Good water, water to "eat". What is virtual water?

How much water do we "eat" every day without realizing? It may sound like a joke but it isn't. All the foodstuffs we eat contain high percentages of water, from chocolate to ice cream, from rice to pasta, from meat to fruit…. What's more, large quantities of water are needed to produce food in the first place. Have you ever considered how much water is "hidden" in the food you eat daily?

Illustrations 1-3:© Centro Civiltà dell'Acqua
Different quantities of water are available in the food we eat every day.

How much water do we "eat" every day?
Life is water, and human beings feed on water all the time without even being aware of it. One part of this water comes directly from liquids and another no less important part comes from the food we eat. During a person's life s/he takes in 25,000 litres of water (including that in foodstuffs) to keep the organic structures and their important biological functions in good working order. As well as rice, pasta and hamburger, consider chips and pizza too. Do you know how much water is required to make a pizza for example?

A pizza of… water!
Would you ever have guessed that pizzas have got a lot of water in them? Well, pizza dough is 50 – 60% water! To mix the flour in well more and more water is required and if we don't use enough the pizza will burn and no one will eat it! There are also tomatoes in pizzas, mozzarella and even vegetables and sliced meats. Tomatoes need lots of water, not just when growing in fields, but also to give

them a good wash, and make tomato puree (passata), which is 93% water! The same holds true for mozzarella and all the other ingredients in a pizza. In this section you will learn about how much water is needed to rear cows and pigs, from which we make mozzarella and ham. Would you have believed that so much water is "hidden" in a steaming hot pizza?

"Virtual water"

Different percentages of water are contained in all foodstuffs, in fact most foods we eat are largely composed of water!

Some researchers have even tried to calculate how much water is "behind" each foodstuff, that is to say how much is used in the production cycles, for example how much is needed to wash finished products, like fruit and vegetables, or to clean animals and stables…

The results of these studies are really curious! Would you have said, for example, that a good 40 litres of water are behind a slice of bread, and that a surprising 185 litres are behind a packet of crisps?! Just think that 900 litres of water are needed to produce 1000 grams of potato flakes, almost one litre per gram! When we use the term "virtual water", we are referring to the quantity of "hidden" water that lies behind all foodstuffs even if you can't see it!

How much water do you need for 1kg of…

"Virtual" water is the total volume of fresh water used to produce a foodstuff or other good.

Pay special attention to the fact we said "fresh" water, because 97% is the earth is made of sea, or salt water. It is not always an easy task to find fresh water! Let's now look at some figures. Here are some of the quantities of "virtual" water hidden behind:

1 hamburger: about 2,500 litres of water
1 litre of milk: about 1,000 litres of water
1 litre of apple juice: about 950 litres of water
1 glass of orange juice (200ml): about 190 litres of water
1 glass of wine (125ml): about 120 litres of water
1 glass of beer (125ml): about 75 litres of water
1 cup of tea (250ml): about 30 litres of water (for the necessary amount to produce a tea bag)
1 cup of coffee (125ml, using 7 grams of coffee): about 150 litres of water (to produce 1kg of roasted coffee takes about 21,000 litres of water)
1 apple: about 70 litres of water

How much water do we eat with…

1kg of pulses: about 3,000 litres of water
1kg of rice: about 2,500 litres of water
1 kg of citrus fruits: about 2,000 litres of water
1kg of maize: about 1,700 litres of water
1kg of barley: about 1,200 litres of water
1kg of wheat: about 800 litres of water
1kg of potatoes: about 500 litres of water

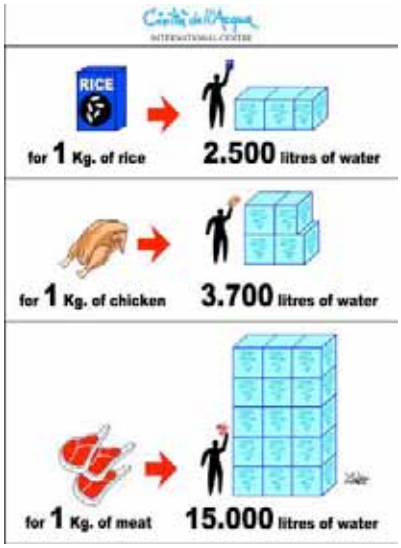

Illustration 4: © Water Footprint Network, University of Twente (The Netherlands), data processed by Centro Civiltà dell'Acqua – Water Footprint of different foods.

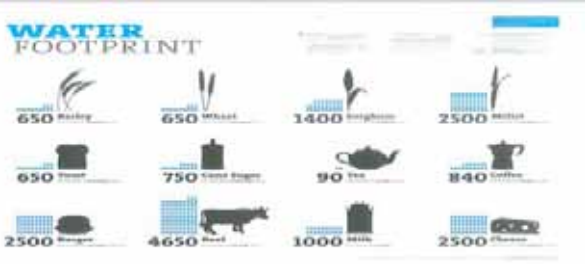

Illustration 5: © Water Footprint Network, University of Twente (The Netherlands)
Water Footprint of different foods.

And here are some more…

1kg of beef: about 15,000 litres of water (considering an animal of 3 years: for 200kg of meat 1,300 kg of grain and 7,200kg of hay are required to feed the animal, 24,000 litres of water for it to drink, and about 7,000 litres for cleaning)
1kg of pork: about 4,800 litres (estimate for a pig of 10 months)
1kg of chicken: about 3,700 litres (estimate for a chicken of 10 weeks)
1kg of bread: about 1,500 litres of water

* these figures can vary from place to place, but are there to give you a general idea!

Vary your diet: don't just eat hamburgers and milk!
Improving our dietary habits can save water! We can choose to eat chicken, for example, rather than beef. For a 300gram steak about 4,500 litres of water are needed, whereas about 1,100 are needed for a piece of chicken, four times less! If you decide to fill yourself up with rice or pasta, you will consume even less water!

Illustration 6: © American Association for the Advancement of Science - Good eating.

A pair of jeans made of… water ?!?
Calculations for virtual water consumption can also be applied to many other things we use daily. Clothes, cars, toys, telephones, computers, etc, are made of water too. For example, to produce a pair of jeans requires 8,200 litres of water (about 19,000 litres are needed for 1kg of cotton)! If we look closely, everything around us always has a water "cost"! Even if we can't see it, it is there…. in everything! You can look at this in more detail in the dossier "Productive Processes".

Water and organic food
In recent years we have grown accustomed to hearing people speak about natural or organic foods. The labels of these foodstuffs are generally green, a color which reminds us of nature. Organic farming respects the earth more because it doesn't use chemical products like fertilizers and pesticides which are used to kill the small insects that eat crops. So it doesn't pollute the environment. In general, organic products are better, not just because they taste better, but because they contain more nutritive substances than non-organic products. Furthermore, fresh organic products do not contain additives, substances added to food to make them last longer. Neither does organic agriculture use additives to make fruit "age" more slowly and look better for longer. Additives can also be used to give products a more intense flavor that is always the same.

"Man is what he eats"
This maxim by Ludwig Feuerbach (1804-1872), a famous German philosopher, helps remind us of two important things. The first is that the human organism is mainly made of water, and that water, fundamental for life, is assimilated as you now know not only through liquids, but through all foods we eat. The second is that everything we eat, whether of vegetable or animal origin, is strictly connected to our bodies. So many different forms of water are required to keep our bodies – and therefore "our water"- in good health. The quality of the water we drink is in direct rapport with the quality of the water we are composed of!

Does organic agriculture really help save water?
One definitely positive aspect of organic farming is the respect for the quality of the earth as well as water. Organic farming does not damage the soil and, over the years, preserves the fertility of the soil much more (compared to soil that is overexploited due to pesticides, weed-killers and chemical fertilizers commonly used in "industrial" agriculture). Further, the water which flows through organic cultivations is much less polluted as a result. Then again, if it is true that organic farming uses very few chemical agents (which always have a considerable impact on the environment), it is also true that these cultivations produce between 20 and 40% less (naturally with variations) than conventional or "industrial" agriculture. In other words, more fields are needed to produce the same quantity of an organic product. In terms of productivity, organic farming yields less. An average estimate is that for each kg of produce, the expenditure of an organic farm is 20% more than a non-organic farm. Then again, 100 grams of organic wheat have a far higher nutritional value than the non-organic equivalent, just as organic eggs or milk have a very different nutritional value to the same non-organic product!

Zero Kilometer Products
Not everything you eat is produced locally. Some fruit and vegetables only grow in certain places, like pineapple which comes from Africa, from Latin America or other tropical countries. The same thing goes for mango and avocado. The transportation of fruit and vegetables from one part of a continent to another is a widely diffused commercial practice, even if it pollutes the environment and increases the price of the foodstuffs. So, whenever possible, it is better to purchase "Zero Kilometer" products. This term means that fruit, vegetables, meat and other products are cultivated, sold and eaten in the same place or region. Organic farming too becomes more sustainable when it applies the Km 0 principle.

The fundamental role of small scale farmers in more sustainable farming

For a more sustainable future of agriculture on a global scale, we will certainly have to reconsider the role of small scale farmers, as opposed to the monocultures and massive productivity of industrial agriculture. Indeed most current funding for agriculture in the "developed" countries favors industrial agriculture and monocultures rather than small scale producers. In the future it is important to create more space and opportunities for small scale farmers if committed to organic production, because only through them is it truly possible to conceive of more sustainable farming practices for our soils and water.

Water and population growth

"Virtual" water is a very important concept when we refer to world population growth. Today there are 7 billion of us on the planet and according to expectations there will be 10 billion of us by 2050, exactly 10 times more of us than 200 years ago (in 1850 there was "only" 1 billion…) Considering that in the last century in all "developed" countries the consumption of water per person has also risen dramatically (from two to ten times per person), what will become of fresh water reserves in 50 or 100 years if we continue at this rate? The United Nations established that the minimum amount of water a human being requires per day is 40 litres: in reality we consume much more if we take virtual water into consideration! Thinking rationally about the large scale effects of using virtual water or having a vegetarian diet (rather than meat eating) leads us to appreciate some fundamental aspects indeed for a more sustainable management of water in the future.

How much water is wasted in all those foods produced that we… don't eat?

Wastage of food has serious consequences on water consumption. Now that you know about virtual water you can make this statement in all certainty! Apart from the economic waste, in throwing away food there is a terrible wastage in the water required to produce it. Think how much food developed countries throw away each day, not just the food that is left on our plate, but also food in the fridge that doesn't get eaten. A lot of fruit and vegetables are not even gathered from the fields if slightly damaged by rain or hailstones, they are left to rot and never reach the shops. Other foods are thrown away by shops and shopping centres simply because they haven't been bought. What can we do to avoid all this and waste less food – and, as a consequence, water too? Well, first you have learn to buy only necessary items when you go shopping and remember that anything you don't eat and throw away could be eaten by someone who is hungry. Then you must learn to conserve foods. Those that you cook and don't eat right away can be kept in the freezer, that way they don't go off and you can defrost them later when you want! All the water that we don't "eat" could be "eaten" by so many other people. Always remember that!

Illustration 7: © Lundqvist J. (2008). Saving water, SIWI, see references - Food waste.

What can you do? Choose a more mindful diet for a more sustainable future

While it is true that world population is increasing, the fresh water available to us on earth remains the same. The food that costs most in terms of water consumption is meat, but if 7 billion people ate meat and meat alone, what would happen to the global level of fresh water? And if we were to eat less meat than we do now, and opt for a primarily vegetarian diet, what would the outcome be? You too can contribute to wiser water use with your dietary choices, for example by choosing one type of meat rather than another, or better still, a healthy vegetarian diet as a base, choosing foods which require less water to produce. Apart from being more careful with water and not wasting it, we can also choose to buy local or national seasonal fruits and products, preferably organic, or at the very least products from small scale rather than industrial scale producers.

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Gruppo Alcuni

H_2Ooooh!

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