Long-term food and water crisis

Background

‘Overeating, undernourishment and waste are all on the rise and increased food production may face future constraints from water scarcity.’

In the last week of August 2012, UN bodies, non-governmental groups, researchers from 120 countries, and 2500 politicians met in Stockholm, Sweden, to address global water supply problems. They called for substantial increases in public and private sector investment to reduce losses of food in the supply chain, enhance water efficiency in agriculture, and curb consumer waste.

Facts behind the conference

* Over 900 million people suffer from hunger.
* 2 billion more face serious health risks from undernourishment.
* 1.5 billion people overeat.
* Over one-third of all food is lost or wasted.
* Demand for food and fibre is projected to increase by 70 per cent by 2050.
* Feeding over 9 billion people by 2050 is possible, but there is a cost to the environment in terms of water withdrawals and land resources.
* Saving water by reducing food waste, increasing productivity, plant breeding, and waste water recycling are critical to everyone.
* Over 25 per cent of all the water we use worldwide is taken to grow over 1 billion tons of food that nobody eats. That water, together with the billions of dollars spent to grow, ship, package and purchase the food, goes down the drain.
* Reducing the waste of food is the smartest and most direct route to relieve pressure on water and land resources.
* Throughout the world, 2.6 billion small-scale producers till the land, raise animals and fish. They are the main providers of food in the developing world. Agriculture is a thirsty activity. But that also means that agriculture holds the key to sustainable water use.

Pending water crisis

Some of the world’s leading water scientists have given one of the direst warnings yet about global food supplies, saying that the world’s population may have to switch almost completely to a vegetarian diet by 2050 to avoid catastrophic shortages. Currently, humans generally get about one-fifth (about 20 per cent) of their protein from animal-based products, but this may have to drop to about one-twentieth (about 5 per cent) to feed the extra 2 billion people expected to be alive by 2050.

A report by the Stockholm International Water Institute claimed that there would not be enough water available on current croplands to produce food for the expected 9 billion people in 2050 if current trends are maintained and changes towards diets common in more affluent nations continue to occur. However, the report added, there should be just enough water if the proportion of animal-based foods is reduced to 5 per cent of total calories and regional water deficits can be met by a reliable system of food trade.

As warnings of water scarcity limiting food production have been issued, Oxfam and the UN are preparing for possibly the second global food crisis since 2007. Prices of corn and wheat have risen nearly 50 per cent since June, caused in part by severe droughts in the USA and Russia, and weak monsoon rains in Asia. More than 18 million people are already facing serious food shortages across the Sahel. Oxfam predicts that the price increase will have a devastating impact in developing countries that rely heavily on food imports, including parts of Latin America, North Africa and the Middle East. Food shortages in 2008 were partly responsible for civil unrest in nearly 30 countries.

Adopting a vegetarian diet is one option to increase the amount of water available to grow more food in an increasingly climate-erratic world. Protein-rich, animal-derived food requires 5–10 times more water than a vegetarian diet. One-third of the world’s arable land is used to grow crops to feed animals. Other options for increasing food-production efficiency include eliminating waste and increasing trade between countries in food surplus and those in deficit.

Competition for water between food production and other uses will intensify pressure on water resources. The UN predicts that food production must increase by 70 per cent by 2050 to feed the world’s expanding population. At the same time, more water is needed to satisfy global energy demand – which is expected to rise by 60 per cent by 2050 – and to generate electricity for the 1.3 billion people currently without it.

In a different report, the International Water Management Institute (IWMI) said the best way for countries to protect millions of farmers from food insecurity in sub-Saharan Africa and South Asia was to help them invest in small pumps and simple technology, rather than to develop expensive, large-scale irrigation projects.

The problem of waste food

Around a third and sometimes up to a half of all the food produced is never consumed. Food waste is generated in different ways (Table 1) in different parts of the world. In LEDCs, it is chiefly because of shortages in the first stage of the supply chain: production, distribution and logistics. In MEDCs, most of the waste is generated at the consumer stage. Approximately 25 per cent of all the food bought is discarded as waste, despite it being perfectly edible. Estimates show that the annual value of the food which goes to waste and is thrown away amounts to approximately US$250 billion globally.

**Table 1** Food waste

| Stage | Example of food waste/loss characteristics |
| --- | --- |
| Harvesting | * Edible crops left in field, ploughed into soil, eaten by birds, rodents, timing of harvest not optimal, loss in food quality * Crop damaged during harvesting / poor harvesting technique * Out-grades at farm to improve quality of produce |
| Threshing | * Loss through poor technique |
| Drying – transport and distribution | * Poor transport infrastructure, loss due to spoiling, bruising |
| Storage | * Pests, disease, spillage, contamination, natural drying out of food |
| Primary processing – cleaning, classification, de-hulling, pounding, grinding, packaging, soaking, winnowing, drying, sieving, milling | * Process losses * Contamination in process causing loss in quality |
| Secondary processing – mixing, cooking, frying, moulding, cutting, extrusion | * Process losses |
| Product evaluation – quality control, standard recipes | * Product discarded / out-grades in supply chain |
| Packaging – weighing, labelling, sealing | * Inappropriate packaging damages produce, grain spillage from sacks, attack by rodents |
| Marketing – publicity, selling, distribution | * Damage during transport: spoilage * Poor handling in wet market * Losses caused by lack of cooling / cold storage |
| Post-consumer – recipes elaboration, traditional dishes, new dishes, proper evaluation, consumer education, discards | * Plate scrapings * Poor storage / stock management at home: food discarded before serving * Poor food preparation technique: edible food discarded together with inedible * Food discarded in packaging: confusion of ‘best before’ or ‘use by’ dates |
| End of life – disposal of food waste / loss at different stages of supply chain | * Food waste discarded may be separately treated, feed to livestock/poultry, mixed with other wastes and landfilled |

One of the reasons so much food is thrown away is that food is cheap in MEDCs. The wastage in LEDCs is as great as in MEDCs, but the reasons are different. In some LEDCs, the climate is warm and humid, the methods of harvesting imperfect and the storage and transport facilities are limited. The amount of food which reaches the market is therefore less – sometimes much less – than that produced.

Wastage of water

The wastage of food also means wastage of water, a resource which is in very short supply in many parts of the world.

All food production requires water and, if a third of the food produced is thrown away, a third of the amount of water used is squandered. Thus, a lot of water, energy, and land is exploited in a way which is neither sustainable nor justifiable. The international community has done extremely little in terms of rectifying this waste of resources. The focus has been entirely on increasing production, with no consideration of the fact that loss and wastage have been increasing at the same rate.

Questions

**1 a** What proportion of protein do humans currently derive from animals? *[1 mark]*

**b** What proportion of protein are scientists suggesting should be derived from animals by 2050? *[1 mark]*

**c** How much more water does an animal protein-rich diet use compared with a vegetarian diet? *[1 mark]*

**d** What were the causes of the 2012 increases in food prices? *[1 mark]*

**2** **a** What proportion of world food production is thrown away as waste? *[1 mark]*

**b** Why is this a problem? *[3 marks]*

**c** Outline the ways in which food is wasted. *[5 marks]*

**3** Identify some of the problems that the world is facing regarding food and water. *[5 marks]*