The Old School, Brewhouse Hill, Wheathampstead,
Hertfordshire AL4 8AN, UK
www.ufaw.org.uk

Animal Welfare 2016, 25: 255-263
ISSN 0962-7286
doi: 10.7120/09627286.25.2.255

Improvement of animal welfare by strategic analysis and logistic optimisation of animal slaughter transportation

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Abstract

The transportation of animals to slaughterhouses is a major welfare concern. The number of slaughterhouses has decreased over time in Europe due to centralisation. This is expected to increase transport time for animals and as a consequence negatively affect animal welfare. We propose an optimisation model based on a facility location model to perform strategic analysis to improve transportation logistics. The model is tested on the Swedish slaughter transport system. We show that, by strategic planning and redirection of transports while keeping the slaughterhouse capacities as of the original data, the potential exists to reduce transport distance by 25% for pigs and 40% for cattle. Furthermore, we demonstrated that approximately 50% of Swedish slaughterhouses can be shut down with a minimal effect on total transport distances. This implies that in terms of the overall welfare picture, the decision of which animals to send where plays a far more significant role than the number of slaughterhouses. In addition, by changing relative weights on distances in the optimisation function the amount of individual transports with long journey times can be decreased. We also show results from altered slaughterhouse capacity and geographical location of slaughterhouses. This is the first time an entire country has been analysed in great detail with respect to the location, capacity and number of slaughterhouses. The focus is mainly on the analysis of unique and detailed information of actual animal transports in Sweden and a demonstration of the potential impact redirection of the transports and/or altering of slaughterhouses can have on animal welfare.

Keywords: *animal welfare, cattle, pig, slaughterhouse capacity, slaughter transports, transportation logistics*