

Value creation through farmer-led participatory development

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Abstract. Antimicrobial use (AMU) and antimicrobial resistance (AMR) have been of concern for decades. To support implementation of AMU reduction strategies, a participatory development approach was used to recruit nine regional groups of farmers supported by their veterinary practices. They were involved in a series of three workshops. Workshops were designed to identify practical strategies for AMU reduction that farmers would trial within their farming systems. Participating farmers successfully demonstrated a reduction in AMU. Value flow began with farmers accepting the invitation to participate in a project that would benefit both themselves and their industry. They saw potential to make a proactive contribution to the reduction of antimicrobial use on-farm. This resulted in them enacting practical strategies they had designed for their own situations. The value this realised was improved animal health and reduced antibiotic expenditure. Veterinary practices realised value through stronger client relationships and farmers adopting 'best practice'.

Keywords: Antimicrobial use (AMU), antimicrobial resistance (AMR), Participatory Development (PD), farmer-led, extension.

Introduction

Antimicrobial use (AMU) and antimicrobial resistance (AMR) have been of concern for decades. However, AMU has more recently been in the spotlight over the last decade in reports suggesting that global mortality due to AMR would rise to around 10 million people by 2050 (O'Neill 2016; Robinson et al. 2016). Around 80% of all antimicrobials globally are used in animals (Chang et al. 2015; Robinson et al. 2016). As such there has been a strong focus on the veterinary profession in terms of measuring, stewarding, and limiting AMU amongst farming clients.

New Zealand is the third lowest user of antimicrobials (mg active ingredient/kg biomass) for animals globally (Hillerton et al. 2016; Bryan & Hea 2017; Hillerton et al. 2021). However, there has been limited progress in terms of meaningful reduction in AMU in some key sectors.

A pilot project in the Southland and South Otago regions of New Zealand using a Participatory Development (PD) approach to develop farmer-led strategies to reduce AMU led to a 30% reduction in AMU across the 160 farms that were involved. This led to the development of a two-year, nation-wide project to extend this approach.

Participatory Development

PD is a process through which groups and communities determine, through inclusive dialogue and consensus, their development priorities and the design of solutions that address their priority needs. It is a participant-led approach that puts their needs and priorities at the centre of the process.

PD has been used in agriculture for many years (Wood et al. 2014; Morgans et al. 2018). PD is a way to ensure that extension projects are relevant and effective (Paine 2004). Farmers are the experts on their own land and in their own situation, so they are best placed to identify the problems they face and the solutions that will work for them. By involving farmers in the development process, we can help ensure that solutions are tailored to their specific needs and that they are more likely to be adopted and sustained.

This approach also increases the opportunity that participating farmers will communicate concepts and solution options to their peers (Topping 2005; Patchett et al. 2020). It differs markedly from the traditional 'top down' approach to sector problem solving which involves presenting farmers with the pre-determined solutions and expecting their compliant implementation.

Some of the potential benefits of using participatory development with farmers are that it:

- Leads to more effective and sustainable solutions.
- Builds trust and relationships between farmers and extension agents and rural advisor professionals.
- Empowers farmers, giving them a voice in the process and ownership of the solutions they develop.
- Participatory development does have some challenges. It can be time-consuming, and it requires a commitment from all stakeholders (Wood et al. 2014). Having said this, it is a

valuable approach to agricultural development that can help to improve the outcomes of extension activities.

Bard et al. (2017, p. 2/17) noted that:

In veterinary consultations, the predominant approach is that of paternalism, where the veterinarian sets the consultation agenda, takes on the role of the guardian and assumes that the client's values match their own, resulting in veterinarians contributing most of the talking and clients playing a passive role.

The result of this approach is most likely to elicit behaviour that is opposite to what was suggested, something known as psychological reactance. This response was a catalyst for exploring how PD could be used to help reduce AMU across farms in New Zealand.

Methodology

The project brief called for a series of three workshops across each of the nine key regions in New Zealand. The first workshop was to establish an initial group of farmers called a sustainable health group (SHG) in each region who would consider AMU on their farms, the need for AMU reduction and identify practical strategies they would trial within their farming systems. The second workshop was designed to utilise the network of this group along with that of their veterinary practice to disseminate the strategies to a second group of farmers and gain their commitment to trial them also. These would be called the cohort group (CHG). A third workshop would then be run at the end of the project to report results, thank the farmers for their participation and gain their feedback. It was also hoped to encourage continued efforts to reduce AMU. The groups were established with the cooperation of a local veterinary practice. A 'practice champion' from each practice was enlisted to coordinate the activities, organise workshops and provide technical expertise and support at the local level.

Recruitment of vets and farmers

The project involved nine regional groups of farmers supported by their veterinary practice and identified practice champion. The veterinary practices were recruited by personal contact with veterinarians known to be interested in research and/or extension initiatives and supportive of AMU reduction in their client base. It was accepted that adopting this stewardship stance may have a negative impact on antimicrobial sales.

Recruitment of farmers was executed through invitation by the veterinarians leading the project in their practice. SHG farmers attending the first workshop were generally recruited through having a good working relationship with their veterinarians. Typically, they exhibited a progressive attitude, a willingness to try new ideas and an interest in adopting best practice principles on their farms. This might be viewed as introducing some bias in the hypothesis of the project (that farmers are more likely to adopt practices they design themselves or at least co-design). However, in our view, and in the larger picture of change adoption, this does not invalidate our sample selection. CHG farmers were recruited in much the same way together with the invitation to SHG farmers to 'bring a friend'.

Workshop formats and participation

Workshop one (SHGs) Following a brief introduction to the project the farmers worked in small groups to surface, share and document their knowledge of and attitudes to AMU and associated issues. The practice champion offered any important technical points that may have been left out and added any local context they thought relevant. The group then listed the diseases and situations where they used antibiotics in their farming operations and identified areas where they saw opportunities for AMU reduction. The group then split into pairs who brainstormed ideas to eliminate or reduce AMU in those situations. The ideas were then shared with the whole group and arranged in themes. From these themes potential strategies of action were defined. Looking at each strategy through the lenses of impact and practicality, a round of voting determined the top three to five strategies.

The farmers then formed groups based on the strategy of their preference. These groups conducted a final reality check on their chosen strategy and wrote a practical implementation guide. By the end of the workshop, each farmer committed to implement one or more strategies on their farm. Attendance at this round of workshops was universally very high and the work was approached with enthusiasm. Following the workshop, the project team created posters as a visual reminder of the strategy and its implementation and for display in the staffroom or in the cowshed.

Workshop two (CHGs) These were conducted, approximately two months after the first, to fit in with practice workload and in time for the beginning of the new milking season. Newly recruited farmers joined and shared current knowledge and attitudes as previously in workshop one, whilst

the original farmers refined their AMU reduction strategies from workshop one to share them with the new members. After the strategies were presented, each new farmer joined a strategy group of their choice. They were supported in this and ongoing implementation by the practice champions.

Workshop three (follow up) A little over 12 months later, once the AMU data for the trial season from each practice was available, a third meeting was organised to report results, thank the farmers for their participation and gain their feedback. The objectives were to learn what farmers had done (both SHGs and CHGs) in their previous season; what they felt worked from a practical viewpoint and what did not. In addition, the veterinary practice champions provided us with a summary of their observations of what happened on each farm.

Whilst it was designed as a workshop, the format was adapted to each individual practice situation. In some cases, it was run as planned where the farmers worked in their strategy groups. They were asked to list the actions they took and highlight what worked for them and what did not. We then interviewed each group so they could share their experiences with the whole group. We also asked them what they would do differently next season.

In other cases when only a few farmers participated we simply had a guided conversation and recorded the answers to these questions. One practice decided to host their group over dinner, so we interspersed the 'work' between courses. This worked very well and enhanced the collegiality of the group a great deal. Another practice decided to incorporate the meeting into a traditional annual quiz night they held with their clients. This had the benefits of ensuring a good turnout and many farmers outside of the group got to hear about the project. Yet another practice incorporated the meeting as a presentation amongst others in one of their seasonal farmer information evenings. In this instance there was little time to explore the farmers' actions and responses. However, once again many outside the group were exposed to the project itself. This was invaluable in filling the gaps especially where attendance was challenged.

Maintenance support in between meetings and during lifetime of project

Development and support of our practice champions was implemented at both individual and collective levels. Initial contact was made with each practice champion to explain what was involved in their role and ensure they understood what they were being asked to commit to. Our suggestion was for them to recruit at least one assistant/buddy to support them. This idea was universally implemented. In some practices as the project advanced the assistant was required to take over the leadership role. There were various reasons for this e.g., changes in role or responsibilities within the practice and in at least two situations the original veterinarian left the practice they were working in during the project. Having these people step into a lead role was essential in keeping the project momentum.

Once we had our team of champions, we ran an interactive online workshop to introduce them all to each other and to the project. This included some background on the need for antimicrobial use reduction on farms along with the purpose and goals of the project itself and how we planned to run it. Some concepts of extension and practice change work and the need for ongoing support of both farmers and for themselves were also shared. During this workshop participants were asked for their ideas on how this might be achieved. Written resources were provided for their reference and self-development. These included papers from the literature and notes from the project team covering technical aspects of antimicrobial resistance and on-farm use as well as extension and change theory.

A second online workshop was held for our champions to share ideas and challenges and answer any questions that might have arisen once they had begun to organise the first round of workshops. Following this, in the lead up to the first round of farmer workshops, we provided a regular open forum 'drop-in' meeting slots online (approximately every two weeks) to enable stories and challenges to be shared.

In addition to this we attempted regular individual contact with champions in each region. This was to check on how they were getting on including, preparations for the workshops, expected numbers and logistics. Maintaining this contact proved challenging as veterinarians became immersed in the busyness of the season. A general shortage of veterinary personnel nationally was a major contributing factor.

Between the first two workshops and following the second, regular checking-in and troubleshooting support with our champions was maintained as was practical. The strategy posters were supplied for distribution to the participating farmers, and they were encouraged to seek assistance from their veterinarians if they encountered any challenges. Otherwise support

for the farmers was left to each champion to manage in their own way. For the most part this appears to have happened through conversations and visits by the champions.

Data collection

We used a case study approach to collect qualitative data (Yin 2009; Pryia 2020). The focus was on the project as the case study. Sampling for data collection was convenience based (Palinkas et al. 2015). Data were collected over the course of the project, exploring the perspective and experiences of the farmers and vets who were involved. At the heart of the qualitative data was the process of developing, discussing, and implementing the AMU reduction strategies developed by the groups. Workshop processes enabled collection of notes on discussions and facilitator and expert observations were also used as additional data sources. In addition, one of the facilitators was responsible for regular check-ins with participating vets in between workshops. Notes and observations from these interactions also formed part of the qualitative data.

These observations were then discussed by the project team. The project team for the purposes of qualitative data collection consisted of the two facilitators and the project manager (and AMU expert vet). The project team met over the course of the project and were able to discuss participant notes and observations of the participants and their discussions at each of the workshops as well as observations from interactions between the workshops between the project team and participating vets. Themes and conclusions on the qualitative data were then captured as part of the reporting process for the project.

Results

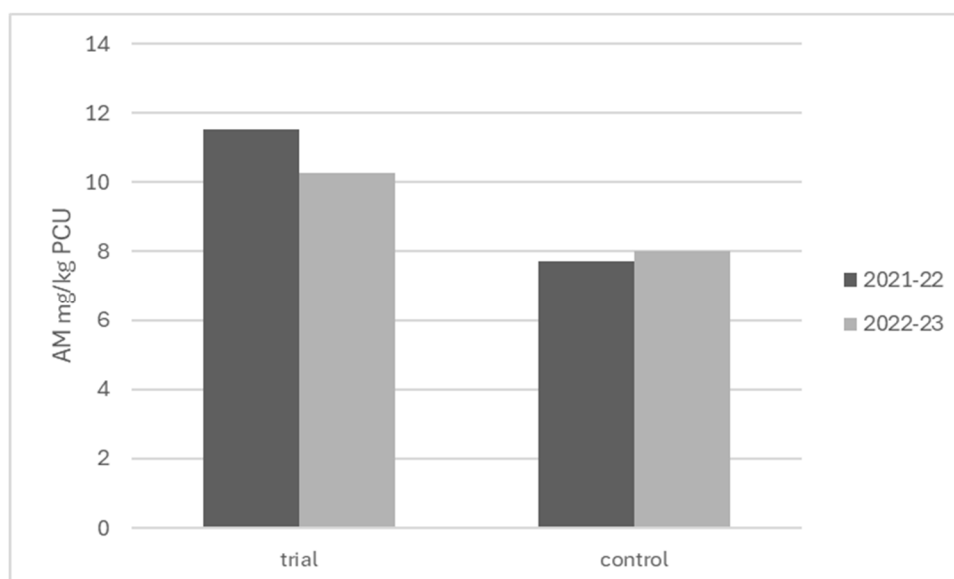
AMU reduction

Participating farmers successfully demonstrated a reduction in AMU. Between the previous season and the season of strategy implementation, AMU on farms involved in the project decreased by an average of 11% amongst all farms (see Figure 1).

All but one region demonstrated a reduction in AMU from the previous year amongst enrolled farmers during the strategy implementation. This varied from -4% to -26%. One region (Bay of Plenty) had a 5% rise in AMU amongst enrolled farms. This was significantly lower than non-enrolled farms which rose 24% and was likely due to the impact of severe weather during the 2022-23 season across their region.

When non-enrolled farms from the same regions were examined (excluding the two clinics that were unable to provide these data; South Canterbury and North Waikato), average AMU for these farms rose by 3.5% during the same period. The effective change in AMU between enrolled and non-enrolled farms was therefore a reduction of 14.5%.

Figure 1. Total change in AMU (as mg/kg PCU) for enrolled and non-enrolled (control) farms



Source: Bryan et al. 2023.

Insights from participating farmers and vets

During the first workshop session it became apparent there was a high level of awareness regarding AMU and antibiotic stewardship generally, though this was variable within each group. However, as participants learned from each other to create a shared understanding in their own context, a collectively high level of AMU knowledge was established. All that remained was for our hosting veterinarians to 'top up' this knowledge on an as-required basis and overlay their local observations. This was seen across all groups. From this common base, participating farmers were then able to apply the learning to their farming systems and come up with strategies that worked for them.

Attendance of original SHG group members at workshop two was highly variable, though numbers overall were satisfactory. It was notable in these workshops that the conversations around AMU reduction strategies and their implementation went to a new level. Perhaps this was due to increased familiarity with the subject matter or the challenging and questioning from the new farmers stimulating new insights. It may well have been a combination of these and other factors. There was an observable increase in open sharing of farming practices and ways to implement the various strategies. This resulted in further refinement, enhancing the practicability of the strategies and enabled each farmer to develop their own processes of implementation.

The major insight from the workshops was the level of engagement from the deep conversations around the sharing of AMU practice that emerged. This was particularly apparent in the second workshops as trust increased in each group and peer-to-peer sharing and discussion became the focus of the process.

Value creation

It was interesting to observe the subtle shifts in thinking that developed during the conversations over the course of the project. Participants shared ideas and tested their thinking with each other. This involved detailed discussions of farming practice as they held the various strategy concepts up to the mirror of practicality and the likelihood of adherence to the implementation guidelines they were developing. This not only helped ensure ownership of the strategy but also facilitated the adoption of new ideas and technology. The decision by many farmers to invest in diagnostic technology, such as cow-side detection options enabling identification of the causal bacteria in a case of mastitis, was the salient example. As they became more aware of the benefits of early and accurate diagnosis, not only in reduced AMU (expenditure) but also in cow health and potential longevity, the purchase and running expenses of the technology became worthwhile.

Overall, the project demonstrated a significant (11.0%) reduction in AMU across participating farms across all regions, in an environment where other farms increased AMU (Bryan et al. 2023). The net change in AMU was -14.5% for participating farmers. If this was replicated year on year the impact on AMU would be vast. Importantly, this impact was demonstrated against a backdrop of farmers and veterinarians already striving to reduce AMU. Given that context, our expectations for delivering change had originally been somewhat tempered.

When farmers develop strategies themselves or alongside their peers, they are more engaged with them, and the results will be more tailored to fit their needs. For these reasons, they are more likely to successfully adopt these strategies, than when they are presented to them by a veterinarian or advisor. Similarly, when farmers have been active participants in strategy development, they seem more inclined to adapt and modify strategies as situations change and evolve. This is vital, because in many situations farmers in our project modified existing strategies but still had an impact on AMU. Perhaps this was because they were now invested and had the confidence to do so. Previously, they may have been more inclined to dismiss this strategy as useless.

What was most interesting was the nature of the strategies. Whilst there were a few novel strategies, the majority were versions of industry standard or best practice, or common recommendations from veterinarians. The difference, as we saw previously, was that the farmers had arrived at these strategies themselves and so were much more likely to effectively adopt them.

Discussion and conclusion

The success of using peer-to-peer support to help farmers reduce AMU was demonstrated in the UK through Farmer Action Groups (Morgans et al. 2021) and through the previous pilot in Southland/South Otago. The approach used in this work was a truncated version of that approach.

Peer to peer learning and collaboration is one of the most powerful avenues to influence change and has been used extensively in a range of disciplines. Learning occurs via other learners who

are not professionals (i.e., not teachers or experts). Additionally, behavioural research demonstrates people want to be in charge of their own destiny. However, at the same time they want to stay connected and have mutually beneficial interactions with others (Deci & Ryan 2002; Pink 2009). This means that, although we will seek the advice of others to inform our decisions, we want to make those decisions for ourselves. Farmers are no different.

Operating from the safety of the peer group satisfies both needs. Farmer-led learning and decision-making have also been highlighted in the veterinary literature. Skilled facilitation is one of the most consistent factors in successful peer groups (Patchett et al. 2020). A facilitator helps to create a 'safe place' for learning together and sharing ideas.

Value from the project began with farmers accepting the invitation to participate in a project that would benefit both themselves and their industry. They saw potential to make a proactive contribution to the reduction of antimicrobial use on-farm. This resulted in practical strategies they had designed themselves for their own situations, being enacted. Implementing these strategies meant improved animal health and reduced antibiotic expenditure. Veterinary practices realised value through stronger client relationships and farmers adopting 'best practice'.

Acknowledgements

Our thanks to the veterinary practice champions and farmers involved in the project. This project was funded through Sustainable Food and Fibre Futures (SFFF Project Number: S3F-21014) by the Ministry for Primary Industries, New Zealand.

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