FELLOWSHIP SUMMARY REPORT

Exploring agri-food-water policy transfer opportunities for improved human health protection under a changing climate

Theme: Managing Natural Capital for the Future

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Collaborating with Dr Yakov Pachepsky, USDA-ARS (July 2nd – Aug 24th 2018)

I give my consent to the publication of this report on the Co-operative Research Programme's website

1. What were the objectives of the research project? Why is the research project important?

The overarching aim of this fellowship was to evaluate an existing agri-food-water policy framework for managing agriculturally-derived microbial watercourse pollution in the USA and UK. Key objectives were to:

1) Use a comparative policy learning approach to identify opportunities of two-way policy transfer to enhance water resource management for human health protection in the UK and USA;

2) Facilitate a programme of knowledge exchange with a focus on promoting better understanding of how to build greater resilience into policy frameworks to recognise future health challenges under a changing climate.

The fellowship focused on management and regulation of microbial water quality of irrigation waters. It used the concept of lesson drawing, or policy transfer, as a conceptual model to explore how the USA and UK can draw lessons from one another to augment their current and future policy options associated with management of this irrigation water quality. The concept of policy transfer is a key facet of public policy analysis and provides a mechanism for evaluating the transferability of policies from one jurisdiction to another (i.e. by linking policy supply and demand to an understanding of how to export and import a policy feature). This was important because it helped to promote a shared understanding of the opportunities and limitations of existing policy instruments used in the UK and USA and facilitated an assessment of where, how and why there may be potential policy transfer benefits between both nations. Essentially, this equated to a comparative policy learning exercise to identify opportunities of two-way policy transfer to enhance water resource management for human health protection in the UK and USA.

2. Were the objectives of the fellowship achieved?

The objectives of the fellowship were achieved; however, the information collected as part of the international visit is still being processed to convert the material into a draft manuscript for subsequent peer review. The fellowship enabled the identification of key differences in approaches used in the UK and US with respect to regulating microbial quality of irrigation water. Thus, strengths and limitations of these contrasting approaches were evaluated using a desk-based study and complemented further using a series of stakeholder meetings with the Food and Drug Administration (FDA), Environmental Protection Agency (EPA) and the Nutrition, Food Safety/Quality National Program Leader at the USDA-ARS.

3. What were the major achievements of the fellowship? (up to three)

1) New links within the USDA-ARS Environmental Microbial & Food Safety Laboratory (EMFSL) with clear potential for future collaboration and complementary research opportunities.
2) Development of a manuscript outline, which is currently in preparation for submission to an international journal.

4. Will there be any follow-up work?

A publication in an international journal is envisaged. A draft of the write-up is well developed and will be co-authored by the Fellow and the Host. The aim is to submit the manuscript for peer review before the end of December 2018. It is highly likely that further collaborations between the University of Stirling and USDA-ARS EMFSL will materialise over the next few years and during the visit the Fellow discussed a grant opportunity linked to UK Innovation funding that may benefit from the Host's involvement. Furthermore, a series of new professional contacts were established during the visit. Thus, interactions are continuing.

5. How might the results of your research project be important for helping develop regional, national or international agro-food, fisheries or forestry policies and, or practices, or be beneficial for society?

The benefits arising to both the UK and the USA are clear given the comparative policy assessment that formed the focus of this eight-week fellowship. Managing microbial water quality of irrigation water is a challenge for food safety. Its public health importance combined with a lack of (inter)national consensus for the most appropriate way to manage pre-harvest contamination risk of ready-to-eat (RTE) produce ensures this remains a high-profile debate. The US Food and Drug Administration (FDA) is currently overseeing the implementation of the 2011 'Food Safety Modernization Act (FSMA). The FSMA 'Final Rule on Produce Safety' outlines minimum standards for safe growing, harvesting, packing and holding of RTE products; however, the scientific evidence-base that underpins the numerical values for allowable levels of faecal indicator organisms (FIOs) generates significant debate and interest.

Thus, the fellowship necessitated collaborative analysis of the current state of knowledge and practice in an important agricultural water management practice and associated policy area designed to protect human health from waterborne disease through contaminated irrigation waters. The identification of high-priority research and policy needs to underpin future developments in policy design and evolution (both within the UK & USA) signals that our critical analysis related to environmental contamination and food security should form a mutually beneficial output in due course. In addition, the fellowship has enabled the development of a longer-lasting collaboration and given current funding agreements that link UK and USA funding agencies – e.g. NERC – NSF funding – there should be opportunities to develop further joint bids for research funding. Indeed, the policy assessment and gap analysis provided useful underpinning evidence for developing future grant ideas, and with clear end-user / societal relevance for impact.

6. How was this research relevant to:

- The objectives of the CRP?

The research programme and associated activities contributed to an informed discussion and debate concerning the management of microbial quality of irrigation water across a number of different organisations and disciplines. Comparative policy analysis such as this provides a framework for evaluating the evidence used in agricultural policy making. The visit provided an opportunity for scientists and wider stakeholders to engage in a dialogue as to why different approaches to risk management of irrigation water are used in the UK and USA and also identified opportunities and limitations associated with the different strategies used to manage this important agricultural water use to ensure food safety.

- The CRP research theme?

This fellowship used a comparative policy learning approach to identify opportunities of two-way policy transfer to enhance natural capital management (principally land and water) for human health protection in the UK and USA. The fellowship integrated evidence spanning both the social and natural sciences to initiate the development of a roadmap of future research and policy needs that is bigger than the sum of its disciplinary parts.

The fellowship mapped onto the theme objective of 'managing natural capital for the future. Catchments (integrated land and water systems of significant natural capital) have been widely altered through human activities. This has often benefitted economic productivity but has also frequently led to unintended consequences, such as reduced water quality and ecosystem functioning, and reduced resilience against other pressures such as microbial contamination of water and climate change. Freshwater environments provide vital benefits to humans, and scientists and policy-makers increasingly look to ecosystem service theory and assessments to support sustainable catchment management. Ecosystem services are defined as the broad range of goods and services that an ecosystem provides through its natural capital, which enhance human health and wellbeing. However, many of these services may be threatened when the upstream catchment system, within which a given waterbody is located, is poorly or inappropriately managed. Understanding how microbial risks can therefore transfer into valuable water sources is

therefore important given that these waterbodies are used to deliver drinking and irrigation water; assessing the different approaches for managing those risks was the focus of this research.

7. Satisfaction

- Did your fellowship conform to your expectations?

Yes, it provided an excellent opportunity to integrate with a productive research group and share research experiences in addition to undertaking the proposed schedule of research relevant to the fellowship.

- Will the OECD Co-operative Research Programme fellowship increase directly or indirectly your career opportunities? Please specify.

The benefits to my career are linked to the development of new and stronger collaborations with the EMFSL research group. The complementarity of our research agendas is clear and I see clear opportunities for future joint research efforts.

- Did you encounter any practical problems?

No

- Please suggest any improvements in the Fellowship Programme.

No suggestions; it worked well.

8. Advertising the Co-operative Research Programme

How did you learn about the Co-operative Research Programme?

- The host at the USDA-ARS contacted me to make me aware of the opportunity

- What would you suggest to make it more "visible"?
  - Utilise more distribution lists for announcing the programme; appoint national 'champions' to raise awareness.

- Are there any issues you would like to record?
  - None whatsoever.

** End of Report **