



SEARCH



In this Issue we have international cooperation amongst nations of the kind this Journal was designed to kindle.

Experts from China, UK, Australia and India have integrated and focused their attention on several current problems of international concern, the solutions to which will have widespread effects, not only for agricultural production, but also for issues of both economy and biodiversity.

In this Issue we have conducted a detailed survey of many aspects of the semi-arid Loess Plateau in north-west China. In four papers the orogeny, climate, greenhouse gases, pollution, population & society and forestry of this area are discussed and ways forward are proposed.

We continue our discussion of the vital subject of the nitrogen cycle. Previously in this Journal, Professor Vaclav Smil (1) concluded that approximately seven percent of man-made energy is employed in the fixation of atmospheric N_2 , as NH_3 , by the Haber Bosch process and that approximately 40 percent of the human race depend on the N-fertilizer industry for adequate food to sustain their lives. Without that industry it would have not been possible for the human race to expand in the way it has during the 20th century.

We all look forward to the time when atmospheric – N can be fixed industrially by a more direct use of solar energy, contributing immensely to a low carbon economy. Industrial fixation of N₂ will have to increase, not only to accommodate an increasing human population, but to compensate for a possible decline in natural N-fixation as the population of oceanic phytoplankton declines.

N fertilizers are essential for the crop yields we now expect. Without N fertilizers it would be impossible to feed the current human and livestock populations of the world. Nevertheless, where the use of these fertilizers is subsidised there is the risk of their excessive use (see Powlson et al. this Issue, pages 10-18). This can lead to pollution of ground water, and the excessive production of nitrogen oxides which are the most potent of greenhouse gases, in addition to the waste of fossil carbon energy in the production of NH₃. Powlson et al. propose there is an urgent need for three sets of key changes in China if the management of N fertilisers is to increase significantly, improving economy and reducing both pollution and GHG emissions:

1. Radical changes in the way that information is communicated to farmers.
2. Changes in Government policies relating to subsidies for the manufacture and use of N fertiliser.
3. Measures to increase farm size and professionalism of farmers.

Of these they consider points (2) and (3) to be much more important.

The ecology and loss of the economic potential of the arid Loess plateau, of China, as a source of crops for food production and for plant growth generally, is of very great concern to the Government of China and to our scientists and economists generally. This subject is detailed in this Issue (pages 19-29). From the point of view of plant growth, the climate of this area has been deteriorating over centuries, owing partly to the loss of forest trees. The causes of this deterioration are discussed by our meteorologist (pages 30-31). We also discuss the use in India of planted trees to help drainage of water-logged land, by acting as natural water pumps (see pages 72-77).

A polythene mulch to retain moisture and heat in the soil to extend forward the growing season is a universal agricultural instrument for several crops. Whilst increasing yields this procedure has several drawbacks. These have been widely studied, especially in China, where a heavy gauge polythene is currently in use.

Thicker material not only costs more, and is an oil-based product, but it persists longer in the soil profile causing pollution and ultimately, following several years of continuous use, it may cause a depression in yield of crops. These effects have been measured by Chinese scientists and are discussed with solutions proposed in this Issue (see pp. 32-36 & 19-29).

As a consequence of over-fishing, and with a decrease in O₂ tension in the upper layers of the sea, and also as oceans gradually become more acidic, owing to an increase in the

partial pressure of atmospheric CO₂, wild fish stocks and fish production will continue to decline. This emphasises the vital importance of fish farming – which will soon exceed oceanic fishing as a food source for the human race. Moreover, as fish are cold-blooded and are buoyed up by water they have considerably lower maintenance energy needs than do land animals. We discuss this subject in detail (see pp. 37-52 for the second paper in the series).

We are again devoting space to the GM crop debate and include a fascinating paper (van Emden, pp.53-59) on the control of insect pests by GM and pesticide means.

It is vital that world-wide decision and policy makers understand the arguments both for and against GM. In my view it is quite irrational, to condemn a whole field of science for reasons of heresay statements and prejudice, rather than to base judgements on substantive peer-reviewed evidence and rational discussion.

There can be arguments both for and against individual procedures, but not for an entire field of knowledge. Hence, it is our opinion that these issues should be aired and that sound, rational conclusions should be reached- a major function of this Journal.

New cultivars of crops, whether of GM or traditional origin, must be purchased by the farmer for sowing. Problems and procedures in the supply chain and scaling up of supply from the breeding firm to the farmer are also analysed in this Issue (pp. 78-83).

Finally, research is becoming more and more expensive, so that the need for cooperation between groups is ever more pressing. The procedures and problems encountered in Public-Private Partnerships of research work are discussed here (pp.85-86).

In this Issue we are commenting to a much greater extent, than previously, on our papers to initiate discussion on both suggested consequences of conclusions drawn and on the wider implications of these conclusions. Hence, we welcome sensible comment from readers, either as Letters to the Editor, or more formally in our peer-reviewed, Comment & Opinion Section. Please, let us know your views. These should be addressed to the editor: editor@world-agriculture.net

Reference

1. Smil, V. World Agriculture (2011) Nitrogen cycle and world food production, Vol. 2, No.1, pp 9-13.

1409

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Comments

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