

# Project „Theory and Practice: Sustainable Use of Water“

This water exhibition is part of our international project:  
„Theory and Practice: Sustainable Use of Water- An European Challenge.“

## Target and frame of the project:

A learning partnership, funded by the EU programme Grundtvig (LLL - Life Long Learning), between August 2013 and Juli 2015.

The participating organisations shall reflect their water consumption (direct and virtual water), improve it and extend their method repertoire for education on water topics. The project results (best practice examples) then can be imparted in our particular learning groups. Throughout the term of the project all organisations meet up in partnermeetings of several days duration in each of the participating countries to exchange, educate themselves together and thereby further the project.

At our meetings in Berlin, Locorno, Porto, Sosnoviec, Bologna and Diyarbakir we ...

... reflected on the water consumption of our organisations

... set joint and organisation-based project goals

... discussed our „Water-Footprints“

... visited „water sites“ as sources, rivers, embankment dams, wastewater treatment plants, mills, farms etc.

... exchanged experience on interactive Methods of political education concerning water.



## The foreign partner organisations are:

- **Tabanca Pequena (Portugal):** An organisation helping rural communities in west-african Guinea Bissau (former colony) to e.g. build wells.
- **Centrum Kształcenia Ustawicznego (Poland):** A school-centre that wants to improve their pedagogical methods and dealing with water.
- **Scuola Universitaria Professionale della Svizzera Italiana (Swiss):** An university of applied science which educate teachers and pedagogues and deals with effective pedagogical methods on sustainability.
- **Associazione Universita Verde di Bologna (Italy) :** An NGO, active in political education on sustainability and water.
- **Dyrbakir Zirai Mücadele Arastirma Müdürlüğü (Turkey):** An agricultural science and education institute offering trainings for farmers on how to change their practice towards ecological agriculture.

## The Association OBUK (Open Education Environment Culture)

Förderverein Offene Bildung Umwelt Kultur e.V. (OBUK) was founded in 2007. The association is active in culture, political and environmental education and runs the ecological guest house („tagungswerk“) in the KuBiZ-centre.

Linking the practical implementation of ecological standards with political education is one of our main goals. So we care for a ecological and sustainable accoutrement.

We work on the topic sustainability using interactive methods to make it more accessible for our seminar participants. For example: In workshops we connect information about the global water-situation with water sensitive cooking.

In this partnership-project we combine political education with the practical implementation of ecological standards by showing this exhibition as well in our guest house.



<http://sustainableuseofwater.wordpress.com>

<http://tagungswerk.de>



# The Way of our Tap Water

Berlin tap water is from 100% local ground water.



There are about **800 water supply wells**, pumping up the ground water. Afterwards it is pumped into waterworks (in Berlin, there are 9) and processed to drinking water. Oxygen is added to filter out the metals manganese and iron. Other chemical additives are not necessary, because the ground water is already very clean. In big underground cisterns the water is impounded and from there pumped to Berlins' households.

Berlin's tap water contains many **healthy minerals**, especially magnesium. The mineral nutrient supply is even higher than prescribed by the German drinking water regulation. According to the testing institute „Stiftung Warentest“ it is often better to drink the tap water than to carry water bottles home. (test, 07/2012)



**Where does the waste water go to?** The used household water flows from the toilet and the gutters through pipes into the canalisation. All waste pipes lead to one of the 150 wastewater pumps in Berlin. They pump the water to the sewage works. There are 6 sewage works in Berlin, in which the water is cleaned. 620 million liters of water are cleaned daily. This is one bathtub per inhabitant of Berlin. Afterwards the cleaned water is piped into the Spree, the Havel and the Teltow canal.

Despite all presettings the controllers find **residues of medicines** in Berlin's waste water, among them pain reliever, hormones and beta blockers, antibiotics and psychotropic drugs. These substances are detected in the cleaned waste water in the sewage work, so they can get into the ground water. The danger and long term damage of these substances is not yet well known. Especially hormones can influence the human body, not to mention the animals living in the water. This is a worldwide problem, that is increasing with the consume of medication.

The **direct water consumption** per inhabitant in Berlin is **115 litre** on average per day.

The overall **length** of the drainpipe in Berlin amounts **9.500 km**.

In Berlin the **waste water pipes are too big** for the amount of waste water flowing through them. Thereby stinking mud stays in the pipes. The waterworks rinse with tap water because there is no pipe system for reused water. In peak periods it amounts half a million cubic metre or 5.000 full bathtubs. (Source: Berliner Morgenpost)

A solution to avoid this waste of drinking water would be building a system of thinner waste water tubes. This seems to be too expensive from the perspective of the Berlin Senat.



Programm für lebenslanges Lernen





# Background information on the referendum against the partial privatisation of the Berlin drinking water in 2011:



**Berliner Wassertisch**  
[www.berliner-wassertisch.info](http://www.berliner-wassertisch.info)

## Successful referendum for the remunicipalisation of the Berlin water

In February 2011, 665.713 inhabitants of Berlin voted in a referendum for the disclosure of all contracts dealing with the partial privatisation of the Berlin waterworks. Thus, the campaign „Waterprivatisation? No thanks!“ was the first successful referendum in Berlin.

The goal was to build pressure on the enterprises RWE and Veolia in order to make them return their shares of the Berlin water works to the public hand. The plan worked out.

Berlin bought back the shares of RWE and Veolia in April 2011. The Berlin water works could be fully returned in possession of Berlin.

## Partial privatisation of the water works - the prehistory

In 1999, the former big coalition of SPD and CDU, represented by the Senator of Finances Fugmann-Heesing (SPD) and the Senator of Economics Branoner (CDU), sold 49,9% of the shares of the Berliner water works to the energy enterprise RWE and the france enterprise Veolia. Both enterprises bought each 24,95 percent of the shares (together for 1,7 Billion Euro) and a guaranteed lucrative return. Ever since, the water prices increased by 35 %.

## The Berlin water table

The initiative Berliner water table was founded in 2007 with the goal to reverse the privatisation of the Berlin water. Through the recommonalisation, a better democratic control should be established. Supporters of the initiative were (amongst others) organisations such as Grüne Liga, Attac, Verbraucherzentrale, die Grünen, parts of the leftists, small parts of the SPD, the Piratenpartei, the GEW, der diocesan of the catholics in the archdiocese, the association of the tax payers and tenant associations. In October 2011, the water table already reached 280 000 votes for it's petition for a referendum about the disclosure of all contracts regarding the partial privatisation of the Berlin waterworks. The SPD and the Left party supported this claim and passed a bill, which regulated that contracts in the field of public services must be published in the future. In November 2010, the senat promulgated 700 pages of contracts with RWE and Veolia in the internet. From the viewpoint of the senat, the demands of the petition were fulfilled. But this was insufficient for the Berlin water table. They suspected, that there are further secret contracts, e.g. guaranteed profits for both enterprises in case of a repurchase of their shares by the land Berlin. Therefore, they started a referendum, which was successful. The main idea of it was the demand, that all unpublished contracts shall be revealed immediately. If they were not published within a year, they would be declared as legally invalid. Some considered this referendum as dispensable and questionable. Senator Wolf and the land chairman of the leftist party, Klaus Lederer declared previously, they would not vote in the referendum. But this did not reduce it's success.

Source: Berliner Zeitung, 14.2., 15.2., 17.2. und 18.2.2011





# DIY Fizzy instead of mineral water transportation

## The Mineral Water Problem

Ever since the opening of our seminar house, we face the problem that many guest groups want to drink mineral water with carbonic acid.

Most of the groups arrive without cars and so they cannot transport many drinks crates to the seminar house. In addition, there are only few storage capacities and there is no elevator to transport the drinks conveniently. Often, many bottles are left behind after the departure of the group, which we have to bring to the supermarkets or dispose.

In our water partnership we found out, that the Berlin tap water has an excellent drinking water quality and there is no reason not to drink it. Furthermore, it is directly and conveniently available for a good price. Yet, it is not carbonated.

Therefore, we initially installed a home carbonation system from the producer „Soda Club“. Hereupon, several problems occurred, which made the usage difficult and unsatisfactorily:

- Special, expensive water bottles are needed for the carbonation.
- It is difficult to guarantee that the bottles are hygienic.
- The **CO<sup>2</sup> -cylinders** of the carbonation machine only last for a small amount of water (approx. 40l)
- The price for the CO<sup>2</sup> -cylinder is relatively high with 7-8€ per piece.
- All available low-priced home carbonation systems are offered by the Israeli enterprise „Sodastream“. We see this critical, as these are produced in the occupied Palestinian territories.

In search of an alternative **system**, the following criteria applied:

- not using expensive cylinders and bottles of a monopolist manufacturer
- simple use and high capacity
- reasonably priced
- simple in maintenance and hygiene
- good production conditions
- a water consumption of ca. 1500l/year

On the website <http://storyofstuff.org> you can find a small informative film about the mineralwater problem.

## The Alternatives

Our research revealed, that for the public use of carbonation systems, professional providers mostly rent out their gadgets and close a deal for maintenance, amounting 80-100 € per month. In addition, they offer complex buying systems, which often cost more than 1.000 €.

In our research, we found the very interesting system of the southern German company **Aquatechnik Peter Röhl und Partner**. On the website of the company <http://www.aquas-pender.de>, two simple, genius and reasonably priced carbonation systems are offered.

## The Advantages

- The system works with both: The home carbonation CO<sup>2</sup> -cylinders and the much cheaper CO<sup>2</sup> returnable bottles.
- For the system, common PET mineral water bottles are used.
- The system is very hygienic, because the water is not in contact with the gadget.
- The special caps for the bottles can be cleaned in the dishwasher as well as replaced cheaply.



## Ecological Consequences of Mineral Water Transport

The ecological costs of mineral water transport depend on consumer's behaviour. Both, the choice of the place of production and the type of the bottle are relevant. Those, who buy water of the benchmark „Spreequell“ or „Bad Liebenwerda“, get the water from the 150 km away southern Brandenburg (Bad Liebenwerda). The bottle boxes are transported by trucks.

The average consumption of mineral water per person in Germany was 140,2 liters in the year 2013.

Returnable bottles are the most ecological way of package, as a study of the national environmental office shows. In comparison to the one-way bottle, it saves more than 50% of the material and 40% of the greenhouse-gas CO<sup>2</sup>.

According to a study\* of the company Gerolsteiner, the water consumption in the production of PET returnable bottles is only 1/3 of the water consumption of glass returnable bottles. Per consumer of Bad Liebenwerdaer mineral water in Berlin, 2,43 kg CO<sup>2</sup>-emission are caused by the transportation of the water to the supermarket.

When the water is transported from the supermarket to the households, the CO<sup>2</sup> -Emission of the whole transport is nearly tripled. When water is bought in glass bottles, the CO<sup>2</sup> emission from the transport to the supermarket are doubled.

If you buy for example „St. Leonhards Wasser“ from Chiemgau, which is offered in organic supermarkets, it extends the transport way and the emissions again by the factor 4,5. Thereby the overall emissions of the transports are 9 times higher as with the Spreequell-water.

Calculation of mineral water transport (PET returnable)			
LKW	Bad-Liebenwerda – Berlin-Weißensee		Gramm
outward	150 km	168,24 kg	1716
return	150 km	28,04 kg	714
overall producers transport			2430
Consumer: Supermarkt -> home			
round	12*3=36km	120g/km	4320
overall consumption CO2 for 1 person/year			6750
<i>(1 person with average consumption = 140,2l / 2013)</i>			
<i>Data CO2-emission: energy demand and emission comparison of truck, rail and ship in long-distance goods traffic, PE International, 2010</i>			

## Simple and flexible - the System of Aquas-pender

A simple system, here in the version for using a big CO<sup>2</sup>-bottle. The water bottle is a standard PET returnable bottle. (1 or 1,5 litre). The system costs 379 € in the standard version (with connection to the small CO<sup>2</sup>-cylinders from the supermarket) and 479€ in the version with connection to the big gas bottle.



A Swiss study, which compared the ecological impacts of tap water with different mineral waters in the year 2006, came to the conclusion that from one liter of daily consume on the overall ecological burden and also the costs are less, if you use tap water. The greenhouse-gas emission of tap water are only 20% compared to mineral water.\*\*

\* Source: „Ökobilanz für die leichte PET-Mehrwegflasche“, Prognos&IFEU Institut für Energie- und Umweltforschung GmbH, 03/1999  
 \*\* see gwa 3/2006: „Vergleich der Umweltbelastungen von Hahnenwasser und Mineralwasser“



# OPEN COLA selfmade



## Step 1: Preparing the 7X (Top Seekrut™) flavoring formula

3.50 ml	orange oil
1.00 ml	lemon oil
1.00 ml	nutmeg oil
1.25 ml	cassia oil
0.25 ml	coriander oil
0.25 ml	neroli oil
2.75 ml	lime oil
0.25 ml	lavender oil
10.0 g	gum arabic
3.00 ml	water

Mix the oils together in a cup\*. Add gum arabic (natural!), mix it with a spoon or a hand-mixer.

Add water and mix it well. Use the mixer for 4-5 minutes. You can also switch to a blender for this step. The mixture can be kept in a sealed glass jar in the fridge or at room temperature.

Please note that this mixture will separate. The Gum Arabic is essential to this part of the recipe, as you are mixing oil and water. The ready-mixed flavours can be stored in a closed glass in the fridge.

\* Oils: Can cause skin irritation. If oils come in contact with skin, wash with soap and water.

## Step 2: Preparing the Syrup-concentrate:

2.00 tsp.	7X formula
3.50 tsp.	75% phosphoric acid or citric acid*
2.28 l	water
2.36 kg	plain granulated white table sugar
0.50 tsp.	caffeine (optional)**
30.0 ml	caramel color

Mix it in a 5 l container

Take 5 ml of the 7X formula.

Add the 75% phosphoric or citric acid.

Add the water, then the sugar.

While mixing, add the caffeine, if desired.

Make sure the caffeine is completely dissolved.

Then add the caramel color. Mix thoroughly.

The concentrate is ready!

\* 75% Phosphoric Acid: Due to its acidity, this product is corrosive to the eyes and skin. Handle with gloved hands, and use extreme caution. If comes in contact with the eyes or skin, immediately flush with plenty of water for at least 15 minutes. Get medical attention. Rinse any spills on clothing or other surfaces thoroughly. Store in a secure area. Do not store more than 50.0 ml.

\*\* It's best not to store caffeine in any amount. Caffeine can kill people in relatively small doses. The median lethal dose for an adult human is around 10 grams, or approximately one third of an ounce

## Step 3: Preparing the Cola-Drink

To finish the drink, take one part of the syrup and add 5-8 parts (home-)carbonated water.

## Further information...

...is available on the wikipedia-website

[http://en.wikipedia.org/wiki/OpenCola\\_\(drink\)](http://en.wikipedia.org/wiki/OpenCola_(drink))



The Open-Cola ingredients

OpenCola is a brand of open-source cola, where the instructions for making it are freely available and modifiable. Anybody can make the drink, and anyone can modify and improve the recipe.

You can use the Open Cola recipe to make your own home-made Cola with an own flavoring.

The drink can be distributed licence-free, if you mind the rules of the GNU General Public License.



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Förderverein Offene Bildung Umwelt Kultur e.V.



# What is the water footprint of a product?

The water footprint is the volume of fresh water which is used in the production of a product (also called virtual water).

A water footprint has temporal and spatial dimensions. It can be divided into:

## Green water footprint:

Volume of rainwater that goes into the product or evaporates.

## Blue water footprint:

Volume of the surface water or ground water which goes into the product, evaporates or is lead into a reservoir or into the sea.

## Grey water footprint:

Volume of water, that is conterminated through the production process (e.g. by pesticides).

*Calculation: Amount of water which is used to recondition normal water quality by dilution.*

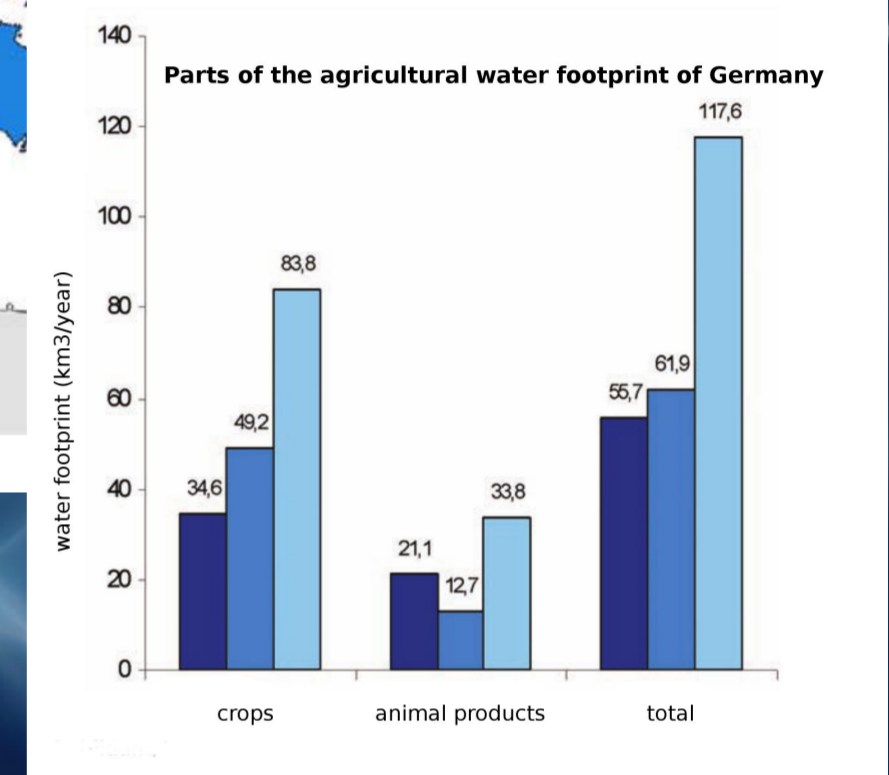
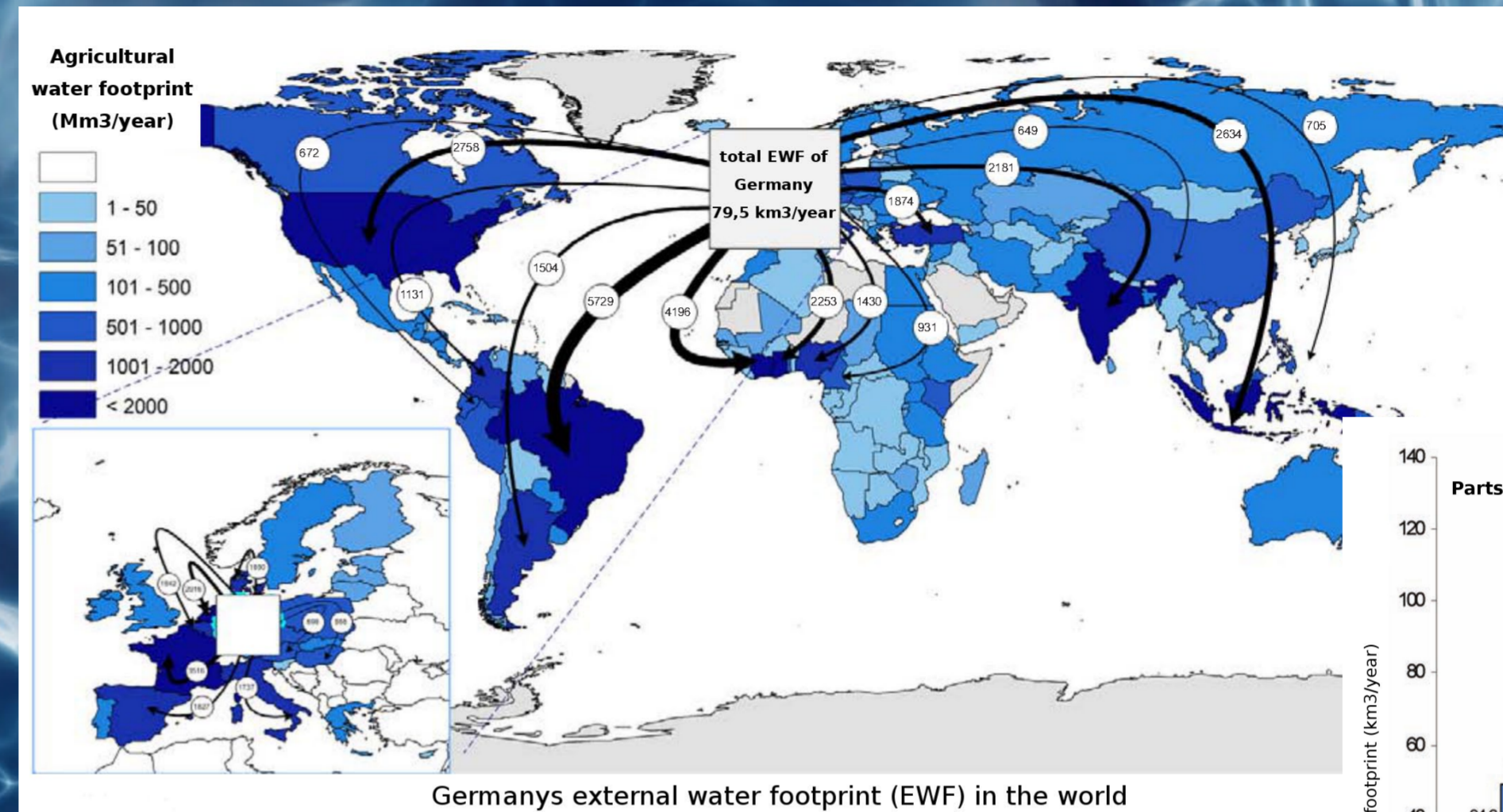
The overall water footprint of a german consumer amounts:

- About 2,3% of the water footprint result from the direct water consumption of 124 liters per day in the household.
- About 97,7 % of the water footprint is invisible. It is expended by products which are bought in the super market.
- **4.058 liter per day** are expended in agricultural products, 954 liter per day in industrial products.

**5.288 liter water per day is the average overall water footprint of a german consumer.**

(Source: WWF, Der Wasser-Fußabdruck Deutschlands, 2009)

## The global water footprint of Germany for agricultural products



## Potatoes from Egypt

Using the example of the potatoe, you can see how different the water footprint of a product can be, depending on the country it comes from.

A kilogram of potatoes from Brandenburg, Germany has a water-footprint of: 90 liter green water, 13 liter blue water; 30 liter grey water. Potatoes from Egypt have: 21 liter green water; 289 liter blue water, 118 liter grey water.



**Conclusion:** Because it rains a lot less in Egypt than in Brandenburg, much more ground water (blue water) has to be used in Egypt for the irrigation of the potatoes. This is problematic because Egypt is a country with water scarcity and the ground water is not refilled quickly.

Additionally, due to the hot weather in Egypt, the water evaporates much quicker than in Brandenburg, so overall much more water has to be used for irrigation.

Therefore it is recommended not to buy potatoes from Egypt or other southern countries with water scarcity, but to buy regional potatoes.



# Mit den richtigen Wassern (ge-)waschen

As far as possible, the usage of **phosphate**, the biggest polluter of water in detergents, is abolished in Germany. Through legal regulations (proscriptions) and technical innovation in the sewage plants, the encumbrance of phosphate in detergents is almost completely brought down.

Therefore, the **efficient use of energy** in the washing process became the most important environmental factor. Yet, other ingredients of detergents contaminate the water, too.

## 1. Usage of water of washing machines

Producers of washing machines in Europe have to specify the consumption values of their products. Prospective buyers should pay attention to energy efficiency class. **A++** or **A+++** saves at least 35% of the energy in comparison to a machine with the class A. Moreover, one should consider the **consumption of water**. It may vary between 40 liter (5 kg machine) and 50 liter (8 kg machine), depending on the size of the machine.



Furthermore, the machine should have a **capacity automatic**, which adjusts the amount of water used to the utilization.

The **Eco-Top-Ten Lists** of the Eco-Institute (Öko-Institut e.V.) can help with the choice of eco-products:

<http://ecotopten.de>

EcoTopTen-Waschmaschinen: Einbau 5,5 - 8 kg Fassungsvermögen A+++														
Hersteller	Modell (Fassungsvermögen)	Energieeffizienzklasse (1)	Schleudereffizienzklasse (2)	Schleuderkategorie (3)	Jährlicher Stromverbrauch kWh/Jahr (4)	Jährlicher Wasserverbrauch Liter pro Jahr (5)	Strom-/Wasserverbrauch Baumüllprogramm (6) (kWh / pro Wäsche)	Reduktion des Strom-/Wasserverbrauchs bei halber Beladung (7) (%)	Strom-/Wasserverbrauch Baumüllprogramm (8) (kWh / pro Wäsche)	Reduktion des Strom-/Wasserverbrauchs bei halber Beladung (9) (%)	Reduktion Strom-/Wasserverbrauch bei halber Beladung (10) (%)	Kaufpreis (Unverbindliche Preisempfehlung des Herstellers) in Euro (11)	Jährliche Gesamtkosten in Euro/Jahr (12) (CO <sub>2</sub> -Ausstoß (kg CO <sub>2</sub> -Äqu. pro Jahr) (13))	sonstige Funktionen und Qualitätsmerkmale vorhanden? (14)
Miele	W2519WPM5 (5,5kg)	A+++	1400	B	137	9.240	0,73 / 45	22 / 13	0,60 / 57	20 / 32	1.699 €	194 €	96	b
Miele	W2859WPM5 (5,5kg)	A+++	1600	A	137	9.240	0,73 / 45	22 / 13	0,60 / 57	20 / 32	2.239 €	221 €	96	b
Panasonic	NA-147VB3WDE (7kg)	A+++	1400	B	162	9.240	0,80 / 55	16 / 10	0,92 / 68	34 / 26	549 €	172 €	119	b
Panasonic	NA-148VB3WDE (8kg)	A+++	1400	B	162	9.900	0,76 / 48	23 / 13	0,92 / 58	38 / 25	599 €	186 €	119	b
Panasonic	NA-148VG3WDE (8kg)	A+++	1400	B	160	9.750	0,68 / 50	- / 26	0,84 / 63	20 / 37	699 €	190 €	112	b
Panasonic	NA-168VG3WDE (8kg)	A+++	1600	A	155	9.750	0,68 / 50	- / 26	0,84 / 63	20 / 37	749 €	195 €	115	b, ETM Magazin Sehr GUT, 92%
Panasonic	NA-168VK3WDE (8kg)	A+++	1600	A	155	9.750	0,68 / 50	- / 26	0,84 / 63	20 / 37	849 €	203 €	115	b

## 2. Efficiency of the washing process and the dosage

630.000 tons of detergents are used every year in Germany. In average, this is 8 kilos per inhabitant. Additionally, 220.000 tons of special detergents such as fabric softener and other **cleaning products encumber the environment, especially the sewage**.

Compact detergents can help to dose the amount of detergent and additives. Detergents only work with soft water. Therefore, any detergent contains softener. Yet, the water hardness varies from region to region. The **Berlin tap water** has on average water hardness of 17°dH. Therefore it is considered to be **hard water**.

To ensure the ideal mixture of washing substances and softener, we recommend the **use of a modular system**.

With the usage of ready-made mixed detergents, especially in combination with hard water, an unnecessary amount of surfactants, enzymes and possibly bleaches are used. The sewage is uselessly polluted.

Moreover, heavy duty detergents contain bleaches and should only be used with white clothing, respectively for disinfection of clothing e.g. during contagious diseases. Here again, the modular system allows the specific use.

**Instead of a modular system, one could also use a color-detergent. It can be dosed to a minimal amount (corresponding to soft water) and upon need, bleach and softener can be added.**

With the water hardness in Berlin, one **can save up to 40% of the washing-active substances**. Even ecological detergents burden the water – even though it is less than with petrochemical products.

Furthermore, the selection of the right washing program is relevant. Generally, the **washing temperature** should be between 30 and 40 degrees Celsius. According to Bundesumweltamt (Federal Environment Agency), this is totally sufficient for up-to-date detergents (including eco). For the disinfection of the machine (as well as in case of diseases), one should run the machine ever two to four weeks with 60 degrees.

Only in specific cases, when germ-free clothes are needed, a **95 degree wash** is recommended. Note: this **requires more than double of the energy** on a 60 degree wash. Additionally, it is important to adjust the wash. The sorting of the clothes makes sense to be able to use the optimal washing program.

Generally, the machine should be **fully occupied, but not overloaded**.

This increases the washing effect and saves energy and water. Modern machines feature especially long eco programs. These save water and energy despite their long duration.

## 3. Choice of detergent and the ingredients

Many ingredients of detergents strain the water very much. The productivity of them, their ingredients and the right dosage play a crucial role in reducing the pollution of water. Up-to-date detergents use **tensides** (washing-active substances) to resolve fat and dirt from the clothes. Conventional detergents replace the natural tenside soap with synthetical ones, which are produced with a high energy input, basing on coal and petroleum.

But there are also **tensides**, which are produced from **regrowing raw materials**, such as sugar and plant oils. They are better bio gradable and are often used by eco – brands. Eco detergents go without bulking agents (to increase the volume), color brightener, chloride or the controversial genetic produced enzymes, which are often used by the conventional producers.

However, who would like to strain the environment as little as possible should use **perfume free detergents**. Some

fragrances, such as citrus, are poisonous for organisms in the water.

A big **problem** with the plant-based tenside production is the **extensive use of palm- and coconut oil**. The permanently rising need for these oils has already let to **enormous environmental destruction**, especially in Asia. This has a **dramatic impact over wide areas on the eco-systems and therefore on the water as well**.

Palm tree-oil from an eco-production can defuse this development. But the world-wide production of eco-palm-oil is vanishingly low.

**Criteria for choosing a detergent:**

- 1.) **Effective power**, also with low temperatures
- 2.) **Bio-degradable** (preferably organic ingredients)
- 3.) **Modular system**, to be able to dose softener and bleach according to needs
- 4.) **Free of color brightener and perfume**
- 5.) **Waiver of animal testing**
- 6.) **Recycling packaging** material
- 7.) **Free of Phosphates** (already standardized in Germany, but not in all places in the world!)
- 8.) Generally, enzymes are important cleaning-substances. **Allergy sufferer should check**, if the use of enzymes has negative impacts on them.

Two **eco-labels** help choosing the detergents:



Eco-Garantie-Log (striker)



EU-Ecolabel

Besides, **softener should not be avoided**. They contain a big amount of potentially allergy-promoting, pollutive ingredients.

The strength of washing of diverse products is **regularly tested** by e.g. Stiftung Warentest (Foundation of product-testing) or Öko-Test (eco-test).

## Our products comparison

Produkt (Producer/Name)	Price*	Environmental properties		Wash performance
		Ingredients	Production	
AlmaWin Vollwaschmittel Pulver	0,26 €	++	++	+
AlmaWin Colorwaschmittel	0,23 €	+	++	+
Klar Basis Compact Color**	0,46 €	++	++	+
Ecover Color Waschpulver Konzentrat	0,32 €	O	+	+
Ecover Color Zero Waschpulverkonzentrat	0,42 €	+	+	+
Frosch Aloe Vera Color-Waschpulver	0,21 €	O	+	+
Denk mit Colorwaschmittel Aktiv-Schmutz	0,11 €	+	undef.	++

\* For a 5-kg wash middle water-hardness and average soiled

\*\* For use with a modular system

## 4. Ecological recommendations

### Almawin / Klar

When researching, we were especially persuaded by the products of the company Almawin/ Klar. Besides the usage of exclusively plant-based, well degradable and mainly **organically produced washing substances**, the company is also producing **green-electricity**. The product line "klar" offers additionally free of fragrance detergent, which achieved good results for the washing in the test of the magazine "Öko-Test". But it is comparatively expensive.



### Ecover

Products made by Ecover also have a good washing result. Ecover watches out for the **ecological production** and usage of substances, which strain the water as little as possible. Furthermore, ecover is attempting to **reduce the usage of palm-oil** and abolish is perspectively.

### Frosch – der Mittelweg

The color-detergent of the company Frosch is persuading with it's good washing results, good environmental characteristics and a medium price. The producer Erdal-Rex is engaged for an ecological production and guarantees animal protection and the exclusively usage of plant-based tensides. Additionally, they are trying to reduce the usage of palm-oil and to use tensides from an European production. Unfortunately, they do not offer perfume-free products.

### DM - der konventioneller Weg

The drugstore chain DM is offering the color detergent "Denk", an economical alternative with good washing results. They give little information about the production process. At least, the producers are pursuing the goal of a sustainable production.



Source: Öko-Test 03+04/2014



# What are sustainable Textiles?

## Ethical Aspects

### Social Responsibility

The textile industry is labour intensive and the transparency of the industry is almost non-existing. Before the clothes are sold by the retailer, the raw material, the fibre, the fabric and the clothes might all be produced in different locations all over the globe. Poor working conditions, modern slavery and child labour have constantly been reported, especially in this industry. There are some certificates, which require social responsibility in manufacturing textile products. Fair trade is a well known one, which sets a minimum price for cotton, requires environmental standards and involves producers in social community projects such as schools, roads and health care.

**"About three quarters of the US cotton crop is thus 'dumped' on the world market, often priced below the costs of production."**

### Animal textiles

Animal textiles are commonly made from hair, fur, skin or silk. In beddings, down is also used. The environmental backpack of an animal product is usually considerably higher compared to non-animal products. Additionally, the animal's suffering must be considered as an ethical problem, especially in the modern animal industry.

**"We want to promote the vegan lifestyle which is the reason for excluding animal products in the bedding for the guest house."**

## Practical Aspects

### Use in the guest house

In a guest house, the bedding has to be washed frequently. The washing wears out the fibres of the textile. Polyester products normally last longer than natural ones. Still, polyester has a bad capacity of transferring moisture from the textile, so the feeling might not be the most comfortable. Viscose products such as Tencel and Modal have the best moisture-transferring abilities. Viscose materials are also anti-allergic and they protect the sleeper from mites.

**"Buying textile products can be complicated, if the ethical and environmental aspects are considered. However, one of the greatest factors of buying bedding are the practical features of the product. The product has to be durable and comfortable."**

## Ecological Aspects

### Natural or man-made

The natural fibres are plant based and part of the problems of the modern global agriculture. The monoculture plantations with irrigation cause erosion in the soil, which can lead to drought and desertification in dry areas. The use of synthetic pesticides can cause poisoning and pollution both in the soil and ground water. The most common textile raw material, cotton, is often produced in dry areas, where a sustainable cultivation of the plant is almost impossible. At least the natural fibres are biodegradable over time.

**"The production of textiles in it's every phase is extremely water and energy intensive. The raw materials for textiles are either natural fibres such as cotton or man-made fibres such as polyester."**

The basis of the most common man-made fibre, polyester, is raw oil, which is a non-renewable resource. The man-made fibres or oil based fibres are usually more efficient with the water usage, but instead they require huge amounts of energy to be produced. When water is considered, also the energy consumption of a product plays a huge role. In every non-renewable energy source, it takes also a massive amount of water for example to cool down the power plants.



## Goal: Choosing sustainable bedding

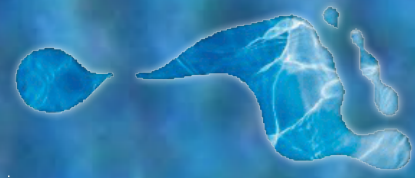
### Greenwashing

The retailers in the textile industry are aware of the global problems of textile production. Fortunately, also the consumers are more and more aware of them, too. Since even the retailers do not always know the background of their products, so called greenwashing has been a trend during the last years. The advertising of textiles gives an environmental friendly image to the consumer, without having any scientific basis. This deception can only be fought by being a critical consumer.

**"The modern textile industry is a complex organism, which has a huge global scale. There is no product which is transparent, ethical, environmental friendly, practical and affordable. Fortunately some products are better than others, but it takes some effort to find out the right ones."**

Textile materials in comparison			
	Polyester	Cotton	Rayon / Viscose
<b>General Information</b>	* Man-made petrochemical fibre – it's raw material is crude oil.	* Natural fibre – made out of cotton plant.	* Rayon is a general term for man-made fibres produced out of wood pulp.
<b>Energy consumption</b>	* Requires non-renewable resources such as fossil raw materials. * 63% higher energy consumption than cotton per 1 kg fibres.	* It takes less energy to produce compared to polyester.	* Depending on the product varying energy footprint. * Different products that have an energy footprint which varies from the massive number of polyester to almost 20% of it.
<b>Water consumption</b>	* Very low water consumption for the production. * Production need less than 0,1% of the Water needed for cotton-production.	*The water footprint of cotton is massive compared to any other fibre on the market. *Sometimes produced in regions with scarce water supplies and high requirements for irrigation. The water footprint varies a lot in different parts of the globe.	* Often the tree planted is eucalyptus, which draws up phenomenal amounts of water, causing problems in sensitive regions. * The water-footprint of the production in European productions is mostly small and between 11 and 45 litres per kg Viscose-fibre.
<b>Waste</b>	* Does not decompose – should be recycled. * dumping into landfills results in water and soil pollution.	* Increased fertilizer use in traditional cotton growing. * Pollutes both surface and ground water. * Poisonous pesticides such as DDT are still commonly used in cotton production.	* To make rayon, the wood pulp is treated with hazardous chemicals such as caustic soda and sulphuric acid.
<b>Green products</b>	* Polyester can and should be recycled. * The energy footprint and CO2 emissions of recycled polyester is up to 50% lower than polyester made out of virgin materials.	* Pesticides or fertilizer are not used. * It takes bigger water footprint to produce organic cotton, but the grey water footprint is five times smaller compared to "traditional" cotton. * Organic cotton production is only 0,7% of annual cotton production, but it grows every year.	* Austrian company <i>Lenzing</i> has been able develop material <i>Tencel</i> , which has a global water footprint of only 1 litre per kilo. * Most efficient fibre-product on the market.
<b>Global market</b>	* Global polyester market set to reach 39,3 million tons by 2015 (65% of all fibre production). * China is the worlds largest producer.	* Current estimates for world production are about 25 million tonnes, accounting for 2,5% of the world's arable land. * China is the world's largest producer of cotton.	* In 2009 celluloses accounted for about 5% of all man-made fibres. * China is the world's largest producer of rayon.
<b>Expediency</b>	* easy maintenance and good washing properties	* Good treatment of humidity and a pleasant feeling	* Good treatment of humidity
<b>Best practice</b>	Recycling Polyester of the German producer <i>Advansa</i> . The products <i>Hollofil</i> , <i>Comforel</i> and <i>Suprelle</i> have the European Eco-label.	Cotton with the label „Cotton Made in Africa“, which are e.g. sold in Germany by <i>Otto</i> , have a clearly better ecological footprint than conventional cotton. In addition social projects in the African growing area are supported.	The Austrian manufacturer <i>Lenzing</i> produces ecological rayon. Its modal fibre is produced climate-neutral from European beech tree and uses only little water resources. Likewise ecological is the <i>Tencel</i> fibre from <i>Lenzing</i> . The enterprise is currently working on its ecological improvement.





# The sustainable duvet

## Materials and producers

### Polyester

Polyester made out of crude oil is the most common fibre used in textile industry. The water footprint of polyester is small, but it takes a massive amount of energy to be produced. Recycled polyester is a growing market globally and offers better environmental properties.

### Cotton

Cotton is the most common natural fibre used in textile industry. The water footprint of cotton is huge and there are both social and environmental problems involved within the cotton industry. Poisonous fertilizers and pesticides are used in the traditional cotton farming, endangering the nature and humans in the areas of cultivation. Organic cotton is not polluting the environment though it takes a larger water footprint to produce it.

### Rayon

Rayon can be considered as a sustainable textile with certain qualifications. The brands vary a lot globally and the development of new rayon based fibres and textiles has been fast during the last centuries. Bamboo and eucalyptus monoculture

plantations may destroy the whole nature in the area, but on the other hand with modern technology it is possible to produce rayon which has no water or climate footprint at all.

### Big Variety

The market offers thousands of different beddings. Most of them consist of a mixture of different materials. This often means that e.g. a filling of a duvet is made of sustainable materials and the opposite is true for the cover. The textile industry also frequently develops new materials. Therefore, there is often no precise and reliable information on the material.

### Prices

The end of a sustainability research is often the recognition that the few responsible manufactured products are very expensive. This means that very few people have the chance to make responsible purchasing decisions, even if they want to. After all, some alternatives are better than others!

**Eco-textile suppliers in the internet:**

<http://www.purenature.de>      <http://www.hans-natur.de>  
<http://www.oeko-planet.com>      <http://www.waschbaer.de>  
<http://www.allnatura.de>      <http://www.hessnatur.com>

## Manufacturers and retailers

### Eco textile supplier

In the Internet are some Eco-Textile-dealers represented. Here it starts at about 100 € for a light blanket. Most products are a combination of cotton and possibly other fillings.

### OTTO - Mail order service

The Otto-Group is the second largest mail-order service of the world active in more than 20 countries operating more than 100 online-shops. As an example we have selected and compared products from the Otto-online-Shop.

Otto offers a very large selection of comforters and pillows in different price ranges and styles. With its brand Eco republic Otto offers products that should feature special ecological characteristics.

In our product comparison we have made a selection from different ecological and price point of view more interesting items. The prices are based on those of the Otto-online-shop May 2014 (Red note markers mean a devaluation of the product because of this rating)

Product comparison bedding (duvets without animal products)										
Product	Price	Material	Preferences	Comments	Comfort	Energy consumption	Water consumption	Rating	Overall grade	Rank
»Tencel«, Ecorepublic Home	95,00 €	Cover: 100 % Tencel Filling: 70% Tencel, 30% Supreme Fill			1	3	1	2	1,7	1
Irisette mit Tencel	100,00 €	Cover: 100 % Tencel Filling: 60% Tencel, 40% Polyester			1,5	2	1	1,5	1,7	1
Ecorepublic Home ,organic	45,00 €	Cover: 100% Cotton organic Filling: 100% Polyester	Controlled organic (***) Recycling	from Pakistan from Poland	2	3	3	3	2,2	2
»ECO«, Paradies	95,00 €	Cover: 100% Cotton Filling: 100% Polyester	Fairtrade (**) Recycling		2,5	3	2	2,5	2,2	2
Naturfaserbettdecke, »Tencel/Leinen«, F.A.N.	42,00 €	Cover: 100% Cotton (*) Filling: 50% Tencel, 50% Flachs			1	3	5	4	2,2	2
Naturfaserbettdecke, »Sensitive«, F.A.N.	52,00 €	Cover: 100% Cotton (*) Filling: 100% Tencel			1	3	5	4	2,2	2
»Tencel Extra Dry«, F.A.N.	42,75 €	Cover: 82% Pol, 18% Tencel Filling: 60% Tencel, 40% Polyester			2,5	4	1	2,5	2,3	3
»DACRON® Hollofil 7«, Ecorepublic Home	40,00 €	Cover: 100% Polyester Filling: 100% Dacron Hollofil Polyester	Recycling	Advana	3	5	1	3	2,3	3
»DACRON® Thermolite Micro«, Ecorepublic Home	40,00 €	Cover: 100% Polyester Filling: 100% Suprelle Polyester	Recycling	Advana	3	5	1	3	2,3	3
»Cotton Made in Africa«, Ecorepublic Home	50,00 €	Cover: 100% Cotton Filling: 100% Polyester	Made in Africa (**)		2,5	3	2	2,5	2,7	4
»Bamboo - Feeling Microfaser«, Ecorepublic Home	47,45 €	Cover: 100% Polyester Filling: 50% Bambus Viskose, 50% Polyester	Recycling		2,5	5	1	3	2,7	4

(\*) Devaluation by one grade, because using of conventional cotton without indications of source  
(\*\*) „Fair Trade“ and „Cotton Made in Africa“ is to be expected very low blue and gray water use, since smallholder production. Therefore, upgrading to two notes.  
(\*\*\*) Organic cotton has a much better Greywater-footprint, so upgrading to a note.  
**Note:** Overall grade is composed of 40% of the reference score and 60% grade for the filling. (Depending on weight)

<http://www.businesswire.com/news/home/20110720005675/en/Global-Polyester-Market-Reach-40-Million-Tons#L7165bcRtU>  
[http://www.revisita.ritualpro.com/files/11E15\\_200704.pdf](http://www.revisita.ritualpro.com/files/11E15_200704.pdf)  
[http://www.vivanta.com/organic/fiber/organic\\_cotton\\_facts.html](http://www.vivanta.com/organic/fiber/organic_cotton_facts.html)  
[http://www.waterfootprint.org/Reports/Grey%20WF%20Phase%201%20Final%20Report\\_Formatted%2008-2013.pdf](http://www.waterfootprint.org/Reports/Grey%20WF%20Phase%201%20Final%20Report_Formatted%2008-2013.pdf)  
<http://www.greengraces.org/greenliving/clothes/environmental-impacts>  
[http://www.thick.com/products/chemical/planning/cbi-rayon\\_and\\_lyocell.aspx](http://www.thick.com/products/chemical/planning/cbi-rayon_and_lyocell.aspx)  
[http://organicclothing.blogspot.com/my\\_weblog/2005/11/tencel\\_sustainable.html](http://organicclothing.blogspot.com/my_weblog/2005/11/tencel_sustainable.html)  
<http://www.ircac.org/living/stuff/choosing-between-organic-and-cotton-tencel.asp>  
<http://www.wenzing.com/en/content/sustainability/responsibility-for-the-environment/pulpy-wood-purchasing.html>

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