**Use of inadequate data and methodological errors lead to a dramatic overestimation of the water footprint of *Jatropha curcas***

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In their recent article, Gerbens-Leenes et al. (1) calculated the water footprint (WF, the amount of water required to produce 1 GJ of energy) of several bioenergy crops. The water footprint of *Jatropha curcas* was remarkably high (8.6 times higher than WF of sugar beet, the most water efficient crop) which may have serious future management implications for this species.

However, we strongly believe that jatropha's WF was dramatically overestimated due to methodological errors and inappropriate data use.

For their calculations of jatropha's WF, the authors relied on a non-peer reviewed report (2), providing data of the total available water in plantations, summing rainfall and irrigation, but not of evapotranspiration, required to calculate WF correctly. Hence, ignoring discharge by using total available water, Gerbens-Leenes et al. (1) overestimate jatropha's WF.

In addition severe doubts concerning the calculation method can be formulated. The lack of statistical processing makes it impossible to derive sound conclusions of the WF estimates. The used jatropha dataset consists of one plantation in five different countries, which does not allow estimates of WF of the entire country in which these plantations are located, as claimed by the authors. Furthermore, it is unclear where the authors took the required parameters from to calculate WF of jatropha ($f_{fat}$, $f_{diesel}$ and $HHV_{diesel}$), as these cannot be found in any of the articles they are referring to. In addition, cultivation aspects were ignored (*e.g.* were the plantations situated in regions with suitable climatic conditions and were the agronomic practices adequate?).

Moreover, all jatropha data originated from immature plantations between one and four years old. As all tree species, jatropha invests mainly in the build-up of non-reproductive biomass during its first growth years. This leads to low seed productivity in its first years (3), while productivity rises steadily attaining a constant and maximal productivity when maturity is reached, after five to eight years, depending on growing conditions (3). Therefore, relying on data of immature plantations instead of taking the entire rotation period into account additionally overestimated WF of jatropha.

In strong contrast with the findings of Gerbens-Leenes et al. (1), recent literature on plant water relations of jatropha suggests a low WF. Typical of a stem succulent species, jatropha strongly controls its stomatal conductance, resulting in a relatively high transpiration efficiency (5.81±0.19 mg/g) and conservative water use, with a transpirational crop coefficient ($K_{cb}$) of 0.540±0.026 (4). Furthermore, conversion of jatropha oil into biodiesel through transesterification is a very efficient process (3).

In an immature jatropha plantation in Egypt, a crop water use efficiency of 0.393 kg oil/$m^3$ water was reported under optimal irrigation (5), which would imply a WF for jatropha (with $HHV_{diesel}$= 39.65 MJ/kg, $f_{diesel}$ = 0.99, after (3)) of 65 $m^3$/GJ, only 16% of the estimate of Gerbens-Leenes et al (1). Although based on a dataset limited in time and number of replications, this estimate agrees well with recent literature on plant water relations and indicates that Gerbens-Leenes et al. (1) indeed dramatically overestimated the true water footprint of jatropha.

**References**

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