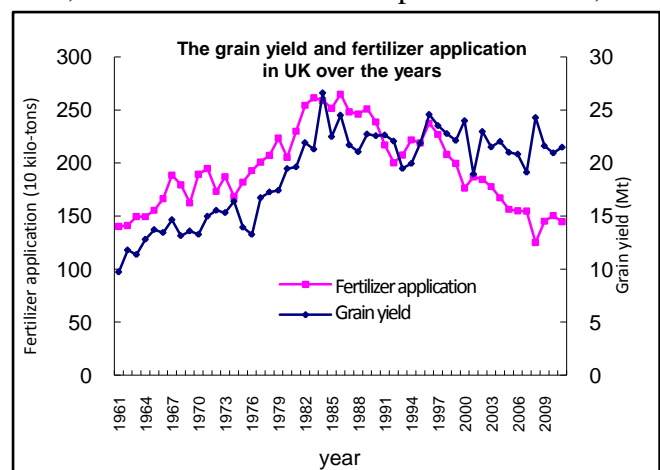


Figure 2 The grain yield and fertilizer application in UK over the years (FAOSTAT.2011)

fertilizers and reduced the pressure on the environment of excessive fertilization.

Germany and American fertilization (Figures 2 and 3):

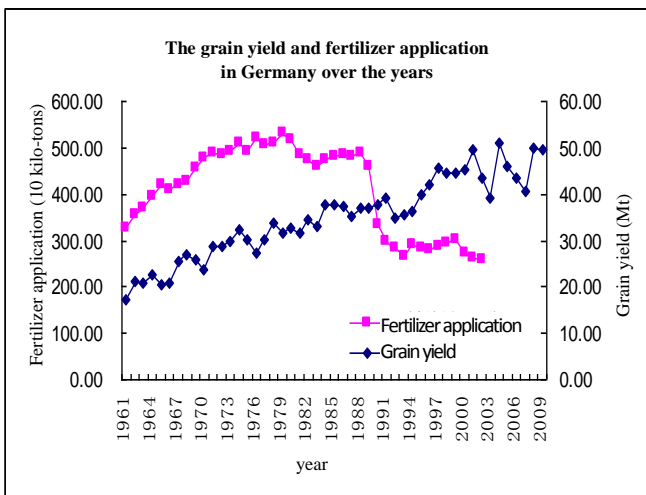


Figure 2 The grain yield and fertilizer application in Germany over the years

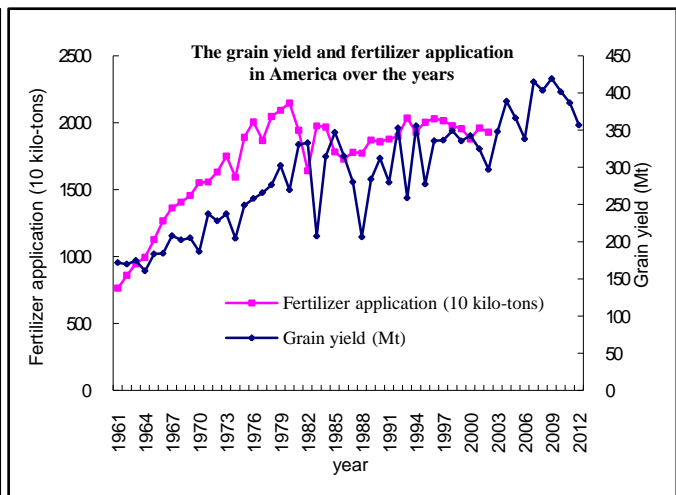


Figure 3 The grain yield and fertilizer application in America over the years

Fertilization in China

Fertilizer played a big role in China's grain production. Since the mid-1990s, China's fertilizer consumption continued to rise, but the total grain output grew slowly (Figure 4). At present, the utilization rate of nitrogen fertilizer of rice, wheat and corn are 28.3%, 28.2% and 26.1% respectively, with an average of 27.5%, 15 ~ 20% lower than in developed countries. Figure 5 indicates the relationship between the Chinese fertilizer application and Partial factor productivity (PFP) from 1980 to 2005. With increasing fertilizer inputs, PFP decreased obviously. If appropriate measures are not taken, fertilizer utilization rate will continue to decline.

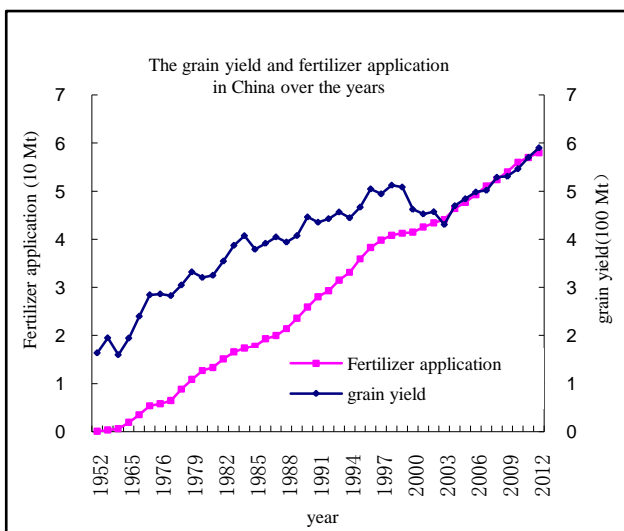


Figure 4 the grain yield and fertilizer application in China over the years (*China Statistical Yearbook, 2012*)

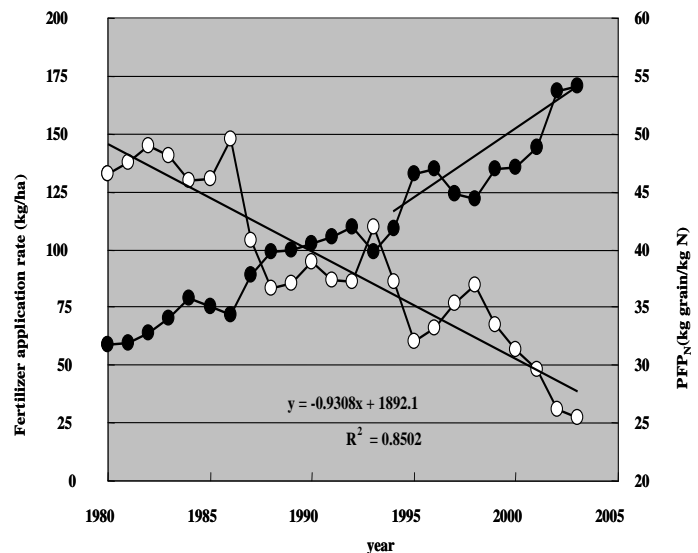


Figure 5 the relationship between the fertilizer application and PFP (*China Agricultural Yearbook, 2005*)

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