Source: *The Business Times,* p26
Date: 7 July 2015

Managing the food, water and energy nexus

Properly coordinated policies are required to provide adequate resources to the expected 2.3 billion new inhabitants on this planet by 2050. BY CECILIA TORTAJADA AND ASIT K BISWAS

TODAY, some 100 undergraduate students from seven Asian countries are meeting in Singapore to discuss the increasingly complex issue of how to manage three important resources of the world: food, energy and water. This discussion will take place within the framework of the first Asian Undergraduate Summit organised by the NUS Students' University Scholars Club.

According to the United Nations, the global population is projected to reach 9.6 billion by 2050 from an estimated 7.3 billion now. This means within the next 35 years, adequate energy, clean water and nutritious food have to be made available for an additional 2.3 billion people. The problem is not as simple as it may appear at first sight.

Currently at least 805 million people suffer from chronic undernourishment, 1.1 billion people do not have access to electricity and 3.5 billion do not have clean water to drink. Accordingly, by 2050 enough additional resources have to be provided to not only the newcomers but also the people who currently do not have proper access to them.

The problem is further complicated because of rapid growth of the global middle class, which is expected to grow from 1.8 billion in 2009 to 3.2 billion in 2020 and 4.9 billion by 2030. As people become wealthier, their lifestyles change. Their energy needs go up very significantly, their dietary habits change because their diets become more protein-rich, and their water demands increase steadily. Furthermore, all over the world middle classes expect their lifestyles to improve steadily.

This means that the world in 2050 will have to provide adequate food, energy and water to the expected 2.3 billion new inhabitants, cover the current shortfalls in resource availability for billions of people and simultaneously fulfil the rising aspirations of a rapidly increasing middle class. Can the aspirations and expectations of the world be fulfilled in terms of food, energy and water by 2050? If the current trends continue, the chances are very slim that the world will have enough energy, food and water for every inhabitant by the mid-century. Yet, there is no reason as to why this should be.

Take food. If we consider it alone and estimate how much extra food will have to be produced by 2050 to meet global needs, the increase needed would be about 60 per cent. The next question would be – is this possible? Has the world enough extra arable land for a 60 per cent increase in agricultural production? Optimistically, land available can be increased by about 20 per cent. Also, would adequate quantity of water be available to make such increases in food production possible, especially as most countries of the world are now already facing moderate to serious water stress? The answer has to be a categorical "no".

The problem, however, is solvable if food is considered on a holistic basis. At present, globally nearly one-third of food produced is either lost or wasted. This means every year some 1.3 billion tonnes of food is not eaten. In 2009, Americans threw away a staggering 33 million tonnes of food, making it the largest component of municipal solid wastes.

India, a chronically malnourished country, is the world's second-largest producer of fruits and vegetables. Yet, 40-45 per cent of this produce never reaches the Indians. Even Singapore, which imports more than 90 per cent of its food, threw away 796,000 tonnes of food in 2013, an increase of 13.3 per cent over 2012. An average British family throws away US$1,490 worth of food each year.

RICE YIELDS

Globally, around one-third of food produced is wasted. If this waste can be significantly reduced – and there is no reason why it cannot be done – hundreds of millions of people could eat the food that is already being produced.

India's rice yields are about half those of China and Turkey. If India can reduce its yield gaps with China and Turkey, and reduce its food wastage significantly within the next 10 to 15 years, much of its food problems would be solved. PHOTO: AFP

Elimination of this food waste would save about 250km3 of water and 1.4 billion ha of land and reduce carbon emissions by 3.3 gigatonnes each year. Next, consider rice yields. Currently India's rice yields are about half those of China and Turkey, two other developing countries. If India can reduce its yield gaps with China and Turkey, and reduce its food wastage significantly within the next 10 to 15 years, much of its food problems would be solved.

The problem becomes complicated since other forces are at work, such as biofuel. It is perceived to be a clean, accessible and low-carbon source of energy. During 2000-2009, with heavy government subsidies, global ethanol production increased four-fold and biodiesel tenfold. Biofuels account for 20 per cent of global production of sugarcane, 9 per cent of oilseeds and coarse grains and 4 per cent of sugar beets. In 2011, in United States, it accounted for 6 per cent of transportation fuel but consumed 40 per cent of its maize production.

With heavy subsidies, it was economically attractive for farmers to produce crops for biofuels which reduced food available for humans. The World Bank estimated that this diversion in 2011 resulted in a price increase of food crops that drove 44 million extra people in developing countries into extreme poverty.

OECD-FAO (Organisation for Economic Co-operation and Development-Food and Agriculture Organization) has estimated that global biofuel production will increase from 140 billion litres in 2012 to 222 billion litres by 2021, an increase of over 50 per cent. It is thus essential to assess what are the food, land, water and energy implications of biofuel policies. Will biofuel production increase contribute to lower food availability and thus higher food costs? Such interrelated questions on the food-water-energy nexus are seldom asked by governments all over the world, let alone answered properly.

During a conversation with former Indian prime minister Indira Gandhi in the early 1980s, we asked why after 35 years of independence the country had made only limited progress in alleviating poverty and hunger. After some reflection, she replied that individual government policies often had unexpected negative consequences in other areas. These sometimes cancelled out, or even exceeded, the positive impacts of the policies on a specific sector. This has been a recurring problem all over the world in the past.

Today, many countries to their chagrin are belatedly learning Mrs Gandhi's lesson. In an increasingly complex and interconnected world, policies directed to a specific issue, say food, may be ineffective, even counterproductive, unless they take into account their impacts on other issues such as energy, water, land, environment and health. The same goes for policies on water or energy. It is essential to assess their impacts on other related sectors.

Sadly, this will be a difficult task in the modern world. Policies in all sectors are made by individual government ministries, often without considering their impacts on other sectors. Individual ministries in most countries have become independent fiefdoms. They tend to see other ministries as competitors for funds, power and political and media attention. Thus, real intersectoral coordination of policies between ministries is mostly missing at present.

LIP SERVICE

In medium to large countries, there are three layers of governments: central, state and municipal. Take water, where the main jurisdiction may lie at the central level (as in China or Mexico) or at the state level (as in Brazil, Canada, India or the US). Urban water management is mostly at the municipal level, and the rest at central and/or state levels.

Agriculture, which globally accounts for 70 per cent of water use, is also managed at central and state levels. The situation is similar for energy or electricity. Historically these ministries have not coordinated policies, even though policies of one ministry have major impacts on other ministries, and vice versa. There is much lip service at present about the relevance and importance of nexus and these interrelationships. However, they rarely get done, except somewhat superficially.

Currently the food, energy and water nexus has become a global bandwagon. Every country talks about the need and urgency of coordination but not even a single country, large or small, has managed to achieve it. After decades, even centuries, of rivalry between ministries, it will not be easy to break through the barriers, both institutionally and mentally.

Thus, one of the biggest challenges of the 21st century is how to formulate and implement policies on food, energy and water sectors that are properly coordinated so that policies in one area do not have unacceptably high adverse impacts on the other two sectors and vice versa. It will not be an easy task but one that must be accomplished.

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