Chemistry for Tomorrow's World

Agricultural productivity

By 2030, the world's population will have increased by more than 20% to over eight billion.[1] A rapidly expanding world population, increasing affluence in the developing world and limited land and water availability mean that we have no alternative but to significantly and sustainably increase agricultural productivity to provide food, animal feed and fuel.

The World Bank estimates that cereal production needs to increase by 50% and meat production by 80% between 2000 and 2030 to meet the growing demands including those of developing nations.[2] Agricultural efficiency can be influenced in many ways including improved pest control, a better understanding of the science of plant growth and improved water management.

How can the chemical sciences help?

- Chemistry is key to developing more targeted pesticides in order to deliver the maximum potency against pests with minimum effects on the environment.
- Further understanding of plant nutrition, together with the intricacies of soil chemistry and microbiology, will aid in the optimisation of fertilisers, irrigation and crop protection.
- To cope with extremes of water quality and availability simple accurate water monitoring devices and targeted water delivery systems are needed.
- Developments in genetic modification offer many improvements for agriculture, such as creating better disease resistance and crops that are designed to grow in nutrient poor soil.
- Scientists need to develop new vaccines, medicines and high protein/high calorie feeds for livestock. They also need to improve our understanding of the role of genetics in selective breeding and the engineering of new hybrids.
- By working together, chemical, environmental and agricultural scientists can help us to understand and predict the future impact of climate change on farming practices.
- Sensors and processing tools need to be developed to minimise any loss of quality and value to products that may occur through crop handling and storage.

About the RSC & Chemistry for Tomorrow's World

The Royal Society of Chemistry (RSC) is the leading society and professional body for chemical scientists. Over 2008 and 2009, it gathered expert views to identify priority areas where the chemical sciences can play an important role in the development of society.

For more on this initiative please visit our website: **www.rsc.org/roadmap**, contact us at **roadmap@rsc.org** or call the RSC science team on +44 (0)1223 432424.

1 *UN World Population to 2030*, United Nations (2004)
2 *Food Matters: Towards a strategy for the 21st Century*, Cabinet Office Strategy Unit