

The Journal of Agricultural Education and Extension

Competence for Rural Innovation and Transformation

ISSN: (Print) (Online) Journal homepage: <https://www.tandfonline.com/loi/raee20>

Advisor understanding of their roles in the advisory system: a comparison of governance structures in Argentina, Australia, Brazil, and New Zealand

James A. Turner, Fernando Landini, Helen Percy & Marcos Gregolin

To cite this article: James A. Turner, Fernando Landini, Helen Percy & Marcos Gregolin (2021): Advisor understanding of their roles in the advisory system: a comparison of governance structures in Argentina, Australia, Brazil, and New Zealand, The Journal of Agricultural Education and Extension, DOI: [10.1080/1389224X.2021.1944233](https://doi.org/10.1080/1389224X.2021.1944233)

To link to this article: <https://doi.org/10.1080/1389224X.2021.1944233>



© 2021 Crown Copyright. Reproduced with the permission of the Controller of Her Majesty's Stationery Office and AgResearch



Published online: 12 Jul 2021.



Submit your article to this journal [↗](#)



Article views: 182



View related articles [↗](#)



View Crossmark data [↗](#)

Advisor understanding of their roles in the advisory system: a comparison of governance structures in Argentina, Australia, Brazil, and New Zealand

James A. Turner^a, Fernando Landini ^{b,c}, Helen Percy^d and Marcos Gregolin^e

^aFarms Systems and Environment, AgResearch, Hamilton, New Zealand; ^bUniversity of La Cuenca del Plata, Posadas, Argentina; ^cConsejo Nacional de Investigaciones Científicas y Técnicas (CONICET), Posadas, Argentina; ^dAdoption and Practice Change, AgResearch, Hamilton, New Zealand; ^eFederal University of Santa Maria, Santa Maria, Brazil

ABSTRACT

Purpose: Explore advisor understanding of their roles in advisory systems characterised by differing mixes of public and private funding and delivery.

Methodology: A systems perspective of advisory system governance is combined with an individual perspective of advisor roles. Data from a survey of 38 Australian, 19 New Zealand, 606 Argentine and 279 Brazilian respondents were analysed for statistical differences.

Findings: In all contexts, advisor priorities reflect state or industry goals. Where there is more private funding and delivery, advisors also prioritise farmer commercial goals. Under public extension funding and delivery, group methods and capacity building are emphasised to reach many farmers and realise public goals.

Practical implications: Advisors play a crucial role in reconciling competing national, industry and farmer goals at the farm-level. This emphasises participatory methods and intermediary positions in the advisory system to facilitate dialogue and support farmers to realise competing goals. A policy implication is public and industry funding is needed for advisors to engage with public and industry organisations to understand and contribute to policies and objectives they will be advising on.

Theoretical implications: Combining a systems perspective of country-level advisory system governance with an individual perspective of advisor roles highlights that advisor understanding of their roles are related to the public governance context in which they operate.


Originality/value: The advisor understanding of their roles in the advisory system is related to different governance of pluralistic advisory systems. This contributes to articulating advisory policies and practices to support coordination and inclusion in pluralistic advisory systems.

ARTICLE HISTORY

Received 22 August 2020
Accepted 10 June 2021

KEYWORDS

Extension agents; rural advisors; advisor roles; governance; advisory system; pluralistic advisory systems

CONTACT James A. Turner  james.turner@agresearch.co.nz  Ruakura Research Centre, 10 Bisley Rd, Hamilton 3214, New Zealand

© 2021 Crown Copyright. Reproduced with the permission of the Controller of Her Majesty's Stationery Office and AgResearch. This is an Open Access article distributed under the terms of the Creative Commons Attribution-NonCommercial-NoDerivatives License (<http://creativecommons.org/licenses/by-nc-nd/4.0/>), which permits non-commercial re-use, distribution, and reproduction in any medium, provided the original work is properly cited, and is not altered, transformed, or built upon in any way.

Introduction

Rural advisory policy and governance across many countries is undergoing reform to address fragmentation and exclusion in pluralistic advisory systems (Davis, Babu, and Ragasa 2020) and enable farmers to effectively respond to complex challenges such as climate change, food security and disruptive technologies (Klerkx 2020; Nettle, Crawford, and Brightling 2018). Changes include emphasis on participatory methodologies, new intermediary roles by public and farmer-funded advisory agencies, and public-private partnerships (Nettle et al. 2017; Davis, Babu, and Ragasa 2020). For example, there is increasing emphasis on market-oriented extension in Latin America to support smallholder farmer access to commercial markets (Davis, Babu, and Ragasa 2020) and intermediary roles of advisory organisations in Europe to facilitate coordinated action by agricultural actors (Compagnone and Simon 2018).

There is a growing body of research, cited by Klerkx (2020), on the performance of pluralistic advisory systems (e.g. Labarthe and Laurent 2013) and the division of public, private and third sector organisation roles (e.g. Compagnone and Simon 2018). There is increasing interest in how advisory system governance and advisory organisations are evolving to improve coordination and inclusion in pluralistic advisory systems (e.g. Eastwood, Klerkx, and Nettle 2017; Cerf et al. 2017; Klerkx et al. 2017; Nettle, Crawford, and Brightling 2018; Paschen et al. 2017), including a Special Issue of this journal (Nettle et al. 2017). However, how these changes to advisory governance are related to advisor understanding of their own individual roles in the advisory system remains an area of limited study (Nettle et al. 2017).

The aim of this paper is to explore advisor understanding of their roles under different country advisory system governance contexts characterised by contrasting mixes of public and private funding and delivery. To address this aim, this paper combines a systems perspective of country-level advisory governance with an individual perspective of advisor roles within the advisory system. Governance structures of four countries (Argentina, Australia, Brazil and New Zealand) are described based on the best-fit framework for analysing pluralistic agricultural advisory services (Birner et al. 2009). Advisor roles in the advisory system are described in terms of advisor understanding of their objectives, their preferred advisory methods, and how they relate to other actors in the advisory system (Nettle, Crawford, and Brightling 2018; Prager, Creaney, and Lorenzo-Arribas 2017; Paschen et al. 2017).

This study extends previous research on the governance of pluralistic advisory systems in four ways. Firstly, a lot of research has been conducted on understanding the consequences of privatisation of advisory services (e.g. Gboko, Faure, and Ruf 2020; Faure et al. 2017; Labarthe and Laurent 2013; Knuth and Knierim 2013). It is timely to explore how different governance structures in pluralistic advisory systems are related to advisor understanding of their roles in the advisory system (e.g. Paschen et al. 2017; Minh et al. 2014). This contributes to articulating advisory policies and practices to support coordination and inclusion in pluralistic advisory systems and enable farmers to effectively respond to complex challenges (Nettle et al. 2017; Klerkx 2020).

Secondly, in general, advisory services and approaches have tended to be studied from an organisational point of view, while neglecting the diversity of perspectives and

understandings of individual advisors, and there is scarce research on how advisors understand their roles (Davis et al. 2019; Landini 2015; Kamara, Van Hulst, and Dorward 2020). This is an important topic of research, as advisor understanding of their roles shape their practice, and hence what knowledge and support they potentially provide farmers (e.g. business, production or livelihood-oriented), how they provide this support (e.g. advising, dialogue, facilitating or brokering), and with whom they partner to provide support to farmers (Ingram 2008; Nettle, Crawford, and Brightling 2018; Klerkx and Proctor 2013).

Thirdly, the study responds to calls by several authors for more cross-country comparisons of national advisory systems by analysing survey findings from four countries with differing advisory governance (Davis, Babu, and Ragasa 2020; Klerkx 2020; Nettle et al. 2017).

Finally, recent comparative studies have focused on Europe (Knierim et al. 2017; Prager et al. 2016), while Latin America, and Asia are underrepresented. Davis, Babu, and Ragasa (2020), Zhou and Babu (2015), and a special issue of this journal (Klerkx, Landini, and Santoyo-Cortés 2016) are recent exceptions. Two of the countries studied are from Latin America (Brazil and Argentina) and two from Australasia (Australia and New Zealand). These regions provide an interesting context for studying advisor roles under contrasting governance. Over the last two decades, Australasian state extension and advisor services have been privatised with the aim of making them more efficient and responsive to farmer needs (Nettle et al. 2021; Paschen et al. 2017; Turner et al. 2016). In contrast, in Latin America, the public extension has remained and even been strengthened through increasing public investment (Klerkx, Landini, and Santoyo-Cortés 2016). These countries, therefore, have many different types of advisory organisations, the state outsources rural advice to different extents, and innovative approaches to advisory organisation and practices have been developed, such as the territorial approach to rural extension and development in Latin America.

Analytical framework

Advisory governance

Each country's advisory system governance and policy elements were described using the best-fit framework (Birner et al. 2009), which describes advisory services from a systems perspective using four characteristics: governance structures, capacity, management, and advisory methods. In this analytical framework, we focus on *governance structures*; the institutions and policies that guide the actors, and their roles and objectives in the advisory system. Governance structures, therefore, include policies and institutions that define the roles of national and state government, private and NGO sectors in funding and providing advisory services, the degree of privatisation and decentralisation, funding mechanisms and coordination.

To describe individual advisor understanding of their roles in pluralistic advisory systems, advisor roles were described based on individual advisor understanding of what they want to achieve, their preferred advisory methodologies, and perceived position of the different actors in the advisory system.

Governance structures related to advisor objectives

Advisor objectives are concrete aims or outcomes advisors strive to reach, as well as means to attain national, industry and organisational goals (Davis and Sulaiman 2014). The objectives that advisors prioritise are related to national agricultural and extension policy goals that set the objectives of advisory services (Birner et al. 2009; Minh et al. 2014), particularly public-funded and delivery advisory organisations (Davis, Babu, and Ragasa 2020). For example, Latin American countries have specific national policies to address social needs and target populations (e.g. food security, farmer wellbeing and family farming) (Davis, Babu, and Ragasa 2020). These are not public or industry-good priorities in New Zealand or Australia, where the emphasis is on improving agribusiness performance and environmental outcomes (Paschen et al. 2017; Rijswijk and Brazendale 2017).

Advisor objectives are also related to the type of advisory organisation they work in (Davis, Babu, and Ragasa 2020; Knierim et al. 2017). For example, Knierim et al. (2017) suggest that advisors from public-funded services are encouraged to address objectives aligned with public-good provision. Advisors from farmer-based or industry-funded organisations tend to address objectives aligned with industry-good goals, e.g. the Research and Development Corporations in Australia (Nettle et al. 2021; Paschen et al. 2017). Commercial advisors tend to respond to farmer client requests with a focus on personalised technical and economic advice (Klerkx, de Grip, and Leeuwis 2006; Knuth and Knierim 2013). This is to address commercial problems faced by farmer clients (Prager et al. 2016; Nettle, Crawford, and Brightling 2018) or to provide technical advice tied to the sale of farm inputs (Faure et al. 2017; Dhiab, Labarthe, and Laurent 2020). However, commercial advisors have been found to contribute to public-good provision when the governance context provides a combination of strong public policy on environmental impacts of farming, coupled with policies encouraging public-private partnerships (Klerkx et al. 2017; Paschen et al. 2017).

Finally, advisor objectives are related to their own interests and values (Ingram 2008; Landini 2015; Nettle, Crawford, and Brightling 2018). For example, Ingram (2008) found agronomists with productivist views might persuade farmers towards less environmentally-sensitive practices, while agronomists with more awareness of environmental degradation might bring about changes more in line with the goals of sustainable agriculture.

Governance structures related to advisory methods

Advisory methods are the nature of interaction with other actors in the advisory system (e.g. one-to-one, face-to-face dialogue, group, mass communication, etc.) that advisors use to achieve their objectives (Nettle, Crawford, and Brightling 2018). Advisors preferred methods are related to organisational, state and national policy, and extension paradigms (Davis, Babu, and Ragasa 2020; Birner et al. 2009; Paschen et al. 2017), as well as advisors' beliefs, values and motives that define their roles in the context of the advisory profession, i.e. their own professional identities (Cerf et al. 2017; Nettle, Crawford, and Brightling 2018). For example, commercial advisors funded directly by farmer clients or through clients' purchase of inputs emphasise individual advisory practices, i.e. one-to-one, face-to-face communication (Knierim et al. 2017; Faure et al. 2017; Dhiab,

Labarthe, and Laurent 2020). This enables commercial advisors to provide personalised advice to their farmer clients (Prager et al. 2016). Commercial advisor use of group methods appears to be uncommon, with a lack of facilitation and networking practices found among commercial advisors in Europe (Knuth and Knierim 2013; Sutherland et al. 2017), Ghana (Gboko, Faure, and Ruf 2020), Peru (Faure et al. 2017) and globally (Davis, Babu, and Ragasa 2020).

On the other hand, public-funded advisors tend to emphasise the use of group and mass dissemination methods (Knierim et al. 2017). Group methods include training, and creation and strengthening of farmer organisations, so that smallholder farmers can be reached as a group rather than more resource-intensive one-on-one methods (Leeuwis 2008). For example, Knierim et al. (2017) found that public advisory providers in Europe used one-to-one methods in only a third of cases and served more clients than private commercial advisors.

Governance structures related to advisor positions in the advisory system

Advisor understanding of their position in the advisory system refers to their relation to other actors (farmers, public authorities and researchers), the roles that they and the other actors play in networks to realise extension objectives, and how coordination is realised (Klerkx and Proctor 2013). Klerkx, van Mierlo, and Leeuwis (2012) discuss the evolution of advisory models and advisor position in the advisory system including top-down transfer of technology, participatory farming systems research and extension, institutional coordination in Agricultural Knowledge and Information Systems, and co-innovation in Agricultural Innovation Systems. For example, these authors argue that under a technology transfer model, advisors are positioned as connecting and translating innovations from scientists to farmers who are adopters or laggards, and that under an institutional coordination model, advisors are positioned as intermediaries and facilitators of innovation among farmers and scientists.

Previous research (Knuth and Knierim 2013; Rijswijk and Brazendale 2017; Nettle, Crawford, and Brightling 2018; Paschen et al. 2017) suggests that in the absence of public policy encouraging and funding institutional coordination, privately funded commercial advisors tend to limit cooperation with other advisors and are poorly connected with the R&D system and public authorities. Lower levels of cooperation among commercial advisors, and withholding of information, is related to advisors viewing their technical knowledge as their competitive advantage (Compagnone and Simon 2018; Cerf et al. 2017; Knuth and Knierim 2013). Additionally, commercial advisors have been found to lack the time and resources to maintain connections with research organisations and public authorities (Knuth and Knierim 2013; Labarthe and Laurent 2013; Rijswijk and Brazendale 2017; Nettle, Crawford, and Brightling 2018). Other authors (Davis, Babu, and Ragasa 2020) have found this to also be the case with public providers due to a lack of time to search for additional knowledge.

Where there are weak linkages in the advisory system contributing to duplication of effort, contradictory messages, and weak service delivery, there have been calls for public (both advisory and research) and farmer-based and industry organisations to increase their role in institutional coordination (Knierim et al. 2017; Compagnone and Simon 2018; Paschen et al. 2017). This includes jointly setting priorities, development of new

public-private-third sector partnerships (Davis, Babu, and Ragasa 2020) and of common good resources for delivery by both public and private advisory services (Compagnone and Simon 2018). For example, a New Zealand farmer-funded advisory organisation coordinated the provision of pasture renewal advice and information by commercial and public (including research) providers (Rijswijk and Brazendale 2017). In Bulgaria, Poland and the United Kingdom this brokering between research and farmers is provided by public advisory organisations (Sutherland et al. 2017), while in a French project to reduce pesticide use this coordination role was played by a farmer-led organisation (Cerf et al. 2017).

Advisory system policies have been shifting from an emphasis on transfer of technology to participatory methods and functional skills, such as facilitating learning and knowledge exchange (Kamara, Van Hulst, and Dorward 2020; Davis, Babu, and Ragasa 2020; Minh et al. 2014; Paschen et al. 2017). This includes training advisors in these skills (Kamara, Van Hulst, and Dorward 2020), as well as in technical skills; as occurs in some Latin American countries (Davis, Babu, and Ragasa 2020). However, governance and support to encourage the use of participatory methods or functional skills do not always translate into changes in advisor practices (Kamara, Van Hulst, and Dorward 2020; Davis, Babu, and Ragasa 2020).

Country governance structures

Using the best-fit-framework governance structures, each of the country advisory system providers, policies, funding, coordination, and management approaches are described (Table 1) and located based on the balance of public and private funding and delivery (Figure 1). Figure 1 shows the characteristics of advisory systems with different mixes of public and private funding and delivery, and locates Argentina, Australia, Brazil and New Zealand based on their mix.

Methodology

Participants

Advisors from Argentina, Australia, Brazil, and New Zealand completed a questionnaire about advisory objectives and methods, as well as a validated Likert-type scale regarding beliefs about extension and innovation (which allows understanding of the role respondents assign to farmers, advisors, public authorities and researchers). The Argentina sample was gathered in 2017, and others in 2018 and 2019. They were selected to allow fruitful comparisons among countries that went through privatisation of public extension (Australia and New Zealand) and countries that have not (Argentina and Brazil). Table 2 presents the characteristics of the samples.

Importantly, the different country samples are unbalanced (Table 2). As others suggest (e.g. Rusticus and Lovato 2014), unbalanced samples increase Type II errors, i.e. the possibility of not finding statistical differences between groups when there are. This implies that differences should be considered trustworthy, while results that show an absence of differences should be taken with caution.

Table 1. Summary of country advisory system governance based on best-fit framework characteristics.

		Governance structures			
	Providers	Policies	Financing & budget	Coordination	Management
Argentina	Multiple providers. Public extension plays a dominant role at different levels (mostly federal level) providing free advice to small and medium-sized farmers. Private providers are mostly fee-for-service advisors, input sellers and processing companies.	No specific extension policy defining private advisory roles and objectives. Most relevant are the medium- and long-term policy documents of the INTA (National Agricultural Technology Institute). INTA policy includes inputs of multiple farmer representatives. Policies focus on family farming and rural development, including establishment of the Subsecretariat of Family Farming, (part of the Ministry of Agriculture).	Public extension funded by the government (federal level funds, provincial level governments, fund provincial public extension). Private extension funded by clients (including input sellers).	There is no national level coordination space or strategy. Coordination tends to be local, based on the premises of a territorial approach, but mostly coordinates public institutions. INTA acknowledges the brokering role of advisors and importance of institutional coordination.	Institutional extension policy is presented as participatory, but public extension institutions tend to take a top-down approach.
Australia	Many pluralistic actors from private sector, state, and industry organisations with different objectives and advisory approaches – commercial advisors (input suppliers), Rural Research and Development Corporations (RDCs), farmer-owned organisations, independent (fee-for-service) advisors, and processing companies. Public advisory organisations at the state-level	No specific extension policy Privatisation and formation of the RDCs to encourage rural industries to invest in extension. Australian States and industry organisations decide investment in advisory services. The national government may invest in advisory provision for certain topics (carbon farming; drought management, natural resource management), however the States have responsibility for delivery. National Policy of Technical Assistance and Rural Extension includes a focus on marginalised groups and supporting family farming. National Agency of Technical	Public investment in extension has been static for two decades. RDCs allow government and industry to co-invest in research, development and extension. Commercial, product advice, farmer-levy funded, and Government funding.	RDCs intended to encourage linkages between research, development, extension and farmers.	Limited public training in extension methods. Training provided by individual advisory organisations.
Brazil	Strong government role in coordination and financing Many pluralistic actors from private and NGO sectors – advisory firms, sellers of farm inputs, and	National Policy of Technical Assistance and Rural Extension includes a focus on marginalised groups and supporting family farming. National Agency of Technical	Federal – universal coverage attempted. ANATER funds state-level public extension, as well as private organisations. NGOs are encouraged to seek	System of public calls for services to smallholders. Incentives and mechanisms to encourage knowledge exchange with researchers. ANATER provide federal funding	Training in participatory methods, though advisor practices are frequently top-down.

(Continued)

Table 1. Continued.

		Governance structures				
		Providers	Policies	Financing & budget	Coordination	Management
	agroindustry cooperatives, also offer advisory services	Assistance and Rural Extension (ANATER) supports family farming, including providing extension services	competitive funding. Federal funding for extension of Ministry of Agrarian Development (MDA).	and consolidated extension services.		
New Zealand	Many pluralistic actors from private sector and industry organisations – private consultants, agribusinesses, and veterinarians, processing companies. Regional government also has a role in providing advice, specifically around environmental practices.	Public advisory services commercialised and privatised. Commodity Levies Act (1991) formed industry organisations that are farmer funded to undertake industry good advice. Agricultural policy export commodity focused. Increasing environmental policy for agriculture, particularly for freshwater protection.	Commercial, product advice, farmer-levy funded, and some minor Government funding	No specific policies or organisations tasked with coordination. Individual cases of coordination by industry organisations around specific advisory topics.	No public training in extension methods. Training provided by individual advisory organisations.	

Sources: Davis, Babu, and Ragasa (2020), Diesel et al. (2008), Diesel, Neumann, and Sa (2012), Hall and Kuiper (1998), Hunt et al. (2012), Landini (2013), Paschen et al. (2017), Nettle, Crawford, and Brightling (2018), Rijswijk and Brazendale (2017), Nettle et al. (2021), Tort (2008).

		Funding	
		Public	Private
Delivery	Public	Public sector funding & delivery Government funds and its agencies provide advisory services and training	Public sector cost recover Producers/associations pay fee or tax to covers costs of advisory services
	Private	Public sector funding of “external” advisory providers Government funds, but other providers responsible for delivery: <ul style="list-style-type: none"> • Contracting out • Subsidies to producers to hire services directly • Funding NGOs for services 	Public withdrawal from funding and delivery Commercialisation Privatisation to private advisory providers Transfer to NGOs or farmer organisations

		Funding	
		Public	Private
Delivery	Public	Argentina	
	Private	Brazil	New Zealand

Figure 1. Public and private sector agricultural advice funding and delivery alternatives. Adapted from Davis, Babu, and Ragasa (2020).

Finally, considering the importance of the variable ‘Type of institution’, differences between countries were explored. As expected, there are differences among countries (Fisher’s Exact Test: $p < .001$). Focusing on private versus public, results show differences between all pairs except Australia and New Zealand (using Squared Chi and Bonferroni correction). The Australian and New Zealand samples have a higher percentage of respondents working for private organisations, while Argentina and Brazil a higher

Table 2. Characteristics of the country samples.

		Argentina	Australia	Brazil	New Zealand
Sample size		606	38	279	19
Gender (%)	Men	66%	47%	78%	79%
	Women	34%	53%	22%	21%
Mean age		43.6	47.5	47.2	49.8
Years of experience		12.1	15.9	18.3	21.2
Type of institution	Private	9.5%	54.8%	0.0%	88.2%
	Public	89.2%	29.0%	99.3%	5.9%
	University or other	1.3%	16.1%	0.7%	5.9%
Educational level	Tertiary degree	13.1%	5.3%	17.1%	5.3%
	University degree	65.9%	65.8%	57.8%	52.6%
	Master's degree	14.6%	18.4%	17.8%	31.6%
	Doctorate	1.3%	10.5%	3.3%	5.3%

percentage work for public organisations (though the percentage of the Brazilian sample is the highest).

Research instrument

The research instrument was a questionnaire composed of three parts: (1) sociodemographic questions; (2) a Likert-type scale containing 26 items addressing beliefs about extension and innovation, which express the role respondents assign to different actors (including themselves) in the advisory system; (3) advisory methods (individual, group, mass media); and (4) fundamental advisory objectives (including productivity, commercial strengthening, and wellbeing). The items of the Likert-type scale are published in Authors (2019). The rest of the research questions are in the Annex.

The contents of the Likert-type scale, the list of objectives and advisory methods were developed after a literature review of the following papers (including Leeuwis 2008; Ingram 2008; Klerkx, van Mierlo, and Leeuwis 2012; Sulaiman and Davis 2012; Höckert and Ljung 2013; Landini 2016), and later adjusted based on input from twelve international experts on rural extension and advisory services from eleven countries (Australia, Brazil, Chile, France, India, Nicaragua, Nigeria, Pakistan, South Africa, The Netherlands, and the United States), who read the preliminary topics for the Likert-type scale and the lists of advisory objectives and methodologies, and suggested corrections and improvements. For more explanation of how the questions in the survey were developed see (Authors 2021).

The Likert-type scale is named 'Beliefs about Extension and Innovation Scale' and was statistically validated in Argentina in Spanish (Authors 2019). Likert-type scales are composed of multiple items that assess underlying dimensions or factors (Santos and Clegg 1999). This scale assesses five dimensions identified using exploratory and confirmatory factor analysis (Authors 2019). They are:

- Dialogue and horizontal coordination (7 items): Extension is seen as an interactive, bidirectional and interpersonal process between extensionists and farmers, and rural innovation as a coordinated activity and social learning process among multiple actors, including extension agents, farmers, researchers and local organisations and institutions;

Table 3. Most important objectives of extension.

Extension objectives	Mean	Countries (%)
1. Protection and management of natural resources.	40.8%	^a New Zealand: 55.6% ^a Australia: 51.4% ^b Argentina: 27% ^b Brazil: 29.1% $\chi^2(3) = 12.2; p = .001$
2. Increasing farmers' productive and commercial knowledge through training sessions.	43.7%	^a Australia: 51.4% ^a Brazil: 44.8% ^b New Zealand: 44.4% ^b Argentina: 34.1% $\chi^2(3) = 12; p = .007$
3. Productive modernisation aimed at increasing productivity and profitability.	39%	^{ab} Australia: 43.2% ^a Brazil: 42.1% ^{ab} New Zealand: 38.9% ^b Argentina: 31.7% $\chi^2(3) = 9.83; p = .020^*$
4. Creation and strengthening of farmer organisations	31.8%	^a Argentina: 56.3% ^b Brazil: 40.6% ^c New Zealand: 16.7% ^c Australia: 13.5% $\chi^2(3) = 45.8; p < .001^{**}$
5. Improving farmers' quality of life by helping them to have access to basic services.	30%	^a Brazil: 46.4% ^b Argentina: 35.5% ^c Australia: 18.9% ^c New Zealand: 11.1% $\chi^2(3) = 20.6; p < .001^{**}$
6. Developing entrepreneurial and business capacity.	31.2%	^a New Zealand: 50.0% ^{ab} Australia: 32.4% ^b Argentina: 25.1% ^c Brazil: 17.2% $\chi^2(3) = 15.1; p = .002^{**}$
7. Resolution of productive or commercial problems posed by farmers by means of providing advice.	30.9%	^a New Zealand: 50.0% ^a Australia: 43.2% ^b Argentina: 19.8% ^c Brazil: 10.7% $\chi^2(3) = 37.6; p < .001^{**}$
8. Strengthening of farmers' productive strategies and livelihoods through the funding of small productive projects.	24.4%	^a Argentina: 35.1% ^a Brazil: 35.2% ^b Australia: 16.2% ^b New Zealand: 11.1% $\chi^2(3) = 9.9; p = .019^*$
9. Integrating farmers into commercial chains and supporting the commercialisation of their products in conventional markets.	21.7%	^a Argentina: 34.6% ^a Brazil: 33% ^b Australia: 13.5% ^b New Zealand: 5.6% $\chi^2(3) = 13.2; p = .004^{**}$
10. Provision of information regarding prices or climate for it to be used for decision making.	8.6%	^a New Zealand: 16.7% ^a Australia: 16.2% ^b Argentina: 0.9% ^b Brazil: 0.8% Fisher's exact test: 33.3, $p < .001^{**}$

Notes: 'Mean' refers to the mean of the countries' results. * $p \leq .05$; ** $p < .01$. Superscripts indicate subsets of countries that are statistically different (without using Bonferroni correction).

- Transfer of Technology (6 items): Researchers are viewed as the source of knowledge and innovation, advisors as its diffusers, and farmers as adopters of externally generated knowledge and technologies;
- Blame on farmers (5 items): Suggests farmers are responsible for their own lack of progress due to their passive, traditionalist, and handout attitudes;

Table 4. Preferred advisory methods.

Methods	Mean	Countries (% of most preferred)
Group	46.2%	^a Argentina: 57.4% ^{ab} New Zealand: 44.4% ^b Brazil: 42.6% ^b Australia: 40.5% KW: $\chi^2(3) = 16$; $p = .001^{**}$
Individual	37.4%	^a New Zealand: 50.0% ^a Brazil: 40.4% ^a Australia: 37.8% ^b Argentina: 21.5% KW: $\chi^2(3) = 48,3$; $p < .001^{**}$
Institutional coordination	11.6%	^a Argentina: 18.6% ^b Brazil: 14.3% ^b Australia: 13.5% ^{ab} New Zealand: 0.0% KW: $\chi^2(3) = 30.9$; $p < .001^{**}$
Mass media	4.7%	Australia: 8.1% New Zealand: 5.6% Brazil: 2.6% Argentina: 2.5% KW: $\chi^2(3) = 4,93$; $p = .177$

Notes: 'Mean' refers to the mean of the countries' results. KW: Kruskal-Wallis test; * $p \leq .05$; ** $p < .01$. Superscripts indicate homogeneous subsets built based on stepwise step-down post hoc analysis in SPSS.

Table 5. Beliefs about extension and innovation.

Beliefs	Mean	Countries (means)
Transfer of technology	2.93	^a New Zealand: 2.68 ^a Australia: 2.78 ^b Argentina: 2.99 ^c Brazil: 3.28 KW: $\chi^2(3) = 46.15$; $p < .001^{**}$
Dialogue and coordination	4.30	New Zealand: 4.20 Australia: 4.32 Argentina: 4.34 Brazil: 4.35 KW: $\chi^2(3) = 2,87$; $p = .412$
Blaming farmers	3,03	^a New Zealand: 2.66 ^a Australia: 2.79 ^b Argentina: 3.17 ^c Brazil: 3.49 KW: $\chi^2(3) = 64.95$; $p < .001^{**}$
Participatory, demand-driven extension	3.76	^a Australia: 3.55 ^a New Zealand: 3.55 ^b Argentina: 3.91 ^c Brazil: 4.05 KW: $\chi^2(3) = 30.13$; $p < .001^{**}$
Self-critical attitude	3.98	^a Brazil: 3.86 ^{ab} Australia: 3.93 ^b Argentina: 4.00 ^b New Zealand: 4.12 KW: $\chi^2(3) = 15.75$; $p = .001^{**}$

Notes: 'Mean' refers to the mean of country means; KW: Kruskal-Wallis test; * $p \leq .05$; ** $p < .01$. Superscripts indicate homogeneous subsets built based on stepwise step-down post hoc analysis in SPSS.

Table 6. Synthesis of results.

Public funding & delivery (participants from Argentina)	Public funding, public & private delivery (participants from Brazil)	Public & private funding and delivery (participants from Australia)	Private funding & delivery (participants from New Zealand)
<i>Important advisor objectives. Concrete aims or outcomes to achieve more general national or organisational goals</i>			
Prioritise improving farmers' quality of life by helping them access basic services.	Prioritise improving farmer's quality of life by helping them access basic services.	Prioritise protection and management of natural resources and increasing farmers' productive and commercial knowledge through training sessions.	Prioritise protection and management of natural resources.
High priority on building farmer capacities by creating/strengthening farmer organisations, funding small projects to strengthen farmers' productive strategies and integration of farmers into conventional markets.	High priority on modernisation and increasing farmers' productive and commercial knowledge through training sessions. Also prioritise creation and strengthening of farmers' organisations.	High priority to productive modernisation and providing advice to resolve farmer productive and commercial problems. Also prioritise entrepreneurial and business capacity development.	High priority on advice to solve farmers' productive and commercial problems and develop entrepreneurial and business capacity. Also prioritise increasing farmers' productive and commercial knowledge through training sessions.
<i>Preferred advisory methods: techniques, tools or mechanisms used to achieve objectives</i>			
High tendency to consider extension as involving dialogue with farmers.	High tendency to consider extension as involving dialogue with farmers.	High tendency to consider extension as involving dialogue with farmers.	High tendency to consider extension as involving dialogue with farmers.
Group methods preferred more than individual methods.	Relatively even share of respondents preferring group or individual methods.	Relatively even share of respondents preferring group or individual methods. Highest percentage preferring mass media.	Relatively even share of respondents preferring group or individual methods.
<i>Advisor positions in the advisory system: Roles assigned by respondents to the different actors in the advisory system (including themselves)</i>			
Slight tendency to view farmers as responsible for their problems, and higher tendency to view extension as participatory and demand-driven.	Highest tendency to think in terms of transfer of technologies, to view farmers as responsible for their problems, and view extension as participatory and demand-driven.	Low tendency to think in terms of transfer of technologies or to view farmers as responsible for their problems. Institutional coordination also preferred.	Lowest tendency to think in terms of transfer of technologies or to view farmers as responsible for their problems. No preference for institutional coordination.
More preferred institutional coordination.	Institutional coordination also preferred.	Tendency to take a self-critical attitude to advisory practice.	Higher tendency to take a self-critical attitude to advisory practice.
Higher tendency to take a self-critical attitude to advisory practice.	Lower tendency to take a self-critical attitude to advisory practice.		

- Participatory, farmer-led extension (4 items): Focuses on demand-driven extension and participation of farmers in the design and evaluation of extension programmes;
- Self-critical attitude (4 items): Advisors are open to peer and farmer feedback, and self-reflect on how they carry out their advisory practice.

Cronbach's Alpha was calculated for all five factors using the entire sample: (a) .87, (b) .82, (c) .75, (d) .74 and (e) .59. Usually, values under .70 are considered low. According to Argibay (2006), low Cronbach's Alpha values may be related to a low number of items (below 10 items). From his point of view, low Cronbach's Alpha values prevent using scales for individual assessments but not from studying mean group values, as in this research.

Data collection

In Argentina, the survey was sent to extension agents currently or formerly working in the INTA or the Subsecretariat of Family Farming, with the support of authorities of both institutions. In Brazil, due to limited support from national agencies, authorities of the public extension organisations of the states of Amazonas, Pernambuco and Santa Catarina sent the questionnaire to their extension agents. These states were selected to cover different extension organisations and agroecological systems. In Australia and New Zealand, the survey was sent to members of two organisations (the Australasia Pacific Extension Network [APEN], with members involved in extension or identifying with the practices of extension, and the New Zealand Institute of Primary Industry Management [NZIPIM], a professional body of advisors). In all cases the participation was voluntary and the invitation to participate was sent by an email containing a weblink to access an online survey hosted by SurveyMonkey®. Replies that were either incomplete or from advisors not based in the four studied countries were not included in the analysis. In Australia and New Zealand, to encourage participation, respondents who completed the survey and provided contact information were able to participate in a prize draw for two gift cards of NZ\$50 each.

Importantly, the total population of advisors in each country is unknown, because in each of them there are multiple advisory organisations, as well as an undetermined number of independent advisors. However, the sample is likely to be small relative to the total population. In addition, response rates cannot be calculated because it was the institutions, and not the researchers, who sent the invitation email, following internal guidelines and procedures.

The data analysed in this article are part of a larger study. Data regarding advisor objectives have also been used in a publication presenting a comparative study of advisor objectives in nine countries (Authors 2021). For this study, the focus is on findings regarding advisor understanding of their roles in the advisory system under contrasting governance contexts in four of the nine countries.

Data analysis

Data were analysed with the support of SPSS software. Non-parametric tests were used because normality and homogeneity of variances could not be assumed for most variables (after analysing them using quantile-quantile plots, and Shapiro Wilk and Levene tests). Results are discussed with the support of the analytical framework. Considering the small size of the Australian and the New Zealand samples, and the non-probability sampling procedure, results cannot be considered as representative of the total population of advisors of the four countries (Díaz de Rada 2004).

Findings

Advisor objectives

Participants were asked to choose the three most important advisory objectives from a list of ten. Figures express the percentage of participants who selected an option

among the three most important (Table 3). Results show statistically significant differences in the ten objectives among respondents from different countries.

Statistical comparisons between countries show that in eight out of the ten objectives there seems to be a clear contrast between Argentina and Brazil on the one hand, and Australia and New Zealand, on the other, which shows the existence of clear differences between both groups. Thus, objectives (4), (5), (8) and (9) are more frequently prioritised in Argentina and Brazil, while objectives (1), (6), (7) and (10) are in Australia and New Zealand. In addition, there are two objectives in which differences are not so strong or do not show a clear tendency: (2) Increasing farmers' productive and commercial knowledge through training sessions, and (3) Productive modernisation aimed at increasing productivity and profitability.

Advisory methods

Survey participants were asked to rank four methods of extension (individual, group, institutional coordination, and mass media) from most preferred to least preferred. Table 4 shows the percentage of respondents who chose each method as most preferred. In general, group and individual methods are most preferred, followed by institutional coordination.

Statistical differences were found among countries regarding preferred advisory methods. Comparisons between countries show that group methodologies are more preferred in Argentina and individual methodologies less preferred, in comparison with Australia, Brazil and New Zealand. In addition, institutional coordination is more preferred in Argentina than in Australia and Brazil, although percentages of preference are relatively low in all countries (particularly in New Zealand). Finally, no statistical differences were found regarding the importance of mass media, although Australia and New Zealand show the highest values.

Beliefs about the role of different actors in the advisory system

The Beliefs about Extension and Innovation Scale (Authors 2019) was used to study participants' understanding of the position of different actors in the advisory system. Descriptive results are presented in Table 5. Responses for each item are: 1 (strongly disagree), 2 (disagree), 3 (neither agree nor disagree), 4 (agree) and 5 (strongly agree).

Overall, results show that respondents from all countries tend to consider extension as a participatory, demand-driven process of horizontal dialogue between advisors and farmers, and of coordination among different actors, including researchers and public authorities. Advisors also tend to be self-reflective and self-critical about their practice. In addition, advisors do not have a specific or clear positioning with regards to the idea that extension is mostly about a linear process of technology transfer, and that farmers are responsible for their problems.

Statistical differences among countries were found in three out of the four analytical dimensions. Respondents from Brazil tend to support more a transfer of technologies approach, and to see farmers as responsible for their productive and commercial problems. This suggests a tendency to view their position in the advisory system as transferring knowledge to farmers as recipients. Respondents from Brazil, and to a lesser extent

Argentina, view extension as participatory and demand-driven compared to participants from Australia and New Zealand. Finally, for the dimension, self-critical attitude New Zealand and Argentine respondents show higher values, while Brazil displays the lowest.

Discussion

In [Table 6](#), the differences among respondents from the four countries are synthesised. Participants from Argentina identified objectives that are aligned with national agricultural policy goals of improving smallholder farmer livelihoods. The importance given to improving farmers' quality of life reflects the focus of extension on low-income farmers (e.g. smallholders, non-commercial farmers, family farmers), in line with public responsibility for assisting groups whose needs are less likely to be met by paid advisory services (e.g. Faure et al. 2017; Labarthe and Laurent 2013). Argentine advisors also prioritised objectives related to building farmer capacities, such as strengthening farmer organisations and integrating farmers into conventional markets. These objectives reflect national goals to address key problems faced by non-commercial farmers: scarcity of capital (e.g. infrastructure or machinery) (Carmagnani 2008) through the provision of subsidies to implement small projects, and limited access to markets (Ferrer et al. 2006) through supporting the integration of farmers into conventional markets. These priorities may also relate to advisors' emphasis on institutional coordination required to support farmers' interactions with value chain actors and other farmers, and the increasing role of public advisory organisations in coordination activities; as has been observed in other studies (Davis, Babu, and Ragasa 2020; Knierim et al. 2017; Compagnone and Simon 2018). The focus on reaching many smallholder farmers may explain why there is an emphasis on group methods involving dialogue with farmers and strengthening farmer organisations (Landini et al. 2017); these are more effective methods for reaching many farmers (Leeuwis 2008).

Participants from Brazil also show an alignment of objectives with national policy goals, in this case, productive modernisation and improving farmer quality of life. Transfer of modern technologies is a traditional goal of agricultural ministries seeking to increase agricultural production for export (Landini 2015). The prioritisation of productive modernisation may be related to advisors' emphasis on training and advising farmers to increase their productive and commercial knowledge and on technology transfer. This also aligns with the findings of Ingram (2008) who observed that when advisor's prioritised their own individual preferences they emphasised a technology transfer approach and tended to view farmers as responsible for their problems. Brazilian participants, like their Argentinian counterparts, also prioritise institutional coordination. This reflects a strong government role in coordination and financing of actors from private and NGO sectors and the reach of territorial development in Latin America (Soto Baquero, Beduschi, and Falconi 2007), which views public extension and institutional coordination as key to rural development.

The even share of Brazilian participants preferring individual and group advisory methods is counter to the marked predominance of public providers in the Brazilian sample of advisors, and their emphasis on technology transfer. Previous studies (e.g. Knierim et al. 2017; Knuth and Knierim 2013) have found that to reach more farmers, public funding and delivery of advice tend to emphasise the use of group and mass

dissemination methods. The public-good goals of these organisations also encourage them to try to reach more farmers, while commercial goals of private providers encourage these organisations to focus on personalised one-to-one advice (Knierim et al. 2017; Knuth and Knierim 2013; Faure et al. 2017; Dhiab, Labarthe, and Laurent 2020). The preference for participatory approaches of the Brazilian advisors sampled may be as these approaches are seen as a way of convincing farmers to accept technologies; as has been highlighted by Landini (2015).

Australian participants prioritise objectives that align with both national and state policy goals (protection and management of natural resources), industry (productive modernisation aimed at increasing productivity and profitability, increasing farmers' productive and commercial knowledge) and individual farmer goals (resolution of productive or commercial problems posed by farmers by means of providing advice). This is counter to previous studies in the European context that have suggested that private funding and delivery of advice tends to focus on personalised technical and economic advice (Klerkx, de Grip, and Leeuwis 2006; Knuth and Knierim 2013) to address commercial problems faced by farmer clients (Prager et al. 2016), and have been found to have a minimal role in proactive environmental extension (e.g. Botha, Coutts, and Roth 2008; Sutherland et al. 2017). Further, New Zealand and Australian farmers' strong business orientation is a driver for private advisors to provide advice and information to support production and commercial outcomes (Fielke and Bardsley 2015; Hunt et al. 2013). A possible driver for Australian advisors to prioritise national and state policy goals is that farming clients are increasingly demanding advice to respond to these, as has previously been observed by Nettle, Crawford, and Brightling (2018) and Nettle et al. (2021).

The prioritisation of industry, and national and state policy goals, as well as individual farmer goals, found in the advisors sampled, may suggest that by responding to clients' emerging challenges advisors can play a role in supporting farmers to respond to national and state policy goals by working with their clients to reconcile national, industry and farmers goals at the farm-level. This role may also explain advisors' emphasis on the use of dialogue with farmers; potentially to reflect on and reconcile these goals.

The mix of commercial and industry-aligned organisation participants may explain the even share of participants preferring individual and group advisory methods, and the combination of providing advice and training. The value given to individual (one-to-one) methods is consistent with earlier findings in the European context (e.g. Knuth and Knierim 2013; Prager et al. 2016), as in contexts where farmers are paying for advice they may expect to receive recommendations specific to their needs and farming situation, and a more personalised service. In contrast, the reasons for group methods being valued when advisory funding and delivery is privatised is less clear. This may be due to the potential for these methods to generate contributions (e.g. knowledge exchange among peers) that cannot be provided using an individual approach (Landini et al. 2017). Australian participants also emphasise institutional coordination, which may reflect the role of the RDCs in funding and facilitating public-private partnerships (Nettle et al. 2021; Nettle, Crawford, and Brightling 2018; Paschen et al. 2017). Again, this appears to reflect observations by other authors (e.g. Davis, Babu, and Ragasa 2020; Rijswijk and Brazendale 2017; Paschen et al. 2017) regarding the increasing role of public and industry advisory organisations in coordination activities.

New Zealand participants prioritise objectives that, like their Australian counterparts, align with national or state policy, (protection and management of natural resources), industry (develop entrepreneurial and business capacity) and individual farmer goals (solve farmers productive and commercial problems), and is consistent with earlier findings (Ministry for Primary Industries 2012; Hilken et al. 2018). In turn, farmers' increasing interest in advice on resource protection may be driven by increasing requirements for compliance with environmental regulations. Again, like their Australian counterparts, this mix of public, industry and farmer objectives may reflect the combination of industry and individual farmer funding of advisors, and be related to advisor emphasis on one-to-one dialogue with farmer clients to support reconciling competing goals at the farm-level.

The dominance of commercial advisors in the New Zealand sample may explain the emphasis on solving farmer productive and commercial problems and building farmer business capacity, as has previously been observed for commercial advisors (e.g. Klerkx, de Grip, and Leeuwis 2006; Knuth and Knierim 2013). This is also consistent with earlier research indicating that New Zealand's removal of public support for agriculture in the early 1990s has increased the business orientation of farmers (Hunt et al. 2013).

Overall, it appears that where there is more public advisory funding, such as Argentina and Brazil, advisors' objectives align in a more direct way with national goals, since there are fewer alternative objectives, and participatory advisory approaches are preferred. When predominantly public advisory funding couples with the prioritisation of productive modernisation, as is the case in Brazil, it appears a top-down, technology transfer approach is emphasised. The preference for participatory approaches does not contradict a technology transfer approach, rather these approaches may be used as a way of legitimising extension aims established by public policy and convincing farmers to accept technologies; as has previously been proposed by Landini (2015). Where there is greater private advisory funding, such as Australia and New Zealand, advisors' objectives appear to be a mix of industry, farmer, national or state policy, and industry goals. This balancing of goals with farmer individual needs suggests advisors play a role in reconciling multiple (and potentially completing goals) at the farm-level and may explain an emphasis on one-to-one dialogue with farmers, to achieve this balancing of goals.

Practical and policy implications

Extension and advisory services are critical to support increasing public-good provision from agriculture (Klerkx 2020). Where advisors have a tendency to transfer technologies and view farmers as responsible for their problems, e.g. Brazil for the case of productive modernisation, advisors' interactions with farmers emphasise public-good objectives externally defined in policies or by public institutions. This is a concern, considering the identified limitations of technology transfer for achieving sustainable practice change, i.e. lack of end-user involvement creates low adoption because technologies do not fit in farming systems and an enabling context for adoption is missing (Klerkx, van Mierlo, and Leeuwis 2012).

In contrast, advisors could emphasise intermediary positions in the advisory system (i.e. low tendency to think in terms of technology transfer or to view farmers as

responsible for their problems) and dialogue and institutional coordination methods that support farmers to reconcile and realise national, industry and farmer goals at the farm-level. There is evidence of this in the responses from participants in Australia and New Zealand, and to some extent in Argentina, where in the former, the public goal of protecting natural resources is prioritised along with industry goals of productive modernisation and increasing farmer entrepreneurial capacity and individual farmer goals of solving farmers productive and commercial problems.

A policy implication is that given advisor roles in reconciling national, industry and farmer goals at the farm-level, public funding of advisors is potentially needed so that advisors can engage with public authorities to understand and contribute to policies they will be supporting farmers to meet, as has previously been recommended by Paschen et al. (2017) and Klerkx et al. (2017). Historically advisors have not been sufficiently resourced to keep up-to-date with policy and develop understanding of what policies mean for their farmer clients (Knuth and Knierim 2013; Labarthe and Laurent 2013; Rijswijk and Brazendale 2017; Nettle, Crawford, and Brightling 2018). In this respect, we therefore support recommendations from Klerkx et al. (2017) that commercial advisors can contribute to public-good provision when the governance context provides a combination of strong public policy on environmental impacts of farming, coupled with policies encouraging public-private partnerships.

Another policy implication is the opportunity to publicly fund private advisor participation, via public (both advisory and research) and farmer-based or industry organisations, to increase their role in institutional coordination (e.g. Knierim et al. 2017; Compagnone and Simon 2018; Paschen et al. 2017), including participation in jointly setting priorities and public-private-third sector partnerships (e.g. Davis, Babu, and Ragasa 2020; Paschen et al. 2017), and development of common good resources for delivery by both public and private advisory services (e.g. Compagnone and Simon 2018).

Theoretical implications

Findings from this study suggest that advisor understanding of their roles are related to the advisory governance context in which they operate, as has previously been observed by Paschen et al. (2017). Earlier research has tended to conceptualise private advisory services as operating independent of public governance and thus prioritising individual farmer interests and advisory methods to meet these interests (e.g. Knierim et al. 2017; Prager et al. 2016; Labarthe and Laurent 2013). For example, Ingram (2008) observed that advisor's own individual preferences played a strong role in the objectives they prioritised with farmers, particularly when advisors emphasised a technology transfer approach. Sutherland et al. (2017) observed that private advisors in Europe reconciled public and farmer goals by supporting their farmer clients to access government grants to encourage farmer provision of environmental outcomes, though with a focus on farmers' economic interests rather than meeting the public-good aims of the grants. Thus, advisor's individual or farmer commercial goals were emphasised over, rather than reconciled with, public-good or industry-good goals.

However, we found that advisors operating under private funding and delivery of advisory services have the potential to respond to national and state policy and industry goals, as well as farmer goals, by emphasising advisors' intermediary position in the

advisory system and using dialogue and coordination methods that support farmers in reconciling competing goals at the farm-level. This suggests that advisors reorientate their methods and positions in the advisory system to balance public and private goals in their advisory governance context. This emphasises the importance of situating individual perspectives on advisory objectives and practices within the advisory system governance context (e.g. Davis, Babu, and Ragasa 2020; Klerkx et al. 2017; Paschen et al. 2017; Minh et al. 2014), using frameworks that combine these individual and systems perspectives (e.g. Birner et al. 2009; Prager, Creaney, and Lorenzo-Arribas 2017).

Study limitations

It is important to clarify the limitations of this research. Australian and New Zealand sample sizes are smaller than desired. Larger sample sizes could have helped to identify additional differences between countries and provided the opportunity to use the data to develop a typology of advisor roles or styles (e.g. Ingram 2008; Landini 2015). Additionally, the gender imbalance among samples and that most New Zealand respondents come from a specific professional body (NZIPIM) are also sources of concern, because they could have biased results. For example, results from Australia (with a higher percentage of women) could be expressing women's advisory style instead of a country one, and the results from New Zealand reflecting a profile characteristic of the NZIPIM, and not of the country as a whole.

Finally, this article compared advisor understanding of roles in different advisory governance contexts, although mainly privatised or with strong public extension governance. In the first case, most participants were from the private sector or were working as independent advisors, while in the second most worked for the government. It is possible that differences found are more linked to the advisors' position and organisation they work for, and not to the advisory system they were part of. The small sample size of Australia and New Zealand prevented the opportunity to address this limitation. Future research could create a larger sample with a balance of respondents working in the private and public advisory services to systematically test for differences due to organisational focus compared with advisory governance.

Conclusions

In this article, we studied differences in advisors' understanding of their roles in countries with different mixes of public and private funding and delivery. In all governance contexts, advisor priorities reflect national or state policy goals. Where there is stronger private funding and delivery, advisors appear to work to reconcile these public goals with industry-good and farmer commercial goals. This suggests that private advisors can play a role in reconciling national, industry and farmer interests at the farm-level. This potentially explains these advisors' emphasis on dialogue with their clients to reconcile these interests. Where there is strong public funding and delivery of extension, group methods and capacity building are emphasised to reach many farmers and meet public policy goals. In three of the four countries, there is evidence of advisors prioritising institutional coordination, reflecting increasing calls for public and farmer-based

organisations to increase their role in coordination to reduce duplication of effort, contradictory messages, and weak service delivery in pluralistic advisory systems.

A practical implication of findings is that as agricultural extension is critical to support public-good provision from agriculture, advisors increasingly need to emphasise intermediary positions in the advisory system and the use of dialogue and coordination methods that support farmers to reconcile and realise national, state, industry and individual goals at the farm-level. A policy implication is the need for a combination of strong public policy on public-good provision from agriculture, coupled with policies encouraging public-private partnerships, to support advisors in their intermediary role.

A theoretical implication of findings from this study combining a systems perspective of country-level advisory system governance with an individual perspective of advisor roles highlights that advisor understanding of their roles is related to the advisory governance context in which they operate, particularly the national policy and industry goals. This suggests that advisors reorientate their methods and positions in the advisory system to meet the need to balance public and private (industry and individual farmer) goals in their advisory governance context. This emphasises the importance of situating individual perspectives on advisory objectives and practices within the advisory system governance context using frameworks that combine these individual and systems perspectives.

Finally, the focus of this study was on advisors' understanding of their roles in the advisory system in different country advisory governance contexts. It would be informative to explore advisor understanding of their roles in different countries in relation to the type of advisory organisation they work in to ascertain the influence of organisation type as well as national governance context.

Acknowledgements

The authors thank the different extension and professional institutions that supported the research by helping to access the participants: the Instituto Nacional de Tecnología Agropecuaria and the Subsecretaría de Agricultura Familiar (Argentina), the Australasian Pacific Extension Network (Australia and New Zealand), the New Zealand Institute of Primary Industry Management, and the Instituto Agronômico de Pernambuco, the Instituto de Desenvolvimento Agropecuário e Florestal Sustentável do Estado do Amazonas, and the Empresa de Pesquisa Agropecuária e Extensão Rural de Santa Catarina (Brazil). Thank you to Penny Payne, Margaret Brown, and three anonymous referees for their critical and constructive review of earlier drafts of this paper. The paper was also greatly improved through discussions with participants at the 24th European Seminar on Extension and Education, Acireale, Italy; particularly with Prof Ruth Nettle of Melbourne University.

Disclosure statement

No potential conflict of interest was reported by the author(s).

Funding

This work was supported by the University of La Cuenca del Plata (Argentina) and the Global Forum for Rural Advisory Services (GFRAS), which contributed to the development of the Likert-Type Scale and to the application of the complete questionnaire in different countries

and regions. In Brazil this research was supported by the Federal University of Amazonas (Brazil), and in New Zealand by the Adoption and Practice Change programme at AgResearch, which was funded through the Strategic Science Investment Fund.

Notes on contributors

Dr James A. Turner is a Senior Social Scientist at the Crown Research Institute AgResearch in New Zealand. He holds a PhD in Forest Economics from the University of Wisconsin-Madison and a Post-graduate Diploma in Development Studies. He studies agricultural research and extension from an innovation systems perspective.

Dr Fernando Landini is a professor at the University of La Cuenca del Plata, and a researcher of the National Scientific and Technical Research Council (CONICET), Argentina. He holds a PhD in Psychology and a Master's degree in Rural development. He studies rural extension and agricultural innovation processes from a psychosocial perspective.

Helen Percy is a Strategy Leader and Senior Researcher in the area of practice change. She has a background working at the interface between science and extension in the horticultural industry, the Ministry for Primary Industries, and for the past 9 years at AgResearch New Zealand. She leads work on the uptake of research to create impact.

Marcos Gregolin is a Technologist in Agribusiness (2021) and in Cooperative Management (2017), Bachelor in Social Communication, with specialization in Advertising and Marketing (2006); Master in Sustainable Rural Development (2015) and Doctoral Student in Rural Extension at the Santa Maria Federal University - UFSM. He works in rural extension focused on economic organizations of family farmers, aiming at their integration with markets. Academically, he is interested in research on rural extension, rural communication and cooperatives.

ORCID

Fernando Landini  <http://orcid.org/0000-0002-5322-2921>

References

- Argibay, J. 2006. "Técnicas Psicométricas, Cuestiones de Validez y Confiabilidad." *Subjetividad y Procesos Cognitivos* 8: 15–33.
- Birner, R., K. Davis, J. Pender, E. Nkonya, P. Anandajayasekeram, J. Ekboir, A. Mbabu, D. Spielman, D. Horna, and S. Benin. 2009. "From Best Practice to Best Fit: A Framework for Designing and Analyzing Pluralistic Agricultural Advisory Services Worldwide." *Journal of Agricultural Education and Extension* 15 (4): 341–355. doi:10.1080/13892240903309595.
- Botha, N., J. Coutts, and H. Roth. 2008. "The Role of Agricultural Consultants in New Zealand in Environmental Extension." *Journal of Agricultural Education and Extension* 14 (2): 125–138. doi:10.1080/13892240802019147.
- Carmagnani, M. 2008. "La Agricultura Familiar en América Latina." *Problemas del Desarrollo* 39 (153): 11–56.
- Cerf, M., L. Bail, J. Lusson, and B. Omon. 2017. "Contrasting Intermediation Practices in Various Advisory Service Networks in the Case of the French Ecophyto Plan." *Journal of Agricultural Education and Extension* 23 (3): 231–244. doi:10.1080/1389224X.2017.1320641.
- Compagnone, C., and B. Simon. 2018. "Cooperation and Competition Among Agricultural Advisory Service Providers. The Case of Pesticides Use." *Journal of Rural Studies* 59: 10–20. doi:10.1016/j.jrurstud.2018.01.006.
- Davis, K., S. Babu, and C. Ragasa. 2020. *Agricultural Extension: Global Status and Performance in Selected Countries*. Washington, DC: International Food Policy Research Institute.

- Davis, K., F. Landini, J. Van Niekerk, K. Green, and Stephanus Esaias Terblanche. 2019. "Extension Officers' Perceptions of Extension and Innovation in South Africa." *South African Journal of Agricultural Extension* 47 (4): 152–161.
- Davis, K., and R. Sulaiman. 2014. "The "New Extensionist": Roles, Strategies, and Capacities to Strengthen Extension and Advisory Services." *Journal of International Agricultural and Extension Education* 21 (3): 6–18. doi:10.5191/jiaee.2014.21301.
- Dhiab, H., P. Labarthe, and C. Laurent. 2020. "How the Performance Rationales of Organisations Providing Farm Advice Explain Persistent Difficulties in Addressing Societal Goals in Agriculture." *Food Policy* 95. doi:10.1016/j.foodpol.2020.101914.
- Díaz de Rada, V. 2004. "Problemas de Representatividad en las Encuestas con Muestreos Probabilísticos." *Papers. Revista de Sociologia* 74: 45–66.
- Diesel, V., J. Froehlich, P. Neumann, and P. Cardoso da Silveira. 2008. "Privatização dos Serviços de Extensão Rural: uma Discussão (des) Necessária?" *Revista de Economia e Sociologia Rural* 46 (4): 1155–1188.
- Diesel, V., P. Neumann, and V. Sa. 2012. *Extensão Rural no Contexto do Pluralismo Institucional: Reflexões a partir dos serviços de Ates aos assentamentos da reforma agrária no RS*. Ijuí: Ed. Unijuí.
- Eastwood, C., L. Klerkx, and R. Nettle. 2017. "Dynamics and Distribution of Public and Private Research and Extension Roles for Technological Innovation and Diffusion: Case Studies of the Implementation and Adaptation of Precision Farming Technologies." *Journal of Rural Studies* 49: 1–12. doi:10.1016/j.jrurstud.2016.11.008.
- Faure, G., M. Huamanyauri, I. Salazar, C. Gómez, E. de Nys, and M. Dulcire. 2017. "Privatisation of Agricultural Advisory Services and Consequences for the Dairy Farmers in the Mantaro Valley, Peru." *Journal of Agricultural Education and Extension* 23 (3): 197–211. doi:10.1080/1389224X.2017.1320639.
- Ferrer, G., F. Silvetti, D. Cáceres, and G. Soto. 2006. "Análisis de dos Iniciativas Agroindustriales Vinculadas con la Capricultura en Córdoba (Argentina)." *Agroalimentaria* 11 (23): 71–83.
- Fielke, S., and D. Bardsley. 2015. "Regional Agricultural Governance in Peri-Urban and Rural South Australia: Strategies to Improve Multifunctionality." *Sustainability Science* 10 (2): 231–243. doi:10.1007/s11625-014-0272-6.
- Gboko, K., G. Faure, and F. Ruf. 2020. "Does Privatizing Advisory Services Guarantee Better Services? Evidence from Advisory Services Pertaining to Cocoa Certification in Côte D'Ivoire." *Journal of Agricultural Education and Extension*. doi:10.1080/1389224X.2020.1851269.
- Hall, M., and D. Kuiper. 1998. "Commercialization and Privatization of Agricultural Extension: The New Zealand Experience." *Journal of Production Agriculture* 11 (1): 135–140.
- Hilkens, A., J. Reid, L. Klerkx, and D. Gray. 2018. "Money Talk: How Relations Between Farmers and Advisors Around Financial Management are Shaped." *Journal of Rural Studies* 63: 83–95. doi:10.1016/j.jrurstud.2018.09.002.
- Höckert, J., and M. Ljung. 2013. "Advisory Encounters Towards a Sustainable Farm Development-Interaction Between Systems and Shared Lifeworlds." *Journal of Agricultural Education and Extension* 19 (3): 291–309. doi:10.1080/1389224X.2013.782178.
- Hunt, W., C. Birch, J. Coutts, and F. Vanclay. 2012. "The Many Turnings of Agricultural Extension in Australia." *Journal of Agricultural Education and Extension* 18 (1): 9–26. doi:10.1080/1389224X.2012.638780.
- Hunt, L., C. Rosin, H. Campbell, and J. Fairweather. 2013. "The Impact of Neoliberalism on New Zealand Farmers: Changing What it Means to be a Good Farmer." *Extension Farming Systems Journal* 9 (1): 34.
- 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 (3): 405–418. doi:10.1007/s10460-008-9134-0.
- Kamara, L., F. Van Hulst, and P. Dorward. 2020. "Using Improved Understanding of Research and Extension Professionals' Attitudes and Beliefs to Inform Design of AIS Approaches." *The Journal of Agricultural Education and Extension*, 1–18. doi:10.1080/1389224X.2020.1828114.

- Klerkx, L. 2020. "Advisory Services and Transformation, Plurality and Disruption of Agriculture and Food Systems: Towards a New Research Agenda for Agricultural Education and Extension Studies." *Journal of Agricultural Education and Extension* 26 (2): 131–140. doi:10.1080/1389224X.2020.1738046.
- Klerkx, L., K. de Grip, and C. Leeuwis. 2006. "Hands Off but Strings Attached: The Contradictions of Policy-Induced Demand-Driven Agricultural Extension." *Agriculture and Human Values* 23 (2): 189–204. doi:10.1007/s10460-005-6106-5.
- Klerkx, L., F. Landini, and H. Santoyo-Cortés. 2016. "Agricultural Extension in Latin America: Current Dynamics of Pluralistic Advisory Systems in Heterogeneous Contexts." *Journal of Agricultural Education and Extension* 22 (5): 389–397. doi:10.1080/1389224X.2016.1227044.
- Klerkx, L., E. Petter Stræte, G. T. Kvam, E. Ystad, and R. M. Butli Hårstad. 2017. "Achieving Best-Fit Configurations Through Advisory Subsystems in AKIS: Case Studies of Advisory Service Provisioning for Diverse Types of Farmers in Norway." *Journal of Agricultural Education and Extension* 23 (3): 213–229. doi:10.1080/1389224X.2017.1320640.
- Klerkx, L., and A. Proctor. 2013. "Beyond Fragmentation and Disconnect: Networks for Knowledge Exchange in the English Land Management Advisory System." *Land Use Policy* 30 (1): 13–24. doi:10.1016/j.landusepol.2012.02.003.
- Klerkx, L., B. van Mierlo, and C. Leeuwis. 2012. "Evolution of Systems Approaches to Agricultural Innovation: Concepts, Analysis and Interventions." In *Farming Systems Research into the 21st Century: The New Dynamic*, edited by Ika Darnhofer, David Gibbon, and Benoit Dedieu, 457–483. Dordrecht: Springer.
- Knierim, A., P. Labarthe, C. Laurent, K. Prager, J. Kania, L. Madureira, and T. Ndah. 2017. "Pluralism of Agricultural Advisory Service Providers – Facts and Insights from Europe." *Journal of Rural Studies* 55: 45–58. doi:10.1016/j.jrurstud.2017.07.018.
- Knuth, U., and A. Knierim. 2013. "Characteristics of and Challenges for Advisors Within a Privatized Extension System." *Journal of Agricultural Education and Extension* 19 (3): 223–236. doi:10.1080/1389224X.2013.782166.
- Labarthe, P., and C. Laurent. 2013. "Privatization of Agricultural Extension Services in the EU: Towards a Lack of Adequate Knowledge for Small-Scale Farms?" *Food Policy* 38: 240–252. doi:10.1016/j.foodpol.2012.10.005.
- Landini, F. 2013. "Perfil de los Extensionistas Rurales Argentinos del Sistema Público." *Mundo Agrario* 14: 27.
- Landini, F. 2015. "Different Argentine Rural Extensionists' Mindsets and Their Practical Implications." *Journal of Agricultural Education and Extension* 21 (3): 219–234. doi:10.1080/1389224X.2014.927375.
- Landini, F. 2016. "Concepción de Extensión Rural en 10 Países Latinoamericanos." *Andamios* 13 (30): 211–236.
- Landini, F., and M. Beramendi. 2019. "Construction and Validation of a Psychometric Scale to Assess Extension Agents' Beliefs about Extension and Innovation." *Journal of Agricultural Education and Extension* 25 (5): 381–99. doi:10.1080/1389224X.2019.1643748.
- Landini, F., James A Turner, Kristin Davis, Helen Percy, and Johan Van Niekerk. 2021. "International Comparison of Extension Agent Objectives and Construction of a Typology." *The Journal of Agricultural Education and Extension*. 1–23. doi:10.1080/1389224X.2021.1936091.
- Landini, F., G. Vargas, V. Bianqui, M. Mathot y Rebolé, and M. Martínez. 2017. "Contributions to Group Work and to the Management of Collective Processes in Extension and Rural Development." *Journal of Rural Studies* 56: 143–155. doi:10.1016/j.jrurstud.2017.09.014.
- Leeuwis, C. 2008. *Communication for Rural Innovation: Rethinking Agricultural Extension*. Oxford: John Wiley & Sons.
- Minh, T., R. Friederichsen, A. Neef, and V. Hoffmann. 2014. "Niche Action and System Harmonization for Institutional Change: Prospects for Demand-Driven Agricultural Extension in Vietnam." *Journal of Rural Studies* 36 (0): 273–284. doi:10.1016/j.jrurstud.2014.09.008.

- Ministry for Primary Industries. 2012. *Survey of Technology Transfer Services to Farmers and Growers in New Zealand*. Wellington: Ministry for Primary Industries.
- Nettle, R., A. Crawford, and P. Brightling. 2018. "How Private-Sector Farm Advisors Change Their Practices: An Australian Case Study." *Journal of Rural Studies* 58: 20–27. doi:10.1016/j.jrurstud.2017.12.027.
- Nettle, R., L. Klerkx, G. Faure, and A. Koutsouris. 2017. "Governance Dynamics and the Quest for Coordination in Pluralistic Agricultural Advisory Systems." *Journal of Agricultural Education and Extension* 23 (3): 189–195. doi:10.1080/1389224X.2017.1320638.
- Nettle, R., J. Morton, N. McDonald, M. Suryana, D. Birch, K. Nyengo, M. Mbuli, et al. 2021. "Factors Associated with Farmers' Use of Fee-for-Service Advisors in a Privatized Agricultural Extension System." *Land Use Policy* 104. doi:10.1016/j.landusepol.2021.105360.
- Paschen, J., N. Reichelt, B. King, M. Ayre, and R. Nettle. 2017. "Enrolling Advisers in Governing Privatised Agricultural Extension in Australia: Challenges and Opportunities for the Research, Development and Extension System." *The Journal of Agricultural Education and Extension* 23 (3): 265–282. doi:10.1080/1389224X.2017.1320642.
- Prager, K., R. Creaney, and A. Lorenzo-Arribas. 2017. "Criteria for a System Level Evaluation of Farm Advisory Services." *Land Use Policy* 61: 86–98. doi:10.1016/j.landusepol.2016.11.003.
- Prager, K., P. Labarthe, M. Caggiano, and A. Lorenzo-Arribas. 2016. "How Does Commercialisation Impact on the Provision of Farm Advisory Services? Evidence from Belgium, Italy, Ireland and the UK." *Land Use Policy* 52: 329–344. doi:10.1016/j.landusepol.2015.12.024.
- Rijswijk, K., and R. Brazendale. 2017. "Innovation Networks to Stimulate Public and Private Sector Collaboration for Advisory Services Innovation and Coordination: The Case of Pasture Performance Issues in the New Zealand Dairy Industry." *Journal of Agricultural Education and Extension* 23 (3): 245–263. doi:10.1080/1389224X.2017.1320643.
- Rusticus, S., and C. Lovato. 2014. "Impact of Sample Size and Variability on the Power and Type I Error Rates of Equivalence Tests: A Simulation Study." *Practical Assessment, Research and Evaluation* 19 (11): 1–10.
- Santos, J., and M. Clegg. 1999. "Factor Analysis Adds New Dimension to Extension Surveys." *Journal of Extension* 37 (5): 99–106.
- Soto Baquero, F., L. Beduschi, and C. Falconi. 2007. *Desarrollo Territorial Rural: Análisis de Experiencias en Brasil*. Santiago de Chile: FAO/BID.
- Sulaiman, R., and K. Davis. 2012. *The "New Extensionist": Roles, Strategies, and Capacities to Strengthen Extension and Advisory Services*. Lindau: Global Forum for Rural Advisory Services.
- Sutherland, L. A., L. Madureira, V. Dirimanova, M. Bogusz, J. Kania, K. Vinohradnik, R. Creaney, D. Duckett, T. Koehnen, and A. Knierim. 2017. "New Knowledge Networks of Small-Scale Farmers in Europe's Periphery." *Land Use Policy* 63: 428–439. doi:10.1016/j.landusepol.2017.01.028.
- Tort, M. 2008. "Enfoques de la Extensión Rural. En Nuestro Agro: ¿Evolución, Complementación u Oposición." In *Pasado y Presente en el Agro Argentino*, edited by J. Balsa, G. Mateo, and M. Ospital, 429–450. Buenos Aires: Lumiere.
- Turner, J., L. Klerkx, K. Rijswijk, T. Williams, and T. Barnard. 2016. "Systemic Problems Affecting Co-Innovation in the New Zealand Agricultural Innovation System: Identification of Blocking Mechanisms and Underlying Institutional Logics." *NJAS – Wageningen Journal of Life Sciences* 76: 99–112. doi:10.1016/j.njas.2015.12.001.
- Zhou, Y., and S. Babu. 2015. *Knowledge Driven Development: Private Extension and Global Lessons*. Washington, DC: Academic Press.

Annex: Research instrument

As mentioned, the items of the Likert-type scale are published in Authors (2019). The rest of the research instrument is below.

Preferred extension methods. Put the following options into order, starting from the one you prefer most to the one you prefer least in your work as an advisor/extensionist. Use the number 1 to indicate the one you prefer most, 2 for the next one, and so on until number 4. Keep in mind that the same number cannot be used twice

Working with individual farmers (or with individual farmers and their families).

Working with groups of farmers or with farmers' organisations.

Inter-institutional or inter-actor articulation or coordination work.

Work with mass media (diffusion of productive techniques or of information through media such as radio, mobile phones, internet, social networks, television or other similar mediums). This option should not be taken into consideration when mobile phones, radios or the internet is used to communicate with individual farmers, groups, or farmers' organisations with whom you work face-to-face.

Advisory/extension objectives. In the following list, put a tick next to the 3 most important rural extension objectives, from your point of view. Keep in mind that we are asking for the objectives you consider to be the most important, which could differ from those of the institution or company where you work.

Productive modernisation aimed at increasing productivity and profitability.

Improving farmers' quality of life by helping them to have access to basic services.

Integrating farmers into commercial chains and supporting the commercialisation of their products in conventional markets.

Developing entrepreneurial and business capacity.

Creation and strengthening of farmer organisations.

Strengthening of farmers' productive strategies and livelihoods through the funding of small productive projects.

Protection and management of natural resources.

Increasing farmers' productive and commercial knowledge through training sessions.

Resolution of productive or commercial problems posed by farmers by means of providing advice.

Provision of information regarding prices or climate in order for it to be used for decision making.
