

In this issue

Richard Strange

Received: 20 January 2011 / Accepted: 20 January 2011 / Published online: 3 March 2011
© Springer Science+Business Media B.V. & International Society for Plant Pathology 2011

Reviews of staple crops

Continuing our series of reviews of the World's principal staple crops, **Glen Hartman** and associates document the remarkable story of soybean. Production of this crop has increased from 17 million metric tons (MMT) in 1960 to 230 MMT in 2008 and the crop is now grown on around 6% of the world's arable land. This astonishing increase is related to the numerous benefits of the crop: it is a source of both oil and protein and, as it is a legume, fixes nitrogen, thus improving soil fertility. Also, unlike cereals, on which so many of the world's population depend for sustenance, the protein of soybean is not deficient in one or more essential amino acids. It therefore has enormous potential for improving the diets of people throughout the world, whether it is consumed as a vegetable or processed into various food products. On the negative side soybean is susceptible to a number of biotic diseases such as rust and red leaf blotch and sensitive to such abiotic factors as extremes in nutrients, temperatures and moisture. Flooding, for example may be problematic, as soybean cannot survive many days with fully submerged roots.

Original papers

The theme of water availability is taken up by **Xiaoyun Li** and associates in the context of risk for agricultural productivity and food security in South Asia. They report

on a survey of drought and water-related constraints, including water-logging and flooding of low-lying fields affecting four major crops - wheat, rice, sorghum and chickpea. They found that although these constraints were important they were responsible for only 20–30% of the current yield gaps, other types of constraint, particularly soil infertility and the poor management of fertilizer and weeds for the cereals, and pests and diseases for chickpea, contributed most to yield gaps. Among their conclusions their recommendations for cereals are increase in drought resistance by genetic means and improvements in soil fertility, and for chickpea, better plant protection.

Drought and flooding also feature prominently in **Elisabeth Simelton's** paper on food self-sufficiency and natural hazards in China. Poor soil quality is also mentioned as a limiting factor for crop productivity. She concludes on the basis of 13 years' data that China's current stock of agricultural produce (rice, wheat, maize, tubers, soybeans, and other grains) is adequate as a buffer against seasonal crop failures of the same magnitude as in the past and that provinces with a moderate diversity of crops were the most self-sufficient. Parts of the North China Plain were relatively less affected by natural hazards and therefore regarded as key areas for agricultural development.

Kirsten Kienzler and associates also address the question of self-sufficiency, i.e. the ability to provide sufficiency of a product for a given area or country, as opposed to self-reliance in which deficits in a product are made good by purchase from an outside source, the purchase being paid for by an alternative product. They report on wheat in the Khorezm region of Uzbekistan. Here, the local wheat is of insufficient quantity to satisfy the needs of the people and of insufficient quality to make the locally preferred bread, known as Tandyr. The deficits in both quantity and quality are made good by purchasing

R. Strange (✉)
Department of Biological and Chemical Sciences,
Birkbeck College, University of London,
Malet Street,
London WC1E 7HX, UK
e-mail: r.strange@sbc.bbk.ac.uk

wheat from neighbouring Kazakhstan and paying for it by the export of cotton. Owing to the volatility of the wheat market, the question arises as to whether or not Uzbekistan should pursue a course of self-sufficiency in wheat, as favoured by the government, or continue to import a proportion of the country's wheat requirement. On sheer economics, the authors determined the price of wheat on the global market at which it becomes economic for Uzbekistan to grow all, some or none of its wheat, the finance for purchase in the last two instances being from the export of cotton. They go on to show that the quality of wheat in Uzbekistan could be improved by the judicious use of nitrogen fertilizer but also suggest that breeding varieties with higher protein and gluten content would be beneficial.

Cocoa is an important cash crop in Papua New Guinea, the proceeds being used to purchase food among other items. Although technology has been available for dealing with such important diseases as black pod, caused by *Phytophthora palmivora*, for some time, there had been poor uptake and, as a result, the potential for high bean yields remained unrealized. **Rosalie Daniel** and associates examined the impact of training farmers in Integrated Pest and Disease Management on the production of cocoa. Three years after training, pest and disease incidence had declined and cocoa yields had increased by an average of 30%. This is yet another example of the value of on-farm participatory approaches as an effective means of improving crop management. Other examples published in Food Security may be found in the papers by Tiwari et al. (Food Security 2: 317–325: 2010) and Olanya et al. (Food Security 2: 327–341: 2010).

Despite the nutritional and agronomic benefits of combined rice and fish farming, monoculture of rice continues to be the main farming system in Bangladesh. **Ahmed** and **Garnett** suggest that the reason for this is due to a lack of technical knowledge and concerns about the risks of flooding and drought. They provide evidence that integrated rice-fish farming could increase both the quantity and quality of food production and, applying the Cobb-Douglas production function model, show that higher yields could be obtained by increasing inputs with this system.

Ray Bressan and associates make two assertions about biofuel production: that the use of food crops for this purpose is immoral, and that using land suitable for growing crops productively is to be avoided. In order to prevent competition between the production of crops for food and for biofuels they suggest the cultivation of stress-adapted extremophiles for the latter. These are plants that, owing to their adaptation to various environmental

extremes, may be grown on land that is not suitable for food crops. They also advocate generation of electrical power from such plants by combustion rather than conversion to bulk liquid fuels, although, in the long term, they suggest that photovoltaic capture of solar energy will be the method of choice owing to its efficiency.

Book reviews

Thanks to our book review editor, **David Ingram**, three books are reviewed in this issue. They are *Seeds, Sex and Civilisation: how the hidden life of plants has shaped our world* by Peter Thompson, with a conclusion by Stephen Harris; *Climate change and crop production*, edited by Matthew P. Reynolds; and *Mao's Great Famine* by Frank Dikötter. The first of these is a wonderful overview of man's utter dependence on the husbandry of plants, once they had been domesticated, summed up in the notable sentence, "Henceforth the quality of our ancestors' lives and the survival of their societies would be inextricably bound—as ours still are today—to their ability to care for the seed and on their skills as husbandmen, bound to the soil." The threat of climate change to this husbandry of our crops is admirably reviewed in the multi-authored volume edited by Matthew Reynolds. Finally, Frank Dikötter's chilling account of the famine that engulfed China as a result of the policies of "The Great Leap Forward" and in which an estimated 45 million people died prematurely is a salient reminder of Goethe's dictum, "There is nothing more terrible than ignorance in action"—a strong plea for research if ever there was one!



Richard Strange Editor-in-Chief of Food Security Richard Strange's background is in Plant Pathology, a subject to which he was attracted by its relevance to food security and in which he has published over 90 papers and two books. He currently holds an Honorary Chair at University College London and an Honorary Fellowship at Birkbeck College, University of London. He has been involved with numerous overseas projects, several of which were

located in different African countries, and has supervised Ph.D. students from these and other countries of the Developing World in topics directly concerned with plant disease problems affecting their food security.