

1

Wheat



Wheat

Wheat is the 2nd largest crop grown in the world; 730 million tonnes are grown world wide. It is the largest crop grown in the UK.

raw material

2

Wheat



Bread, pasta, cakes...

Wheat products, along with potatoes, are a staple food in the UK. This means that they make up a large part of the diet of many people.

product

3

Wheat



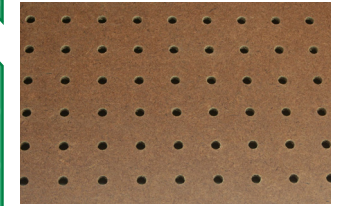
Straw

The UK produces an estimated 6 million tonnes of wheat straw a year. This has many uses but is an underused resource.

waste problem

4

Wheat



Bio-board

Bio-board is a strong and versatile building product which is more sustainable than chopping down trees. It also has no harmful chemicals which can be found in other boards.

green solution

1

Oil seed rape



Oil seed rape

2.3 million tonnes of oil seed rape are grown in the UK each year. The flowers are popular with bees; it produces a pale set honey.

raw material

2

Oil seed rape



Vegetable oil

Oil is used as an ingredient in a wide range of foods such as cakes, biscuits and dressings. It is also used for cooking foods.

product

3

Oil seed rape



Rape straw

The straw has many uses including for animal bedding. However, there is potential to obtain more profit from this resource.

waste problem

4

Oil seed rape



Energy

Straw can be burned in specially designed power stations to produce a renewable source of energy. This means that less fossil fuels need to be used.

green solution

1

Orange



Orange

In Brazil the price of oranges has fallen dramatically (60% between the years 2007 and 2013). This makes it difficult for orange farmers to stay in business.

raw material

2

Orange



Orange juice

Brazil is the largest exporter of orange juice in the world. In 2013 they produced 1.12 million tonnes of orange juice.

product

3

Orange



Orange peel

Brazil produces over 7 million tonnes of orange peel a year. This is expensive to dispose of.

waste problem

4

Orange



Limonene

Limonene is a chemical with many uses. It can be used to flavour food and add scent to cleaning products. It can be used instead of chemicals made from oil.

green solution

1

Potato



Potato

Over 5 million tonnes of potatoes were grown in the UK in 2013. 52% of these in the East of England and Yorkshire.

raw material

2

Potato



Chips, roasted, mashed...

In the UK we eat an average of 100kg of potatoes per person per year!

product

3

Potato



Potato peel

In the UK 359,000 tonnes of potato is wasted every year. This includes potato peel left over from making chips.

waste problem

4

Potato



Plastic

'Bio plastic' takes less energy and fossil fuel to make than traditional plastic. The process also produces less greenhouse gasses.

green solution

1

Maize



Maize

Maize is increasingly grown in the UK. It grows very tall and is used to make temporary 'maize mazes'.

raw material

2

Maize



Corn oil, sweet corn, popcorn...

Maize is mainly used for animal feed. When fresh, it can be cooked as a vegetable. When dried, it can be made into popcorn.

product

3

Maize



Maize straw

Maize is a tall plant, but it only produces one or two cobs of corn per year. This means that there is a lot of maize straw left over.

waste problem

4

Maize



Eco wax

Traditional ways of obtaining wax use toxic solvents, but wax made from maize does not. One use of eco-wax is in cleaning products.

green solution

1

Cocoa beans



Cocoa

Cocoa beans grow in hot, humid conditions and most cocoa is grown near the equator. It takes a whole year's crop from one tree to make half a kilo of chocolate.

raw material

2

Cocoa beans



Chocolate

The UK is one of the world's largest consumers of chocolate. We consume an average of 11kg of chocolate per person per year in the UK.

product

3

Cocoa beans



Cocoa bean husk

The beans are contained within a thick husk, or shell, which is not used in the production of chocolate.

waste problem

4

Cocoa beans



Packaging

Coco shells can be ground into a powder and become one of the ingredients of packaging. Researchers are also investigating ways to use them as a source of food.

green solution

1

Coffee beans



Coffee beans

Coffee is grown in countries near to the equator. The coffee berries have to be picked by hand and the beans roasted before they are ready to use.

raw material

2

Coffee beans



Coffee

Coffee is one of the most popular drinks in the world. The flavour of the drink can be affected by the variety of bean used and for how long it has been roasted.

product

3

Coffee beans



Coffee grounds

The UK produces 500,000 tonnes of coffee grounds per year. If alternative uses are not found for them this would lead to a lot of waste in landfill sites.

waste problem

4

Coffee beans



Oils

The oils made from spent coffee ground can be used to make fuels and soap. This is an important alternative to palm oil and so can help protect the rain forest.

green solution

1

Food crops



Food crops

We use a wide range of crops in this country both grown and raised here and imported from around the world.

raw material

2

Food crops



Food

We eat both unprocessed materials (such as apples) and foods that have been made following a range of processes such as cooking or fermentation.

product

3

Food crops



Food waste

In Britain the average family throws out the equivalent of 24 meals a month. 4.2 million tonnes of food is wasted in this country every year. This includes food that is mouldy and vegetable peel.

waste problem

4

Food crops



Fuels and fertiliser

Some companies specialise in recovering as much of this waste as possible. Some of it is used to enrich the soil and the rest is burned to create energy.

green solution

1

Peas



Pea plants

Peas grow in pods on climbing plants which can grow to over a meter in height. The UK are the largest producer of peas for freezing.

raw material

2

Peas



Peas

Peas are used in both animal and human feed and are a good source of protein. They can be served as a side vegetable, in stews or as mushy peas.

product

3

Peas



Pea vines

Peas are an annual plant, so once the peas have been harvested the vine on which they have been growing dies. The vine represents nearly half of the total weight of the crop.

waste problem

4

Peas



Thickening agent

The pea vines can be processed to extract a substance which adds valuable nutrition to food as well as thickening sauces and soups to make them more appetising.

green solution

3

Fossil fuel



Fossil fuel

Unlike the other raw materials described here fossil fuels such as coal and oil, cannot be replaced. Whatever scientists do their production inevitably leads to pollution.

waste problem

Science Solutions Card Games for 9-11 year olds

These games highlight the problem of waste during food production, and the innovative and exciting solutions generated by scientists to turn this waste into useful products. Download the game details from the *Potatoes to Plastics* home page using QR code below. To purchase further sets of cards please contact ciec@york.ac.uk.



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Science Solutions Playing Cards

Three card games linked to the CIEC publication *Potatoes to Plastics*. These games highlight problems caused by environmental waste and how science is being used to find solutions.

For more information, please visit the CIEC website by clicking on the QR code.



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