Available online at www.centmapress.org

Proceedings in
System Dynamics and Innovation in Food Networks 2016

INTERNATIONAL JOURNAL ON FOOD SYSTEM DYNAMICS

Quality Management in Broiler and Pork Supply Chains Aimed at Reducing Risks of Antimicrobial Resistance: an Elicitation Workshop

H.W. Saatkamp, J.L. Roskam and E. Gocsik
Business Economics, Department of Social Sciences, Wageningen University, The Netherlands
helmut.saatkamp@wur.nl,jamal.roskam@wur.nl, eva.gocsik@wur.nl

Introduction, background and aim of the workshop

Development of antimicrobial resistance (AMR) is considered to be one of the main human health problems. Livestock production, particularly hog and broiler production, are regarded as sources of human exposure to resistant pathogens. It is envisaged that the issue of AMR will be on the agenda of both policy makers at various levels (e.g. supra-national (EU), national and production organisations) and researchers. In the last decade a large range of (potential) exposure and/or risk reducing measures have become available or are envisaged. Examples are:

- On-farm: reduction of usage of antimicrobial agents, more robust animals, therapeutic alternatives to antimicrobials and increased bio-security;
- Beyond-farm: various cleansing and disinfection measures, cross-contamination reducing logistics within the entire chain, various types of meat processing ways which reduce the prevalence of pathogens and further contamination.

Chain-wide implementation of (sets of these) measures is complex and involves simultaneous consideration of various issues, such as: the potential to reduce microbial exposure to humans, the (economic) impact on livestock production, (cost-)effectivity technology and acceptance by the general public, asymmetry of effects and costs between chain participants, the risk of counteracting risk-reduction downstream the chain, legal and institutional thresholds, compliance and governance. Quantitative risk-based economic analysis of (sets of) measures throughout the supply chain can support decision making in this regard. Such analysis should be comprehensive and focused on optimal (i.e. low risks and low additional costs) and coherent sets of measures. Given the complexity of the matters, a conceptual framework was developed to facilitate subsequent quantitative analysis. This framework describes qualitatively all possible factors and aspects that influence both human exposure to pathogens and economic performance. Two levels are considered: (1) the on-farm level and (2) the beyond-farm level up to consumer. Moreover, the issue of (economics of) (non-) compliance is included. Furthermore, the framework includes a rather complete list of risk reducing measures and their direct and indirect relations with human exposure and production costs.

Because (1) the range of potential measures, and (2) the range of various criteria each (set of) measures can be characterized by and on which they can have positive or negative impacts on, analysing all options together is quite laborious. Therefore, it makes sense to elicit a set of promising measures for subsequent quantitative analysis.

The aim of this workshop is to perform such an elicitation with experts in the field of supply chain management; in this workshop elicitation, the emphasis will be on supply chain management characteristics of AMR reducing measures, such as: (1) organisation, governance and management of the supply chain, (2) envisaged effects and costs, (3) legal and institutional possibilities. The focus will be at the beyond farm level, i.e. the range between transport and retail.

DOI 2016: pfsd.2016.1624

Global outline of the conceptual framework

In Figure 1, the basic set-up of the conceptual framework is presented, i.e. the beyond-farm part. It consists of the main levels of the supply chain, ranging from farm to retail (note: the consumer level is not taken into account).

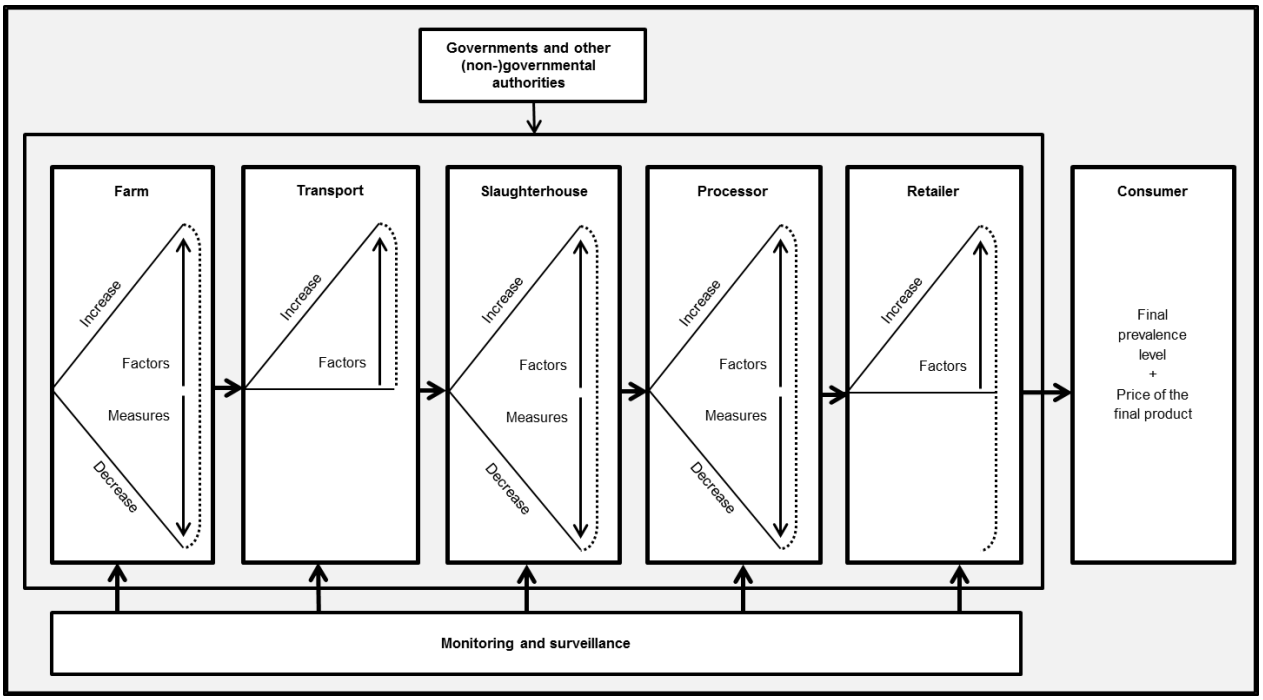

Figure 1. Global set-up of the conceptual framework on economic decision making on AMR reduction (source: Roskam et al., 2016).

At each level of the supply chain, factors exits which can increase the prevalence of AMR pathogens, e.g. the logistic structure, operational procedures during slaughtering and processing, etc.. On the other hand, various measures can be taken that actively reduce AMR prevalence. Both reducing the AMR prevalence increasing effect of the mentioned factors, and taking or improving measures that actively reduce AMR prevalence will have two effects: (1) reduction of the AMR prevalence and (2) increase in production costs. Moreover, they have to be implemented within a running organisation, which could cause other impacts as well. This framework will be the basis for the elicitation workshop.

Approach and set-up of the workshop

The approach of the workshop includes a 7-step procedure following the principles of Multi-Criteria Analysis (MCA). Each step is briefly described below.

Step 1: Presentation and discussion of the conceptual framework.
The most important aspects of the conceptual framework will be presented, and urgent questions for clarification will be discussed. Moreover, for each supply chain level the (presumed) exhaustive list of factors and measures will be presented that have a (potential) effect on AMR prevalence. In this way, all participants will have the same basic understanding of the reasoning behind the framework and the various choice options.

Step 2: Narrowing down the list of choice options.
After obtaining the exhaustive long list, there might be reasons to narrow it down because some measures are, and (perhaps more important) will not be feasible within the mid-run future. Based on specific exclusion criteria, such as fit in current and future legislative framework and future expectations, and preliminary assessment on the performance of the remaining measures, the exhaustive list will be narrowed down to a first long list of potential measures.

Step 3: Each measure can be judged on various criteria, e.g. effectiveness of risks reduction, measures, costs of implementation, easiness of use/implementation, easiness of monitoring of the effect of the measure, acceptance in society, impact on trade, ... In this step, the criteria specifically important for implementation within a supply chain will be discussed and finalized for subsequent use within the MCA.

DOI 2016: pfsd.2016.1624

Step 4: Each measure has a certain (technical) performance with regard to certain criteria; in this case the latter are various criteria retained in Step 3. Hence, an estimation of this performance will be done in this Step. The organizers will beforehand carry out a first assessment, which will be discussed and finalized in Step 4. This performance assessment presumably will be semi-qualitative, e.g. using Likert-scale scorings.

Step 5: Determination of weighing factors for the respective criteria. Until this stage, all work was more or less group work, i.e. plenary discussions. In this Step, each participant will determine her/his own weighing of the criteria according to her/his preference. Preferably, this will be done on their own laptop; if not possible, filling-in prepared forms is the alternative.

Step 6: In this Step, the participants will have a short break. During this break, the organizers will perform a first global MCA-analysis, focussed on: (1) aggregated ranking of the various options and (2) a quick selection of the most promising measures/alternatives. This will result in a first short list of choice alternatives.

Step 7: From the short list, a limited number of alternatives will be retained and subject of a plenary discussion. This discussion will be quite structured, primarily focussing on the main differences between the (limited number of) alternatives, their main pros and cons, etc. In this way, an in-depth discussion on the most promising choice options will be enabled. Moreover, a first feed-back to the participants will be provided.

Step 8: After the workshop, a more detailed analysis will be carried out. The full report is envisaged to be ready end-March, after which it will be distributed amongst the participants of the workshop.

Organisation of the workshop

As can be read from the approach and set-up, the workshop is not a free-discussion type of event. The aim is to structure the whole process, also with regard to timing. This, to enable the possibility of obtaining as much as possible concrete results. Therefore, careful pre-workshop preparations will have been done, as well as planned after-workshop analyses.

Results of the workshop

The above described approach should result in a relatively small set of different measures to reduce AMR pathogens which can be implemented at one or more levels within the pork and broiler meat supply chain. Moreover, the most important features of these measures, particularly their pros and cons from the viewpoint of supply chain management and organisation will be reviewed and compared. This result a such is valuable, but will also provide a good basis for subsequent quantitative economic risk analysis for these measures.

Participants

We welcome participants originating for various backgrounds, particularly supply chain management (organisation, economics), sciences and experts on specific issues/levels of the meat supply chain. Participants of the workshop preferably bring their own laptop: this will facilitate data collection and speed-up data processing. In case this is not possible, paper forms will be provided.

Future outlook and feedback to the participants

After the workshops, a more in-depth analysis of the MCA will be carried out. The final results are expected by the end of March 2016, after which the full report will be distributed amongst the participants. Based on the outcomes of this workshop (and on other issues), quantitative analysis of the elicited measures will be performed in the coming years. All participants will be kept informed on this research by means of written (intermediate) reporting.

References

Roskam, J.L., É. Gocsik, M. Schut, A.G.J.M. Oude Lansink, and H.W. Saatkamp (2016). A Conceptual Framework for Economic Decision Making regarding the Prevalence of Antimicrobial Resistance in Livestock Production Chains (submitted).

DOI 2016: pfsd.2016.1624

Acknowledgements
This research is part of the European EFFORT project. The research leading to these results has received funding from the European Community's Seventh Framework Programme [FP7/2007-2013] under grant agreement n°613754.

DOI 2016: pfsd.2016.1624