

## Beyond individuals: Toward a “distributed” approach to farmer decision-making behavior

Studies of farmer decision-making and behavior have been prominent within social science research into agricultural change. Often, such a focus has been predicated on the idea of understanding why farmers do or do not adopt new practices or technologies, and to identify policy measures aimed at encouraging farmers to change their adoption behavior (Ruttan, 1996). Indeed, this end-of-pipe role, identifying how to overcome barriers to adoption, has been a major reason for the inclusion of social science in inter-disciplinary research on agricultural change. Continuing interest from researchers, policy-makers, and other groups in how to influence farmer behavior is illustrated by a recent review of the literature on this topic commissioned by the UK's Agriculture and Horticulture Development Board, a levy organization that works to “inspire farmers, growers, and industry to succeed in a changing world” (AHDB website), including funding research and knowledge exchange activities. Through this review, the AHDB wanted to learn more about key factors for changing farmer behavior. The experience of conducting the review prompted us to write this editorial, in which we seek to draw attention to the limits of existing behavioral approaches in the agricultural sciences, and to outline an alternative, more “distributed” approach to understanding farmer decision-making behavior.

In the review, we found that models were often used to explain, and to predict, the behavior of individuals. By far the most commonly cited model was the Theory of Planned Behaviour (Ajzen, 1991). This model suggests that behavioral intention is influenced by the attitude of individuals, by the subjective norms within a social or professional network, and the perceived behavioral control of the individual over the behavior to be performed (i.e., how confident individuals were that they could perform the behavior and how much control they had over it). Other models were also cited with a review by Davis, Campbell, Hildon, Hobbs, and Michie (2015) finding at least 82 behavioral models in existence. Such models are generally implicitly or explicitly positivist, considering the behavior of individuals to be open to modeling and prediction. It is posited that shifting various inputs to behavioral intention, such as attitudes, will lead to a change in behavior.

However, some social scientists have long been critical of policy and research that places undue emphasis on the behavior of individuals and for not taking seriously, and also working to change, the social systems in which they live and work (e.g., Rieser, 1973; Gold & Goodey, 1984; Argent & Walmsley, 2009; Shove, 2010). Key amongst these criticisms is the view that behavioral research focused on the decisions and actions of individuals, and how individuals might change, is “politically complicit” (Castree et al., 2014). In other words, it deliberately diverts attention away from the examination of more challenging, fundamental, and politically difficult systemic issues (i.e., social, economic, and political conditions) that are understood to be responsible for various behaviors that are seen as needing to be changed (e.g., adopting a new technology, choosing healthy foods etc.). In being unduly concerned with individuals, behavioral research necessarily diverts attention away from the possibilities of collective action, which involves groups of people deliberating together over the nature of the problems to be addressed and how to work together to bring about change (Lane et al., 2011).

In the context of agriculture, and reminiscent of research conducted in other fields, our review identified that behavioral approaches mostly focus on changing the behavior of individual farmers (Rose, Keating, & Morris, 2018). The major problem here is that an individual farmer is rarely the sole decision-maker (Ingram, 2008); rather, a number of other people, including family, peers, advisors, landowners, food manufacturers, and retailers, can play an important role. Furthermore, there is much evidence to suggest that the focus on individual behavior has led to the portrayal of some farmers as being problem “non-adopters” whose decisions must be changed (Ruttan, 1996). Researchers and/or technology companies have sometimes established the discourse that “we have the solution, if only farm workflows can be changed to accommodate our innovations” (Woolgar, 1990). Such a top-down, pro-innovation bias, has long been criticized, yet studies of behavioral change still suffer from the perception that it is farmers themselves who need to change. Some recent research has conversely suggested that it would be far better if new practices and innovations were developed that

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fit existing workflows, rather than trying to change the behavior of farmers to make them fit imagined farm workflows (see Rose, Parker, et al., 2018). This point was highlighted in the report prepared for AHDB (Rose, Keating, et al., 2018), which suggested that the relevance and usability of innovations would be enhanced if the research process was more participatory, and hence had tried to incorporate an on-farm perspective from the start.

An undue focus on the individual farmer is, therefore, misguided in most circumstances. Very often, an individual farmer is not the only key decision-maker and it allows researchers, technologists, and policy-makers to blame farmers for non-adoption, rather than consider whether their own innovations or policies were poorly constructed. Here, it is crucial to see the role of the social sciences as something far more than “end-of-pipe,” in other words getting farmers to adopt innovations that have already been designed. Instead, approaches commonly associated with the social sciences, such as participatory methodologies, can be better utilized to question the very assumptions of a project, to incorporate user voices at an early stage, and to guide the user-centered design of policies and innovations that will ultimately be more trusted, acceptable, relevant, and implementable in practice.

In recommending a move beyond a focus on individual behavior change toward a more *distributed* understanding of decision-making (i.e., that decision-making is distributed across many actors within a network), it is worth learning from a number of examples where a more associational or relational approach has been adopted. Reed and Claunch (2017) reported on a behavioral intervention with 33 farmers in central Kentucky with the aim of improving the adoption of farm safety practices. They invited 16 farming couples (plus one farmer) to various events called “dinner theaters” where local farmers acted out three comedic plays which contained messages about farm safety (plus a presentation from the principal investigator on farm safety). Thus, the contribution of family and peers to farm decision-making was taken into account at these events. After one week, a survey found that 42% of participants had made safety changes, while 67% were thinking about doing so.

Similarly, Helitzer, Hathorn, Benally, and Ortega (2014) used farming peers to provide educational sessions on integrated pest management (IPM) in New Mexico. The project trained six “model farmers” in IPM techniques before getting them to train 120 farming families. After the intervention, the project team found significant changes in positive behaviors on IPM. In both studies, there was a clear acknowledgment that families shared the responsibility for farm management, illustrating again that change is always social in character, and not the domain of individuals acting alone. Collective involvement can create the social pressure/conditions for change to occur, and there is much evidence that a farmer would change if they felt others had too (see e.g., Kuhfuss,

Préget, Thoyer, & Hanley, 2016). Studies reviewed from the developing world (e.g., Hockin-Grant & Yasué, 2017) also suggested that a household, community approach was useful in behavioral interventions (Rose, Keating, et al., 2018).

A further study from the UK highlights the importance of building multi-stakeholder collaborations (see e.g., Inman et al., 2018). The Demonstration Test Catchments (DTC) platform in England was established to conduct research to help address the issue of agricultural water pollution. It brings together researchers from multiple disciplines and a key element of the platform’s success has been the network of stakeholders involved throughout. The experimental research was co-designed through a collaborative process between researchers, policy-makers, and farmers, ensuring that approaches were robust, addressing the right questions, and considering local knowledge. The DTC platform has established dialogue and knowledge-sharing amongst stakeholders, helping researchers to understand the practical implications of their findings, and enabling research questions to evolve (McGonigle et al., 2014). This is an example of how academic researchers can change their own behavior, in this case adapting research questions in light of stakeholder engagement exercises, rather than trying to change the behavior of farmers to fit in with the thrust of their research.

The studies above have two major factors in common; namely they involved different types of decision-maker in the project (e.g., farmer, family, peers, advisors) and allowed participants to take an active role in developing and communicating key practices. The DTC project further illustrated the value of learning from farmers and other key decision-makers, and the benefits of taking a reflexive approach where the behavior and actions of researchers were also modified.

In summary, therefore, we make the following recommendations for a move toward a more distributed understanding of farmer decision-making behavior:

1. *Encourage a research culture, both within academia, industry organizations, and technology companies, that is participatory and practice-relevant*—this is the first step toward the inclusion of stakeholders in trans-disciplinary agricultural science. In academia, this will require the further incentivizing of stakeholder engagement and impactful research alongside the valorizing of academic publication.
2. *Identify all key decision-makers in a farmer’s “ring of confidence”* (AIC, 2013)—instead of focusing on the individual farmer, all key decision-makers need to be identified and included in a project. This will likely include family, peers, advisors, landowners for tenanted land, as well as others across the supply chain.
3. *Invite and actively include these key decision-makers at project meetings, seminars, and demonstration events*—as practised in the studies by Reed and Claunch (2017) and

Helizter et al. (2014). Once key decision-makers have been identified, they must all be included at an early stage, and then consulted throughout. These stakeholders should be given the power to shape the design of policies and practices to ensure relevance and fit-to-task. During this process, peer or advisor “champions” may be identified who can further help with the dissemination of the project results. Active monitoring of studies such as the PLAID project (Peer-to-Peer Learning: Accessing Innovation through Demonstration) might also yield further useful tips.

In addition, we should also take heed of the deeper critique of behavioral approaches. Although a more distributed understanding of farmer decision-making addresses some of the shortcomings of behavioral approaches that are too focused on the individual, it does little, if anything, to foster enquiry into more fundamental systemic change. Take, for example, the issue of farmers removing hedges to make field sizes larger. A behavioral approach might look to change the subjective norms and attitudes of a range of decision-makers responsible for making such a decision. Yet, it would not consider the wider political and economic factors that may be driving it. As such, social science approaches must be utilized to assess whether a change in the agricultural political economy might be a more powerful way of delivering change than focusing on the final behavior of practitioners. A continuing focus on “decision-making,” distributed or otherwise, runs the risk of crowding out this more politicized perspective (Castree et al., 2014) in studies of agricultural change.

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## CONFLICT OF INTEREST

None declared.

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## REFERENCES

- AIC (2013). The value of advice report. Retrieved from: <http://www.ag-industries.org.uk/latest-documents/value-of-advice-project-report>.
- Ajzen, I. (1991). The theory of planned behavior. *Organisational Behavior and Human Decision Processes*, 50(2), 179–211. [https://doi.org/10.1016/0749-5978\(91\)90020-T](https://doi.org/10.1016/0749-5978(91)90020-T)
- Argent, N. M., & Walmsley, D. J. (2009). From the inside looking out and the outside looking in: Whatever happened to ‘behavioural geography’? *Geographical Research*, 47(2), 192–203. <https://doi.org/10.1111/j.1745-5871.2009.00571.x>
- Castree, N., Adams, W. M., Barry, J., Brockington, D., Buscher, B., Corbera, E., ... Wyne, B. (2014). Changing the intellectual climate. *Nature Climate Change*, 4(9), 763–768. <https://doi.org/10.1038/nclimate2339>
- Davis, R., Campbell, R., Hildon, Z., Hobbs, L., & Michie, S. (2015). Theories of behaviour and behaviour change across the social and behavioural sciences: A scoping review. *Health Psychology Review*, 9(3), 323–344. <https://doi.org/10.1080/17437199.2014.941722>
- Gold, J. R., & Goodey, B. (1984). Behavioural and perceptual geography: Criticisms and response. *Progress in Human Geography*, 8(4), 544–550. <https://doi.org/10.1177/030913258400800406>
- Helitzer, D. L., Hathorn, G., Benally, J., & Ortega, C. (2014). Culturally relevant model program to prevent and reduce agricultural injuries. *Journal of Agricultural Safety and Health*, 20(3), 175–198.
- Hockin-Grant, K. J., & Yasué, M. (2017). The effectiveness of a permaculture education project in Butula, Kenya. *International Journal of Agricultural Sustainability*, 15(4), 432–444. <https://doi.org/10.1080/14735903.2017.1335570>
- Ingram, J. (2008). Agronomist–farmer knowledge encounters: An analysis of knowledge exchange in the context of best management practices in England. *Agriculture and Human Values*, 25, 405–418. <https://doi.org/10.1007/s10460-008-9134-0>
- Inman, A., Winter, M., Wheeler, R., Vrain, E., Lovett, A., Collins, A., ... Cleasby, W. (2018). An exploration of individual, social and material factors influencing water pollution mitigation behaviours within the farming community. *Land Use Policy*, 70, 16–26. <https://doi.org/10.1016/j.landusepol.2017.09.042>
- Kuhfuss, L., Préget, R., Thoyer, S., & Hanley, N. (2016). Nudging farmers to enrol land into agri-environmental schemes: The role of a collective bonus. *European Review of Agricultural Economics*, 43(4), 609–636. <https://doi.org/10.1093/erae/jbv031>
- Lane, S. N., Odoni, N., Landström, C., Whatmore, S. J., Ward, N., & Bradley, S. (2011). Doing flood risk science differently: An experiment in radical scientific method. *Transactions of the Institute of British Geographers*, 36(1), 15–36. <https://doi.org/10.1111/j.1475-5661.2010.00410.x>
- McGonigle, D., Burke, S. P., Collins, A., Gartner, R., Haft, M., Harris, R., ... Lovett, A. (2014). Developing demonstration test catchments as a platform for transdisciplinary land management research in

- England and Wales. *Environmental Science: Systems and Processes*, 16, 1618–1628.
- Reed, D. B., & Claunch, D. T. (2017). Moving social work norms via theater for senior farmers. *Journal of Safety Research*, 60, 7–20.
- Rieser, R. (1973). The territorial illusion and behavioural sink: Critical notes on behavioural geography. *Antipode*, 5(3), 52–57. <https://doi.org/10.1111/j.1467-8330.1973.tb00574.x>
- Rose, D. C., Keating, C., & Morris, C. (2018). Understanding how to influence farmers' decision-making behaviour: a social science literature review, report for the Agriculture and Horticulture Development Board, supported by UEA Consulting Ltd. Retrieved from <https://www.ahdb.org.uk/knowledge-library/understand-how-to-influence-farmers-decision-making-behaviour>
- Rose, D. C., Parker, C., Fodey, J., Park, C., Sutherland, W. J., & Dicks, L. V. (2018). Involving stakeholders in agricultural decision support systems: Improving user-centred design. *International Journal of Agricultural Management*, 6(3–4), 80–89.
- Ruttan, V. W. (1996). What happened to technology adoption-diffusion research? *Sociologica Ruralis*, 36(1), 51–73. <https://doi.org/10.1111/j.1467-9523.1996.tb00004.x>
- Shove, E. (2010). Beyond the ABC: Climate change policy and theories of social change *Environment and Planning A*, 42(6), 1273–1285.
- Woolgar, S. (1990). Configuring the user: The case of usability trials. *The Sociological Review*, 38(51), 58–99. <https://doi.org/10.1111/j.1467-954X.1990.tb03349.x>