From Another Angle

The Future of People on Planet Earth: Challenges for Geophysicists *

David Denham, Secretary and Director, Australian Society of Exploration Geophysicists.

** Abstract of a Key-note address delivered at the 9th SEG, Japan, International Symposium, Sapporo, Japan, 12-14 October, 2009, reprinted with the kind permission of SEG, Japan.*

There are five main interrelated factors governing life on Earth by humans: population, energy, food (including water), climate and human behaviour.

We have the knowledge to live and prosper on Earth but it is questionable that we have the wisdom.

As geophysicists, we can make significant contributions to our future and we should not shirk these responsibilities.

People

The Earth could sustain 5 billion people, but there are currently about 6.8 billion and by the end by 2100 there are likely to be close to 10 billion people on our planet. Furthermore, we mostly want better life styles and aspire to increased wealth. This has resulted in increased consumption of global resources and threatens a sustainable planet for humans.

Energy

Cheap energy is crucial to maintain our lifestyle in developed countries. Global energy consumption has more than doubled in last 40 years and is expected to quadruple from 1960 through 2030. This is mainly due to an increase in global population and personal wealth as well as peoples' life style aspirations.

At present, about 80% of the world's energy is derived from non-renewable resources (oil 34%, coal 25% and gas 21%) and these are running out. Global 'Peak Oil' production will be reached before 2015, with gas and even coal production to peak later in this century.

Food

The price of food has soared recently with increased global demand caused by an increasing global population and personal wealth.

Although crop yields have increased, the area available for agriculture is diminishing with the spread of urban areas and land degradation. There is also strong competition for food products.

Do we grow corn to feed people or to feed cars with ethanol?

Then there is water; 80% of global water consumption is for irrigation and we are running out of new areas to irrigate. So the pressure to grow more food will continue to increase and may well lead to conflicts as land and water become scarcer.

Climate

We need a suitable climate on Earth for humans to survive, particularly as the global population is still increasing at about 70 million per year.

In the last 100 years significant global warming has been observed (an increase of ~0.5°C in the last 30 years). More recently 2009 is expected to be the fifth hottest year globally and in Australia 2009 was the second hottest year in Australia on record.

Globally the first decade of the 21st century was the hottest in recorded history.

There is very strong evidence that the largest contribution to this increase is due to greenhouse gases being added to the atmosphere by humans burning fossil fuels.

If this trend continues, as forecast by many climate scientists, food supplies will be affected and people living in low lying areas will eventually be inundated by rising sea levels.

Human behaviour

We have the knowledge to tackle the people, energy, food and climate issues. As geophysicists we can find enough resources for a sustainable life on Earth. Even if oil, gas and coal become become more expensive we can provide enough energy until we can harness more solar, wind and other sustainable sources. This is our first major challenge.

The second, and harder challenge, is to try and persuade people and governments to improve behavioural patterns.

Humans do not have a good history of solving major problems. We tend to focus on immediate and local issues rather than looking at the bigger picture. From the first Easter Islanders chopping down all the trees and ensuring that they could not escape, to the death and destruction caused by the misguided wars of the last hundred years, humans have not behaved well.

We need to re-think our social and economic paradigms; get away from the goal of economic growth; and be more tolerant and understanding of our fellow human beings. And this will not be easy.