

# GLOBAL WATER FOOTPRINT OF INDUSTRIAL HEMP TEXTILE

Since time immemorial there is no product group that is closer to our skin than clothes. Nowadays 36% of the worldwide clothes are produced from cotton lint. The disadvantage to the use of cotton for the production of textile is cotton's adverse on natural water flows and water quality on water basins.

Using other natural crops for the production of textiles may decrease the impact on the environment given the lower water requirements of many other fibre crops. One of these is hemp, which was already used in the distant past. The water footprint (WF) of industrial hemp, based on earlier studies, is less than one third of the WF of cotton (10,000 l/kg vs. 2,719 l/kg).

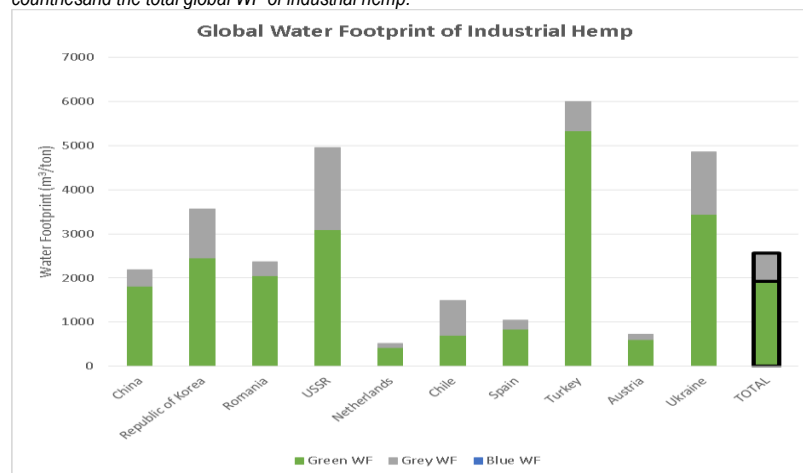
For a more detailed understanding of the WF of industrial hemp a deeper investigation was needed. Therefore the goal of this study is to determine the global average WF of industrial hemp textiles. The global average WF is divided in the green, blue and grey WF. Based on the top-ten industrial hemp producing countries in the world the global average WF is calculated.

- The global average green WF refers to the consumption of rainwater. For this study this is determined by implementing industrial hemp in AquaCrop. This model is able to simulate the yield and evapotranspiration of crops under various conditions. The global average green WF of industrial hemp in the growing stage is calculated at 1,922.1 m<sup>3</sup>/ton.
- The global average blue WF depends on the amount of irrigation. Industrial hemp, however, is generally not irrigated, so the global average blue WF in the growing stage is zero.
- The global average grey WF depends on the use of fertilizers. With an application rate of 150 kg/ha of N, nitrogen is generally the dominant fertilizer component. This results in a global average grey WF of industrial hemp of 644.6 m<sup>3</sup>/ton.
- The total global average WF of industrial hemp in the growing stage is the sum of the green, blue and grey WF's; the global average WF is 2,566.7 m<sup>3</sup>/ton (see Table 1).

The WF of industrial hemp based products depends on product and value fractions and the required processing steps from crop to product of the industrial hemp. The textile from industrial hemp comes from the bast fibre of the stalk of the crop. With the equation to calculate the WF of industrial hemp based products the WF of industrial hemp textile are determined; WF of industrial hemp textiles is 2,819.9 m<sup>3</sup>/ton.

It can be concluded that earlier studies on the WF of industrial hemp textile had already drawn the right conclusion. The WF of cotton textile is more than three times larger than the WF of industrial hemp textile. Besides, the production areas of cotton are often in water scarce regions in the world. Industrial hemp is mainly grown in parts of the world where a little or no water scarcity is, so production of industrial hemp is less impactful on water resources.

Table 1. The green, blue and grey WF of industrial hemp of the top-ten hemp producing countries and the total global WF of industrial hemp.



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