SMALL INCREASES IN WATER USE OR PRICE DECREASE PIGGERY VIABILITY

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Economic implications of water requirements are generally overlooked in intensive animal enterprises, often because water is not considered to be a limiting input and its cost is relatively insignificant when compared to that of other inputs. In many regions though, water is scarce and a constraint for agricultural production (Ward and Michelsen 2002; Rijsberman 2006), resulting in increased prices. Alternatively, intensive animal industries have been suggested as buyers of 'new water' that may be available (at a price yet to be determined in the market place) from improved water management in, for example, rural towns (Pluske *et al*. 2004). Knowledge of water requirements for animal industries as well as subsequent management strategies to deal with market-priced water is therefore important. This paper reports on the effect of changing water prices or water use on the economic viability of a piggery.

Using existing models such as AUSPIG and PIGBAL, relevant biological data can be generated and then integrated with economic parameters to form a simple model. This analysis focuses on a typical farrow to finish 200-sow piggery that relies on: feed intake data from DPI (2002); water intake equations and/or predictions for each age group of pigs (NRC 1998); an average feed price of $270/t; fixed and variable costs based on DPI (2001); an average water price of $1.20/kL (excluding transport costs) based on a mixture of local water and that provided for rural commercial purposes by the Integrated Water Supply System in Western Australia; a 20 year time period (to allow for changes in inputs and outputs over time); a discount rate of 5% (based on current bank interest rates). A base-case cost benefit analyses (Analysis 1) is reported in Table 1. The net present value (NPV), in Australian dollars is the sum of the discounted net benefits over 20 years. The internal rate of return (IRR) is equivalent to the discount rate required for the NPV to equal zero. A strategy with a NPV greater than zero, or an IRR at least equal to an acceptable discount rate, could be considered viable. Analysis 2 demonstrates the effect of increasing annual water price and Analysis 3 deals with an increase in water use, both to a point where the NPV is around zero and the IRR reflects the bank interest rate (Table 1).

Table 1. Comparison of the base-case scenario (Analysis 1) with Analyses 2 and 3

Parameter	Analysis 1	Analysis 2	Analysis 3
Water used in the piggery per year	31,642 kL	31,642 kL	39,224 kL
Annual cost of water	$37,971	$65,993	$47,069
Water costs as a percent of total costs	5.4	9.1	6.5
Water transport costs from source to piggery	$79,106	$79,106	$98,060
NPV	$349,781	$70	$37
IRR	53%	5%	5%

Results suggest that the piggery described in this paper, has the potential to provide a reasonable return (Analysis 1). By increasing the price of water from $1.20/kL to just over $2.08/kL (Analysis 2) results in the piggery just being viable (IRR of 5%). Increasing water use in the piggery by around 25% but keeping water price at $1.20/kL (Analysis 3) also produces a NPV close to zero. Rural scheme water prices are around $2.25/kL for water used in excess of 300kL (Water Corporation 2005). Furthermore, production and environmental factors are important determinants of water intake; for example, consumption varies by 400% for suckers when temperature increases from 20 to 28°C (NRC 1998). Based on the findings from this simple model, piggery managers may need to carefully consider their water use and the price they pay for this input.

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