Topic 5 - ESS answers

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This is a complex question and could be used as a synopsis towards the end of the course. E.g. make a large poster in class and students add storages and flows as they think of them. The flows given here are not exhaustive.

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1. Explain what these graphs tell us about:
   a) The graphs suggest that carrying capacity has been reached and that the additional use of fertilizers is not sufficient to maintain soil fertility.
   b) This is an unsustainable practice – soil fertility is being compromised and with the addition of inorganic fertilizers the soil structure will also deteriorate encouraging soil erosion and the soil is more friable.

2. What actions can we take to make this more sustainable?
   Switch to vegetarian diets so that less is lost to converted pasture.
   Reduce tree plantations and harvest form natural systems.
   Stop deforestation for crops.
   Stop expanding cities outwards.
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- All regions are showing an overall increase in agricultural production since 2004.
- Brazil, China, India and USA have shown consistent rise in production since 1992.
- Ukraine, Russia and Australia showed peaked production in 2008 followed by a sharp decrease.
- Russia and Ukraine showed a significant drop in production between 1992 and 2000.
- All regions show fluctuations in production up until 2009.

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Comment on the distribution of LIFDCs in the world.

- The majority of the LIFDCs are in Africa, with the exception of North Africa.
- The Indian sub-continent and surrounding countries are also LIFDCs.
- Parts of SE Asia are LIFDCs.
- Most of the northern hemisphere has more than enough food.

What are the common factors for these countries?

- They are all LEDCs.
- Majority of them are hot climates/tropics.

What food issues do countries with high per capita calorie consumption face?

- Obesity
- Cardiovascular problems
- Diabetes
- High calories but low nutrient values = deficiency diseases

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1. The area of production and the yield have both increased while the area seeded and harvested has remained constant and then decreased. This is probably due to the fact that the use of fertilizers, pesticides and insecticides has increased meaning that you can get more output from the same area of land.

2. | Impact on world food supply | Impact on the environment |
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World food supply has increased but the distribution is very uneven so it has not solved many issues | We do not know the longer term impact of releasing GM organisms into the environment and the food chains e.g. interbreeding |
Some of the GM food is improving micro-nutrient supply in the diet | Green Revolution varieties need more fertilizer, irrigation and pesticides and this causes eutrophication, salinization and the accumulation of chemicals in food chains |
From the 1940s to the 1960s, plant breeding of wheat and rice and then other cereals produced varieties that were less prone to disease, had shorter stalks (so they did not lodge or fall over in rain) and gave higher yields | Reduced genetic diversity in crops |
In Mexico, wheat yields increased such that the country became self-sufficient in wheat and then exported the surplus |
In India, the IR8 variety of rice, a HYV or high yielding variety, gave five times the yield of older varieties with no added fertilizer and ten times with added fertilizer |
In Africa there was little difference |
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1. ● Food utilization has increased steadily and is now above production
   ● Food production has fluctuated significantly with a drop between 1995 and 2002 then an overall rise with some fluctuation around 2004–6

2. Answer these questions in your own words:
   a) ● Increased human population.
      ● Increased standards of living for many so want for better quality foods – more protein, more meat, more fish, more variety.
      ● Area of land to grow food is limited.
      ● Fish stocks are crashing due to overfishing.
   b) ● Causing food prices to rise as biofuels replace edible food in the food supply
   c) ● Winners –
      ● food production companies that can charge more for their products
      ● farmers who can charge more for their crops/animals
      ● Losers –
      ● consumers who pay more or cannot afford to buy food at all
      ● farmers who cannot charge more if they are locked into contracts

Quick Review questions

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