

This report by Bruce Knight was published in Crop Protection Monthly (www.crop-protection-monthly.co.uk) February 2008

THE SENTRY CONFERENCE 2008

Sentry, a leading UK farm management business, held its 2008 annual conference in Cambridge on 6 February. Titled Matching the Food, Energy and Environmental Challenge, the keynote presentation was given by Robert Thompson, Professor of Agricultural Policy, Illinois University. For four years from 1998 he was director of Agriculture and Rural Development at the World Bank. From 1985 for two years he was also assistant secretary for Economics at the USDA. He is recognised as one of the worlds leading demographers. Unfortunately weather conditions in the mid-west had prevented him from travelling to the UK, so the audience heard and viewed the wide ranging talk on the challenges facing world agriculture, through a video link up.

Population trends

Professor Thompson delivered the stark reality of global population projections. He said that it had taken from the beginning of time until 1804 for the global population to reach 1 billion. However, by 2007 it had reached 6.67 billion. By 2050 the UN projections estimate the population will have risen by a further 38% to 9.19 billion, within a range of 7.8 billion to 11.9 billion. The low figure takes account of the potential impact of HIV/AIDS, particularly in Africa and ongoing birth control programmes.

Professor Thompson said that it is, however, the nature of the change in population and the socio-economic trends that will affect the demand for agricultural produce most. Low income populations are forecast to increase by 46% by 2050, compared with only a 2% increase in high income populations. The population of Africa, currently 965 million, will more than double. In the same period India, currently the second highest populated country at 1.13 billion, will reach 1.75 billion and become the highest populated country. China, currently 1.32 billion will grow to 1.44 billion. The other big change will be the move to urban living. In 1950 30% of the world population lived in urban areas, by 2000 it was 47% and by 2030 it is projected to have reached 60%.

Incomes and food consumption

A massive growth in food demand is therefore predicted with economic growth, notably in Asia. China has currently 35% of its population living on less than \$2/day with 10% on less than \$1/day. India has 80% on less than \$2/day and 34% on less than \$1/day.

The World Bank estimated that, in 2000, 352 million people lived in households with incomes of \$16,000 or more per annum. By 2030 they predict the figure will have risen six fold to 2.1 billion. The type of food required is strongly linked to per capita income:

Average daily spend on food	Population affected 2007	Impact on diet, nutrition and food requirements
Less than \$1/day	1.1 billion (16%)	Of this 854 million are under nourished and suffer hunger
Less than \$2/day	2.7 billion (40%)	At \$2/day most basic calorie intake problems are solved
\$2 to \$10/day		Greater consumption of meat, dairy products, fruit, vegetables – creates increased demand for agricultural commodities
More than \$10/day		Greater consumption of processed food, variety, packaged food etc – no more demand for agricultural commodities in the raw

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Professor Thompson suggested that world demand for food could double by 2050, 50% of the growth coming from population increases and 50% from economic growth.

Demands other than food

Economic growth will also bring about increased demand for wood for paper, construction etc. The richer countries will also require land for amenity use and conservation areas. Described as the biggest shock to the agricultural world since the 1970s the impact of biofuel production from ethanol in the Americas, and from biodiesel in Europe, is contributing to high grain and oilseed prices and therefore feed prices. In the US by 2007, 20% of maize production, exceeding the total for exports, was for ethanol production. The 2007 Energy Bill is looking to more than double demand by 2022. The hope is that ethanol production from cellulosic feedstocks will come in time and that appropriate crops can be grown on marginal land.

Where will the extra crop production come from

Professor Thompson said that increased urbanisation coupled with population and economic growth will mean that international trade in agricultural commodities will increase as low income countries become net importers. The question is which regions will have the capability to produce the crops. He said 40% of the world's land is too dry, 21% is too cold, 21% is too wet, 6% is on rough terrain and 2% is on poor soils. He then made the point that while in theory the area devoted to arable crops could be doubled, this would have to be at the expense of forests and would effectively destroy global biodiversity. In practice the arable area can only be expected to increase by about 12%.

His conclusion is that the only option available is to increase productivity of existing arable areas. However, geographically there are few areas left where agricultural productivity is not being exploited close to its potential. In Brazil it has been demonstrated that by the application of new technology productivity can be dramatically increased. Through investment in agricultural research, soil science and by breeding aluminium tolerance into tropical soybean varieties it has been possible to convert savannah scrub land. As a result Brazil is now the number one soybean producer, without encroaching into the rain forests. With European and North American agricultural areas well developed the best new potential growth areas in terms of soil types and climate, are eastern regions of sub Sahara Africa such as Zimbabwe and Kenya. The Ukraine can also offer further potential although development there to date has been slow.

Can the constraints be overcome

In order to double global food production farmers will need to make better use of water. While 70% of available water is used for agriculture the trend to urbanisation will mean that cities will eventually outbid agriculture. So farmers have to face up to producing twice as much food from less water.

Professor Thompson considers that investment in agricultural research is critical. Past experience has shown that where investment has been made food scarcities have soon turned to surpluses. However the sums now are too large to be left to the private sector. In the case of third world agriculture there has to be public sector investment. The big question is whether there will be the political resolve to make the necessary investments. He sees agricultural biotechnology as a vital element to enhance food quantity and quality while safeguarding environmental impact. It offers the prospects of improving nutritional value of crops, improving tolerance to drought, salinity etc, minimising crop disease, optimising insecticide use, making greater use of herbicide tolerant varieties and reducing post harvest deterioration.

His final observation was a quote from the Chicago based Global Agricultural Task Force report 2006 which said: *"Change will occur whether or not we plan for it. The question is whether we will have the foresight to embrace change and shape it to our benefit, or whether we will allow ourselves to become its victims."*
