

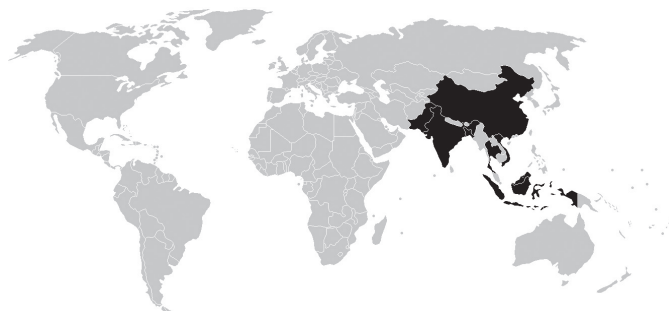
Attachment 2



RICE

Rice is the second most produced cereal in the world. Today, rice is grown on every continent except Antarctica, but the biggest producer is Asia where 90 % of the world's rice is produced and consumed. The world's top rice producing countries are India, China, Indonesia, Thailand, Bangladesh and Vietnam.

Most rice is consumed in the same country where it is produced. Traditional rice exporters are Thailand, Vietnam, India and Pakistan. Rice is also grown in Europe. In fact, about two thirds of the rice consumed in the European Union is grown in Europe with Spain and Italy being the biggest producers. Most EU imports come from Thailand, India and Pakistan.



Almost all of the world's rice is grown on small farms and planted by hand. Unfortunately, small farmers often have to sell their production at very low prices which cause them problems.

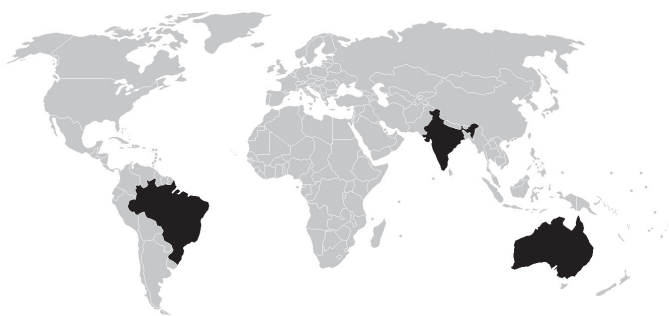
In the shop we buy so-called 'milled' rice in the form of white rice or broken rice. 'Paddy' rice (the rice as harvested from the field) consumes 2 300 litres of water per kg. One kilo of paddy rice produces 0.67 kg of milled rice on average.

How much water does 1kg of milled rice need ?

SUGAR

Sugar can be produced from different plants, such as sugar cane or sugar beet. Nowadays, about 70 % of the world's supply of sugar comes from sugar cane, which is mainly produced in tropical areas. There is no difference between the end products of beet and cane sugar, which are both called white (or refined) sugar; but sugar cane can also be processed into brown sugar (sometimes called raw sugar). We consider here the case of sugar cane.

The top producers of sugar cane are Brazil and India. Brazil is also the world's biggest sugar exporter, followed by the European Union (where sugar beet is grown) and Australia.



Work on sugar cane plantations is hard and can also be dangerous. Workers use sharp machetes and sometimes they also work with hazardous chemicals. Often, the salaries for workers in the sugar cane sector are not enough for even basic needs. Over-irrigation and burning the cane fields are also problems.

It takes about 175 litres of water to produce 1 kg of sugar cane. About 11 % of the sugar cane is sugar, so that 1 kg of sugar cane gives 0.11 kg of sugar.

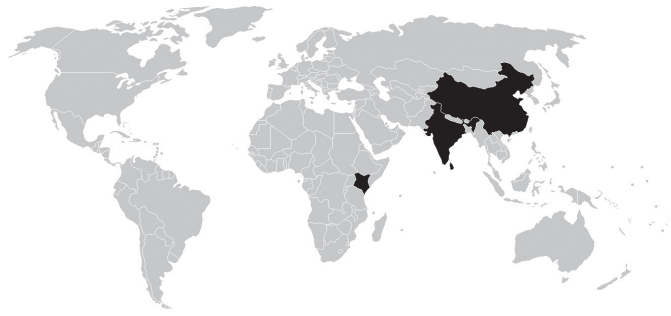
How many litres of water is thus required to produce 1 kg of refined sugar?

Attachment 2

TEA

Tea is the second most consumed drink in the world (after water) and is present in almost every culture. There are four main types of tea: white, green, oolong and black. However, these all come from the same plant called *Camellia sinensis*.

Tea bushes grow in a tropical or subtropical climate. Tea is made from leaves of the tea bush. Tea plantations are usually located on a mountain slope and the higher the plantation is, the better the quality of the tea.



People working on tea plantations often have very low wages and many of them are only employed on short-term contracts so they cannot be sure about their jobs. Also, picking tea leaves is a very tiring task and often the workers do not have any special work clothing or equipment.

The most important countries with tea plantations are China, India, Kenya and Sri Lanka which are also the largest tea exporters.

To produce 1 kg of fresh tealeaves we require 2 400 litres of water. One kg of fresh tealeaves gives 0.26 kg of packaged tea (black tea as we buy it in the shop). For a standard cup of tea (250 ml) we require 3 grams of black tea.

How many litres of water are required for one cup of tea (250 ml)?

BEEF

In industrial farming, it takes on average three years before the animal is killed to produce about 200 kg of boneless beef.



During these three years the animal consumes nearly 1 300 kg of grains (wheat, oats, barley, corn, dry peas, soya bean meal and other small grains) and 7 200 kg of roughage (pasture, dry hay, silage and other roughages). To produce this amount of feed requires about 3 060 m³ of water on average. Additionally, the animal needs 24 m³ of water for drinking and 7 m³ of water for servicing.

How many litres of water are used to produce one kilogram of boneless beef?

Attachment 2

PAPER

Most people know that trees are the main source for paper production, but other materials and plants are also used. Recycling is very important too. However, the number of trees cut down and used to make paper is still enormous. Apart from cutting down trees, the chemicals used in paper production can also be very bad for the environment, especially when they get into water and soil.



photo: Anne Burgess

We assume here that one A4-sheet of paper is the regular 80-gram paper (80g/m^2). One such sheet has a weight of 0.005 kg.

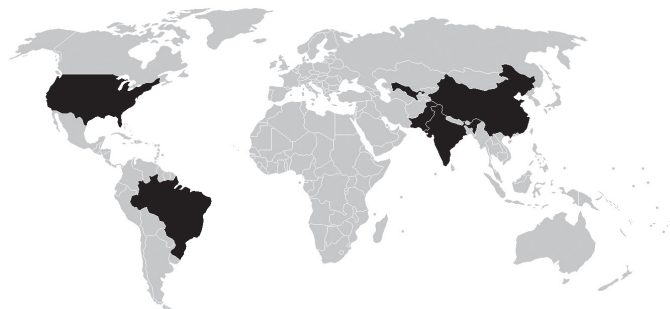
Further we assume that the paper is produced from wood. Consider a forest with transpiration (the process of water passing out from the leaves) of $6\,000\text{ m}^3/\text{ha}$ every year. Suppose that the forest produces 10 m^3 of wood per hectare per year. Finally, account for the fact that 1 m^3 of wood gives 0.3 ton of paper.

How many litres of water are used to produce one A4-sheet of paper?

COTTON

Cotton grows in warm climates and most of the world's cotton comes from China, India, the United States, Pakistan, Brazil and Uzbekistan.

One of the biggest problems related to cotton production is a heavy use of chemicals, mostly those that protect the plants from various insects. These chemicals are very dangerous to both human health and the environment. Moreover, other chemicals are used during processing. This all leads to soil and water pollution.



A cotton shirt is made from cotton fabric, which is made from cotton lint, which comes from seed cotton, which is harvested from the cotton field. Indeed, before the final cotton textile gets to a consumer it goes through a number of processes and products.

The global average of water used to produce 1 ton of seed cotton is 3600m^3 . The seed cotton is first processed into lint – we get only 350 kg of lint out of 1 000 kg of seed cotton. Then, after carding, spinning and weaving we get grey fabric – 1 000 kg of lint produces only 900 kg of grey fabric. Then it goes into wet processing (bleaching and dyeing) and finishes as the final printed cotton textile. Additionally, it requires about 30 m^3 per ton for bleaching, 140 m^3 per ton for dyeing and 190 m^3 per ton for printing. One cotton shirt has a weight of 250 gram.

How many litres of water are used to produce one cotton shirt?