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The Economics of Agricultural Water Productivity in the Blue Nile

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Abstract: Agricultural Water Productivity (AWP) is often simplified as the ‘crop per drop’, described as the output in terms of yield or biomass per unit of water input. This purely physical measure of Water Productivity (WP) using only a single factor input (water) does not consider: (1) the level of other inputs used in conjunction with water, (2) the opportunity cost of water as an input, (3) the value of the output and (4) the costs of production for different crops. This study presents a justification and methodology for incorporating these factors into WP indicators. The application of these extensions to WP in a data poor region is demonstrated for the Blue Nile using the new Water Accounting Plus (WA+) framework. Particular attention is made to the use of globally applicable, remotely sensed data sources for estimation of physical and socioeconomic variables. An advantage of using the WA+ framework in calculating WP is that it provides basin water information partitioned into ‘blue’ and ‘green’ water, land use categories, consumptive and non-consumptive and beneficial and non-beneficial water as well as information on return flows. Extending single factor measures of WP should result in more theoretically justified yet practical WP results, making this a more comparable measure from basin to basin and sub-basin to sub-basin.

Keywords: Water Productivity, Environmental Economics, Agriculture, Water Accounting.