Identification of variables affecting animal health in European organic dairy farms

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INTRODUCTION

• Improving animal health status at herd level relies on the identification of most effective and efficient control measures considering the complexity of farm specific conditions.
• The EU FP7 project IMPRO proposes the use of the Impact Matrix (Vester, 2007) as a novel tool for the identification of farm specific opportunities and constraints in animal health management of organic farms across Europe.

OBJECTIVE - Identifying relevant variables affecting animal health at farm level through systemic approach to assess the organic dairy farm system as first step in performing the Impact Matrix.
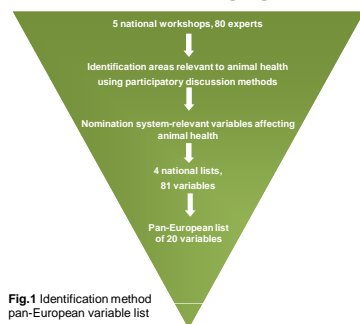
MATERIAL AND METHODS

Fig.1 Identification method pan-European variable list

5 national workshops, 80 experts
Identification areas relevant to animal health using participatory discussion methods
Nomination system-relevant variables affecting animal health
4 national lists, 81 variables
Pan-European list of 20 variables

Expert workshops at national level: (fig. 1)
• 5 workshops: France (2), Germany, Spain and Sweden.
• 80 experts in animal health on organic dairy farms: farmers, advisors, veterinarians, researchers, dairy associations, dairy industry.
• Areas relevant to animal health at farm level were identified by participatory bottom-up discussion methods.
• Nomination of system-relevant variables, with their definition and indicators.

Aggregation at European level: (fig. 2)
• 4 national lists with a total of 81 variables exhibiting great congruence.
• Establishment of a pan-European list of 20 variables by a multinational team of researchers.
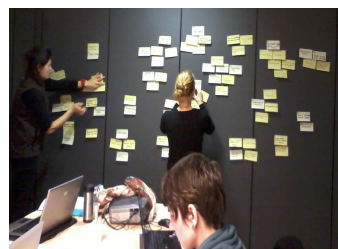

Fig. 2 Aggregation of variables at European level

RESULTS

The following fields were identified to influence animal health (listed in fig. 3 with their corresponding numbers in the Impact Matrix): regulations (no. 1), financial and labour resources (no. 2, 3), availability of advisers (no. 4), farmers' skills, quality of health monitoring and control (no. 5, 6,7), genetic potential (no. 8), cow environment (no. 9), adequacy of the diet (no. 10, 11, 12), preventive measures and treatments of diseases (no. 13, 14, 15), animal performances related to milk production, reproduction and health (no. 16, 17, 18), and management of different age groups (no. 19, 20).

PERSPECTIVES

The variables are key components of the Impact Matrix, to be applied in 200 organic dairy farms in Europe.

Impact Matrix analysis:
• Farmer, veterinarian and farm advisor work separately and in parallel with the Impact Matrix before being asked to merge the matrices into a consensus matrix.
• Strength of influence between variables is rated using a 3-interval scaled grading. Direct influence from variable A (line) on variable B (row) is scored with 0 (no influence), 1 (weak change in B), 2 (related change) or 3 (disproportionate change in the affected factor). (fig. 3)
• Simple mathematical evaluation will identify the roles of the variables in the farm; active, passive, critical or buffering. (fig. 4).

The Impact Matrix analysis permits:
• Discussion and clarification of differences found by the farmer, his veterinarian and farm advisor in scoring the relationships of the variables within the farm. Thus, insuring mediation towards a common denominator for an animal health strategy.
• Identification of active variables with a strong impact on animal health selecting the most effective measures to improve animal health.
• Identification of the variability in European organic farms concerning structural characteristics and the management measures expected to improve animal health.

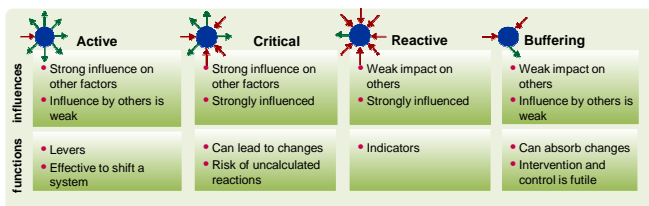Fig. 3 Example of the Impact Matrix composed of the identified variables

Fig. 4 Influences and functions of the systemic roles of variables (after Cole, 2007)

References:
- Cole, A., Allen, W., Kilvington, M., Fenemor, A., 2007. Participatory modeling with an influence matrix and the calculation of whole-of-system sustainable values. Int. J. Sustainable Development (10), 382–401.
- Vester, F. 2007. The art of interconnected thinking, MCB Verlag.

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