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Exploring sustainable resources utilization: Interlink between food waste generation and water resources conservation

Bashir Adelodun¹, Kyung-Sook Choi²

Abstract

The persistence of drought periods and water scarcity is a growing public concern, as climate change projections indicate a more critical scenario in the future. The sustainability of water resources for the increasing population, and to ensuring crop production will unarguably be a daunting task for the water resources managers, with a projected 9.8 billion people by 2050 as well as the need to increase food production by 70 to 100%. Consequently, there is a need for significant irrigation water use for more crop production in the face of stiff competition among water users. However, the available natural resources are already over-constrained, and the allocation of more resources for food production is not feasible. Currently, about two-thirds of global water withdrawer is used by the agricultural sector while 48% of water resources in Korea is used for agricultural production. Despite the apparent ecological deficit and unfavorable conditions of resources utilization, a staggering amount of food waste occurs in the country. Moreover, wastage of food translates to waste of all the resources involved in the food production including water resources. Food waste can also be considered a serious potential for economic and environmental problems. Hence, exploring an alternative approach to efficient resources utilization in a more sustainable way can ensure considerable resources conservation. We hypothesized that reducing food waste will decline the demand for food production and consequently reduce the pressure on water resources. We investigated the food wastage across the food supply chain using the top-down datasets based on the FAO mass balance model. Furthermore, the water footprint of the estimated food wastage was assessed using the representative of selected food crops. The study revealed that the average annual food wastage across the food supply chain is 9.05 million tonnes, signifying 0.51 kg/capita/day and 48% of domestic food production. Similarly, an average of 6.29 Gm³ per annum of water resources was lost to food wastage, which translates to 40% of the total allotted water resources for agriculture in the country. These considerable resources could have been conserved or efficiently used for other purposes. This study demonstrated that zero food waste generation would significantly reduce the impact on freshwater resources and ensure its conservation. There is a need for further investigation on the food waste study using the bottom-up approach, specifically at the consumer food waste, since the top-down approach is based on estimations and many assumptions were made.

Keywords: Food waste, water resources conservation, sustainable management

¹ Ph.D. Student, Dept. of Agricultural Civil Engineering, Kyungpook National University, Daehak-ro 80, Buk-gu, Daegu, 702-701 Republic of Korea Email: adbash2008@gmail.com

² Professor, Dept. of Agricultural Civil Engineering, Institute of Agricultural Science & Technology, Kyungpook National University, Daehak-ro 80, Buk-gu, Daegu, 702-701, Republic of Korea. Email: ks.choi@knu.ac.kr