

Definition:

Aboveground Biomass
Water

Description

Benefit: This impact area refers to the total weight of all aboveground, harvestable parts of cultivated plants. It is suitable, where production is to be used for energy and other non-food purposes that can utilize the whole plant. Woody crops and forage crops will show high efficiencies in this impact area.

Resource: Even in rainfed agriculture, water can constitute a stressed resource, impacting for example on farmers' decisions whether or not to plant cover crops. Irrigation water is always a stressed resource. In cases of seasonal water shortages, the use of water can also be specified as use during critical time periods.

Correlation with soil management

[57] Treatment with constant groundwater table showed higher water use efficiency than crops in irrigated field, irrespective of planting density

[195] Results showed a positive and additive effect of water and nitrogen application on Water Use Efficiency, reflected by yield enhancement

Strength & weaknesses pertaining to measurement of this impact area

Biomass: Total amount aboveground biomass (production is generally easy to measure. However, the informative value is limited where they do not account for qualitative differences between types of biomass and are not accompanied by information on site conditions such as local climate or soil fertility. Therefore, comparisons between efficiencies of different production processes with regard to yields should only be made where products and site conditions are similar. In some cases, it may be advisable to select alternative indicators where the type of benefit is more clearly defined (e.g., energetic value, financial benefit).

Sample Indicators










Indicator values from		Survey	
Experiment or direct measurement		Statistical- or census data	
Expert assessment		Literature values	
Model		Maps or GIS	
Stakeholder participation		Not provided	

Table 1: Field Scale



Indicator	Unit	Indicator values from
[57] Water use efficiency of total biomass (Total dry matter of bean plants/Amount of evapotranspiration)	g * mm ⁻¹	
[275] Accumulation of biomass/Soil water content	g * % ⁻¹	

Table 2: Farm Scale



Indicator	Unit	Indicator values from
[175] Shoot biomass transpiration efficiency (Shoot biomass production (Above-ground net primary productivity of plants that contribute to the production of grain, grazed forage or conserved fodder) /Total rainfall)	kg * mm ⁻¹	

Table 3: Global Scale

Indicator	Unit	Indicator values from
[195] Normalized Water productivity of biomass (Biomass produced/Irrigation water applied + effective rainfall/evapotranspiration)	kg * mm ⁻¹	



References

ID	Citation	¹ Soil type/ texture
57	de Medeiros, G. A., et al. (2014). "Water use efficiency as an indicator of environmental impact of irrigated crops under subtropical conditions." 181 : 455-466.	Red Latosol (Oxisoil); Clay texture (61% clay)
175	Moore, A. D., et al. (2011). "Evaluation of the water use efficiency of alternative farm practices at a range of spatial and temporal scales: A conceptual framework and a modelling approach." <u><i>Agricultural Systems</i></u> 104 (2): 162-174.	Black vertosol soil
195	Pascual, M., et al. (2016). "Water use efficiency in peach trees over a four-years experiment on the effects of irrigation and nitrogen application." <u><i>Agricultural Water Management</i></u> 164 : 253-266.	Petrocalcic calcixerept (Petrocalcic Calcisol); Loamy textured (20% clay and 40% sand) and pH (1:2.5) is basic(8.3)
275	Yang, Z., et al. (2016). "Leveraging abscisic acid receptors for efficient water use in Arabidopsis." <u><i>Proceedings of the National Academy of Sciences of the United States of America</i></u> 113 (24): 6791-6796.	n/a

¹Soil type/ texture: If provided, what are type and texture of the soils studied in the paper?