Feeding India’s growing millions

By Mike Brown

Synopsis
India is expected to become the world’s most populous country by 2025, and to have a population of 1.6 billion by 2050. However, even feeding its present population of 1.2 billion is a concern for the government, with an estimated 270 million people living in poverty, and where one in every three malnourished children on the planet lives in India. How will India feed the extra 400 million people forecast to be living in India by 2050?

Malnutrition currently affects 270 million of India’s poor, and 40% of Indian children are malnourished. Child malnutrition limits physical and mental development, and may lead to increased disease risk and early death in adulthood.

The increase in demand for food comes not just from the rise in population but also from urbanisation and increased personal prosperity. People in urban areas have a more diverse diet and higher calorie intake than those in rural areas. Likewise, as people’s wealth increases, their diet will change and they will eat more fruit, meat and dairy products.

The government of India has a food security policy that entitles 800 million people to subsidised food. The government gives farmers a guaranteed price for many of their products and subsides their inputs, whereas for the consumers prices are fixed. It was estimated that these policies cost the government $19 billion in 2014.

However, it could be possible for India to double its food production by 2050. A major concern is that 30-40% of food rots, due to an inefficient food supply chain. Farm yields can also been increased by increasing the use of technology and chemicals. Compared to China, crops yields per hectare are a lot lower in India. Food production is also affected by the monsoon rains, and in years with below normal rainfall, crop production decreases.

Key terms
Crop yields, malnutrition, diet, food supply chain, farm subsides, price guarantee, urbanisation, food security.

Learning objectives
By examining food security in India you should have better understanding of the some of the issues that affect many developing countries with regard to food production, including:

- Malnutrition and its effects
- How governments can increase food supply and meet demand
- Changing demand for food
- How farmers can increase yields using new technology and new methods.

Specifications links

<table>
<thead>
<tr>
<th>Exam Board</th>
<th>Link to specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>WJEC</td>
<td>Component 4.3: Contemporary themes in Geography, Section B: Economic growth and challenge: India, see pages 36–7. <a href="http://www.wjec.co.uk/wjec-gce-geography-spec-from-2016-e.pdf?language_id=1&amp;dotcache=no&amp;dotcache=refresh">http://www.wjec.co.uk/wjec-gce-geography-spec-from-2016-e.pdf?language_id=1&amp;dotcache=no&amp;dotcache=refresh</a></td>
</tr>
<tr>
<td>IB</td>
<td>Paper 2 Optional themes: F The geography of food and health.</td>
</tr>
</tbody>
</table>
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Introduction
India’s current population of 1.2 billion makes it the world’s second most populous country after China. However, as China’s fertility rate is below the replacement rate of 2.1, it’s population increase is slowing down, while India’s fertility rate of 2.5 will ensure that its population will continue to rise and will pass China’s by about 2025. By 2050 India’s population is expected to reach 1.6 billion (Figure 2). Every year adds approximately 15 million to India’s population. Meanwhile, poverty and malnutrition are high and the demand for food is increasing not just because of the population rise but also because of changing diets. Will India be able to feed its growing millions?

Malnutrition
Malnutrition rates are high in India. Globally, one in three malnourished children lives in India, and the country has more malnourished children than all of sub-Saharan Africa. In urban areas, 33% of children are malnourished. In rural areas 46% are malnourished, and in indigenous tribal areas the proportion is 55%.

Malnutrition in childhood impedes physical and mental development and so the child is less likely to do well in school and they are at greater risk of disease and early death when they reach adulthood. This produces a vicious cycle where malnourished mothers give birth to underweight babies, making them vulnerable to malnutrition and disease. Malnutrition affects females more than males, as females have a lower social standing. It is very common in many parts of India that at meal times the male members of the family will eat first while the women stand around serving them. Only when the males have finished eating will the women then eat their meal, consisting of what has been left by the men.

Vitamin and mineral deficiencies are another consequence of malnutrition. Anaemia, a lack of iron, affects 74% of children under three. Iodine and vitamin A deficiency are also widespread and affect childhood survival and development.

Food security is a major issue for the country. 276 million people were below the poverty line in 2012. Poverty is measured by the Indian government as $15 per person per month in rural areas, and $18.3 in urban areas. The government attempts to help relieve malnutrition by subsidising food prices for the poor. It subsidises food to approximately 800 million people through the Food Corporation of India (FCI).
Increase in food consumption

Population growth
India’s population growth alone will create an extra 400 million people to feed by 2050. The population growth rate will average 1% per year from 2010 to 2030, and 0.5% per year from 2030 to 2050. However, food production has been increasing at 2.1% per year for the last decade.

As food production is increasing faster than population growth, this should lead to more food per capita being available, and so reduce malnutrition.

Increased prosperity
Over the last 20 years India’s has been one of the world’s fastest growing economies, with an average of 6.6% per year in real gross domestic product, although in the past few years the growth rate has slowed.

Increased income levels have led to Indians eating a more diverse diet (Figure 3). In the last 20 years, food consumption has risen by 6% to 2300 calories per day. Cereal consumption has fallen slightly, but there has been a rise in the consumption of oils and fats, fruits and vegetables and dairy products. Meat consumption is relatively low at about 17 calories per person per day, compared to 462 calories person per day in China, and 242 in South Korea. Many Indians are vegetarian, due to their religious beliefs.

Urbanisation
Urbanisation is the increase in the proportion of a country’s population living in cities. Incomes in urban areas are double those in rural areas. In 1990 only 26% of India’s population lived in urban areas. This had risen to 31% by 2010, and is expected to reach 52% by 2050 (Figure 4).

Agricultural production
65% of the Indian population are farmers. There is a powerful farming lobby that looks after farmers’ interests. Politicians often make promises to farmers at election times to buy their vote. Consequently farmers enjoy a lot of subsidies, including free electricity and water, and cheap fertilisers. Farming productivity has been improving, mainly due to research and development and the adoption of new technologies. Many farmers though are in debt, due to the lack of rural banking and financial institutions, which drives the farmers into the hands of unscrupulous money lenders.

Most farms in India are small. 67% are less than half a hectare, 85% are less than 2 ha, while only 0.73% are larger than 10 ha.
Land degradation is a major issue. Around 44% of India’s total area is degraded, the three main reasons being water erosion, waterlogging and soil acidity. Water erosion accounted for 63% of land degradation, followed by soil acidity at 10%. This degradation is mainly due to poor farming practices, including improper crop rotation, over-use of fertilisers, and lack of soil conservation measures. This problem is partially caused by the government subsidies to farmers, who get free electricity which is used to pump groundwater. There are few costs and no incentives for farmers to use the water wisely or in moderation, which leads to waterlogging and increased soil erosion. This has also led to the lowering of the water table and in some places, for example, the state of Punjab north west of Delhi, a major wheat-growing area, there are serious concerns about the level of the water table which has fallen by an average of 75 cm per year between 2002 and 2006, as water is being extracted at unsustainable rates for use in farming and urban areas. Water availability per person is expected to decline by 26%, to 1140 cubic metres by 2050.

**Monsoon rains**

60% of the sown agricultural areas are dependent on rainfall. The southwest monsoon brings 80% of this rainfall. The effect of the monsoon rains on crop production can be seen in Figure 5. In below-normal years of rainfall (highlighted) there is a corresponding decrease in the rice and wheat produced.

<table>
<thead>
<tr>
<th>Year</th>
<th>Status of monsoon</th>
<th>Production of rice (million tons)</th>
<th>Production of wheat (million tons)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2002–03</td>
<td>Below normal</td>
<td>71.82</td>
<td>65.76</td>
</tr>
<tr>
<td>2003–04</td>
<td>Normal</td>
<td>88.28</td>
<td>72.11</td>
</tr>
<tr>
<td>2004–05</td>
<td>Below normal</td>
<td>83.13</td>
<td>68.64</td>
</tr>
<tr>
<td>2005–06</td>
<td>Normal</td>
<td>91.97</td>
<td>69.35</td>
</tr>
<tr>
<td>2006–07</td>
<td>Normal</td>
<td>92.76</td>
<td>74.89</td>
</tr>
<tr>
<td>2007–08</td>
<td>Normal</td>
<td>96.69</td>
<td>78.57</td>
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<tr>
<td>2008–09</td>
<td>Normal</td>
<td>99.18</td>
<td>80.68</td>
</tr>
<tr>
<td>2009–10</td>
<td>Below normal</td>
<td>89.09</td>
<td>80.80</td>
</tr>
<tr>
<td>2010–11</td>
<td>Normal</td>
<td>95.98</td>
<td>86.87</td>
</tr>
<tr>
<td>2011–12</td>
<td>Normal</td>
<td>105.3</td>
<td>94.88</td>
</tr>
</tbody>
</table>

**Figure 5** Monsoon status and crop yields

India is aware that it needs to make its agriculture more drought-resistant and use water more efficiently to produce ‘more crop per drop’. The government support for agricultural research is amongst the highest in the world after the USA and China, at the equivalent to $2.3 billion. In Punjab a university has been educating farmers to use soil moisture content probes. These probes help farmers know when to irrigate, and have led to a reduction in water use of 12-15%. In Gujarat, wheat farmers are testing a new drought resistant wheat GW-11 that requires less water.

**Increasing crop yields**

Crop yields in India are well below those of China. For example, in 2010, China produced 4.7 tons per ha of wheat, 5.5 tons per ha of maize and 1.8 tons per ha of soybean. For India the figures are 2.8, 2.5 and 1.3 tons per ha respectively. Four types of technology have raised yields in India in the past: improved crop varieties and livestock genetics, fertiliser and feed, mechanisation, and chemicals to protect crops and animal health.

**Government agriculture and food policies**

There are three main objectives of India’s agriculture and food policies: food security, food self-sufficiency, and income support for farmers. These policies keep food prices high for farmers, while keeping prices low for consumers and protecting domestic farmers from foreign competition.

**Support for the farmer**

For 24 crops in India, farmers receive minimum support prices. So the farmer knows what price he will get for the crop. The farmer can sell as much as he likes to the government. The main agency that purchases the grain is the Food Corporation of India (FCI). The FCI then stores the grain. The minimum support prices for wheat, rice and maize have risen by 300% in the last decade. However, input costs have also risen sharply. This has led to the FCI of India holding twice as much stock as intended. It does not have the necessary storage facilities to keep it properly, and much of the grain that is stored rots.

The farmer also receives a number of input subsidies from the government. The government controls the cost of fertiliser and pays the difference between the controlled price and the market price. So again, the farmers receives fertilisers cheaply, which removes any incentive to use them at lower levels. Other subsidies include irrigation, for example,
subsidised prices for water pumps and sprinklers, electricity, diesel and seeds.

**Import tariffs**

Import tariffs on food in India remain amongst the highest in the world and keep domestic food prices above world levels (Figure 6).

**Food subsidies for the consumer**

There are 492,000 fair price shops throughout India that sell grain to consumers at subsidised prices. The government has recently changed the categories of consumers that benefit from subsidised grain. Under the National Food Security Act (2013) there are two categories. The first category entitles households to purchase 5kg of rice per person per month, while second category consumers are entitled to 35kg of grain per household per month. This is still being implemented at the moment but is expected to cover 75% of the rural population and 50% of the urban population. The prices are set for three years at 3p per kg for rice, 2p per kg for wheat, and 1p per kg for coarse grains.

**Costs and benefits of government policy**

Both producers and consumers benefit. Agriculture production is high and there is reduced food insecurity. However, there is over-production of cereals, at the expense of fruit, vegetables and dairy products.

Subsidies on agricultural inputs such as water, electricity and diesel promote wastage and inefficiency. Fertilisers are not used correctly, and together with over-pumping of groundwater and poor irrigation, lead to soil degradation. This has also led to a lack of investment in more sustainable and long-term irrigation methods.

India has been heavily criticised by the World Trade Organisation for its trade-distorting farm subsidies and import tariffs. Despite the efforts of the government, 46% of children are malnourished. 40% of the food is lost to government corruption and graft. FCI rice, intended for the poor, is often sold by officials, who are supposed to administer the scheme, for private gain.

**Problems in the food supply chain**

As soon as the crop is harvested the farmer needs to get the produce to market. If there is a large crop it needs to be transported to the nearest city, which can be hours or days away. India’s road network is poor, transport is rarely cooled and storage facilities poor. The FAO estimates that 40% of India’s fruit and vegetables perish before reaching the consumer, an annual loss of $8.3bn.

The farm-to-fork network is dominated by traditional practices that resist change. There are many middlemen with political influence that want to keep things that way. Small shopkeepers also fear the arrival of modern supermarkets.

Investment is needed in a modern supply chain with cold storage units, refrigerated trucks and modern logistics. Foreign food retailers, for example Tesco and Wal-Mart, are keen and willing to invest in India, but the government makes this difficult with unclear regulations and strong political groups against such a move.

Only 3% of India’s food is bought in modern supermarkets. Cold storage is available for potatoes, but this accounts for only 10% of the perishable produce. India needs to build cold storage units for 370m metric tons of perishable foods.

**Acknowledgement**

The following report was referred to in writing this Geofile:

Focus questions

1. Refer to Figure 1, which shows a rural farmer. What does the photograph suggest about the size and technology of many farms?

2. Refer to Figure 4. Analyse the changing diets of rural and urban dwellers in India between 1993 and 2010.

3. Critically evaluate the India's government policy in regard to:
   a) farmers
   b) consumers.

4. In your opinion, will India be able to feed its growing millions? Justify your answer.

Learning checkpoint

Remember this case study.
While you are reading, consider the following questions:

What are the main issues regarding farming in India?  
What could be done to improve crop yields?

What have been the consequences of India’s agricultural subsidies?  
Should India continue with these agricultural subsidies, or open up its agricultural products and food supply to the international market?