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**DIET AND FOOD WASTE OF ITALIAN HIGH SCHOOL STUDENTS:  
HOW TO IMPROVE OUR WATER FOOTPRINT**

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The Water Footprint (WF) measures the amount of water used to produce each of the goods and services we use; it helps us understand for what purposes our limited freshwater resources are being consumed and polluted. Among the factors that contribute to the WF of a nation (and of its inhabitants) a key role is played by food (production and consumption): it is therefore relevant to evaluate the WF of an average high school student and to provide sensible/effective alternatives to the diet of Italian teenagers. This also offers an opportunity to investigate the amount of food wasted in school cafeterias and how (if at all) it is replaced by the students.

We designed a survey on dietary habits and distributed it to all 15-year-old pupils in our school (and to a sample of 18-year-old ones, for comparison); we measured the amount of food eaten and wasted in the school cafeteria (over the time period of a week, for a chosen set of students); to calculate the average WF of the students of our school we estimated the mass of each portion and multiplied it by the specific WF for the kind of product consumed (or wasted); in order to provide a viable alternative we calculated the WF of the Mediterranean diet and compared it to the one determined by the aforementioned methods.

We found that the per capita WF associated to food consumption is roughly 4000 L per day for our students, which could be reduced significantly (up to 25% of the total) by adopting a Mediterranean diet, which requires an increase in the intake of fruits and vegetables, a reduction of the intake of meat (in particular beef), the protein contribution of which is compensated by an augmented assumption of fish and pulses.

The analysis of the data concerning the dietary habits within the cafeteria revealed that in that environment students tend to waste approximately 40% of the food they pick up: such enormous percentage represents, however, not more than 10% of the WF due to food actually consumed (400 L per capita), indicating that the majority of the food intake happens elsewhere. Perhaps not surprisingly, a WF almost identical to the one due to wasted food can be associated to the students' consumption of industrial snacks.

We find that the WF of Italian teenagers' diet could be significantly improved by the following strategy: drastically reducing the consumption of industrial snacks, in favour of more traditional dietary habits such as those represented by the Mediterranean diet. By removing the extra intake of food this would also allow to diminish (ideally, to eliminate) the WF due to wastes at lunchtime.

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### HOW MUCH H<sub>2</sub>O DOES YOUR VENDING MACHINE COST?

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The Water Footprint (WF) measures the amount of water used to produce each of the goods and services we use; among the factors that contribute to the WF a key role is played by food (production and consumption).

Given the fact that during the breaks the students of our school have mainly (if not exclusively) access to food stored in vending machines, the amount of industrial snacks consumed daily (on average) is very relevant. Therefore we chose to estimate the WF of such products, focusing in particular on the impact of chocolate.

We designed a survey on dietary habits and distributed it to all 15-year-old pupils in our school, including a specific section in which it was required to evaluate ones' consumption of industrial snacks (categorized according to chocolate content). To calculate the average WF of the students of our school due to snacks we estimated the amount of each ingredient and multiplied it by the specific WF for the kind of product and by the average consumption.

According to data made available by the WF Network, chocolate (dark) has an extremely high WF, approximately 17000 L/kg: its presence among the ingredients of an industrial snack, therefore, severely affects the amount of water used to produce each unit. Our survey revealed that students on average consume 5 to 6 portions of snacks per week (note that our school week consists of 5 days), which are evenly distributed among the categories we had selected (see above). These have a WF that varies in a wide range (between 40 L for chips and 400 L – 2 to 3 times that of a dish of pasta – for chocolate bars): as a result the average amount of water associated with these products is around 300 L/day per capita.

Food provided by vending machines to the students of our school (besides having questionable nutritional value) has a significant impact on our WF: therefore we intend to raise awareness of such data among our schoolmates to improve our dietary habits, with positive impact on the environment.