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1s7 Water efficiency and water reclycling: what are the options?

Re-thinking water use in pig diets while accounting for food-feed competition

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Livestock feed production is one of the primary users of freshwater and arable land, and it is also in competition with human food production. Therefore, we require reconsideration of the way we use freshwater in livestock feed production. The objective of this study is to assess the impact on freshwater use of pork production by using alternative pig diets based on local feed ingredients, or by-products. We explored three feeding scenarios (STANDARD: diets commercially used in Ireland; LOCAL: diets based on ingredients grown in Ireland; and BY-PRODUCT: diets based on by-products only). We calculated the freshwater use, using the water footprint (WFP) method, and the competition for water use between food and feed production using the water use ratio (WUR) for each scenario. The WUR quantifies the maximum amount of human digestible protein (HDP) derived from food crops that could be produced on the same land, and using the same water resources, that were used to grow the feed ingredients needed to produce 1 kg of pig meat.

The total WFP was 783 L/kg pork for STANDARD, 1063 L/kg pork for LOCAL, and 1013 L/kg pork for BY-PRODUCT. When we considered the WUR, none of the scenarios had a value <1 (i.e. more HDP can be produced from cultivation of food crops rather than from pig meat). However, the BY-PRODUCT scenario (1.3) performed better than STANDARD (2.1) and LOCAL (5.5). Beet pulp and bakery by-products had zero WFP and no edibility, and were thus considered promising ingredients. Moreover, rye, rapeseed meal and sunflower seed meal had a low WFP and no edibility so were also considered fit for future inclusion in diets. We also concluded that both the WFP and WUR methods have separate strengths and limitations, and should thus be used in conjunction; the ideal diet is one with the a minimum WFP and WUR. Consideration of human edibility of feed ingredients is an important approach which should be included in future studies. Moreover, the entire

food system including dairy, beef, poultry etc. and other competitive uses should be taken into account when considering which feed ingredients to use in pig diets.

Keywords: pigs, water use, circularity, diets, by products