International comparison of extension agent objectives and construction of a typology

Landini, F., Turner, J. A., Davis, K., Percy, H., & Van Niekerk, J. (2022). International comparison of extension agent objectives and construction of a typology. The Journal of Agricultural Education and Extension. https://doi.org/10.1080/1389224X.2021.1936091

Purpose: To analyse and compare the extension objectives of individual extension agents across nine countries.

Design/methodology/approach: Extension agents from Argentina, Australia, Brazil, Chile, Mexico, New Zealand, Nigeria, Paraguay, and South Africa were surveyed using convenience sampling (n=2707). A typology of extension agents with different profiles of objectives was built using data from five of the countries.

Findings: The most frequent individual extension objectives were to increase farmers' knowledge through training, and productive modernisation of farms. Four types of extension agents were identified: the socially-engaged extension agent; the agricultural production and business expert; the trainer of subsistence farmers, and the pro-poor practitioner.

Practical implications: Researchers can use these results to analyse specific institutional settings, and extension institutions to reflect on the type of extension agent that best fit their institutional goals and to select practitioners accordingly.

Theoretical implications: Productive modernisation persists as a fundamental individual extension objective in many countries. Individual extension objectives are not stand-alone preferences but clusters of interrelated priorities, which do not necessarily coincide with those of extension institutions or national policies. Practitioners' agency plays a key role in realising (or not) a fit between extension service offerings and demand for extension services, and contributes to a wider repertoire of advisory styles in extension systems than implied by extension institutional objectives.

Originality/value: This research adds to the literature by examining individual extension agents, rather than the institutional extension objectives, and providing a typology of agents with different profiles of objectives.

Keywords: extension agents, advisory services, extension objectives, goals, typology, agency.

Introduction

New challenges in agricultural development require that agricultural extension systems go beyond their traditional role of transferring technologies and knowledge for increased production and productivity to include many other objectives (Davis and Sulaiman 2014). Agricultural extension and advisory services are complex (Christoplos 2010; Davis and Sulaiman 2014), encompassing multiple and diverse activities and practices, including productive, organisational, commercial (Bianqui et al., 2015), environmental (Botha, Coutts, and Roth 2008), management (Nettle, Crawford, and Brightling 2018) and financial (Hilkens et al. 2018) advice and support to farmers and other actors in agri-food systems and rural development (Christoplos 2010).

When studying these diverse practices, four dimensions of extension can be differentiated: goals, objectives, approaches, and tools. Extension starts with **goals** (measurable end results) that are based on worldviews or development paradigms (Davis and Sulaiman 2016). **Objectives** are a means to reach a goal (Davis and Sulaiman 2014). For example, Swanson and Rajalahti (2010) discuss the relationship between national development goals and extension objectives. Development goals may be maintaining national food security and improving rural livelihoods. Under the food security goal, extension objectives may include transferring agricultural technologies to increase productivity of primary food crops and training farmers to use sustainable natural resource management practices. Under improving rural livelihoods, objectives may be to increase farm income by producing high-value products and organise farmers into groups to increase market access.

Interestingly, within this perspective, goals and objectives express different logical levels of ends or outcomes. Goals tend to refer more to general, political, or programmatic ends, while objectives are more concrete and practice oriented. However,

to name a specific end or outcome as an objective or as a goal may depend on the context, as well as the perspective or the institutional role of who is characterising it as such. Thus, despite the existence of conceptual differences between both notions, what is a goal for a specific respondent may be described as an objective by another.

Approaches are the models of extension used to achieve objectives and realise goals. Davis and Sulaiman (2016) discuss the evolution of extension approaches including transfer of technology (also described as top-down), farming systems research and extension (also referred to as "participatory"), agricultural knowledge and information systems (AKIS), and agricultural innovation systems (AIS). **Tools** are the specific means of implementing these extension approaches, with examples of tools including mass media, demonstration farms, farmer field schools, innovation platforms, and the training and visit system (Davis and Sulaiman 2016; Famuyiwa, Olaniyi, and Adesoji 2017).

There is a substantial body of academic and institutional literature that identifies, describes, and highlights multiple extension objectives, a sample of which is presented in Table 1. In some cases, these objectives are argued in general and even in a normative way (the 'objectives of extension'), while in others they are described as the objectives of specific extension institutions. Objectives also differ depending on the type of institution (public, private, third sector) (Davis and Sulaiman 2014; Dhiab, Labarthe, and Laurent 2020; Knierim et al. 2017; Minh et al. 2014; Prager et al. 2016).

Table 1: Summary of goals and extension objectives identified from a sample of references

Goal	Objective	Reference
Food security	Transfer agricultural technologies to increase productivity	Swanson and Rajalahti (2010); Zwane and Davis (2017)
	Train farmers to use sustainable practices	
Rural livelihoods	Increase farm income by producing high value products	Swanson and Rajalahti (2010); Zwane and Davis (2017)
	Organise farmers into groups	
	Human capacity development	Albore (2018)
Sustainable agricultural development	Provision of relevant and current information to producers	Baloch and Thapa (2019); Ingram (2008)
	Dissemination of skills, knowledge and modern technologies	Habtom (2019)
	Improve women's access to extension	Akter et al. (2020)
	Human capacity development	Albore (2018)
	Ensure participation of stakeholders in development	Habtom (2019)
Production and productivity via new practices, techniques and products	Provision of relevant and current information to producers	Chowdhury, Hambly Odame, and Leeuwis (2014); Simpson and Calitz (2015); Swanson and Rajalahti (2010); Zwane and Davis (2017)
	Human capacity development	Albore (2018)
	Generate, promote and disseminate agricultural technology and knowledge	Chowdhury, Hambly Odame, and Leeuwis (2014); Habtom (2019)
Pro-poor economic growth		Zwane and Davis (2017)
Market access	Knowledge brokering	Habtom (2019); Klerkx, Schut, Leeuwis, and Kilelu (2012) Minh et al. (2014); Swanson and Rajalahti (2010)
Biodiversity conservation	Promote ecological agriculture	Abdu-Raheem (2014)

In contrast to this large body of literature on national and institutional extension objectives (Table 1), relatively few articles address the objectives that individual extension agents focus on, in other words what individual extension agents aim to achieve instead of what 'extension' in general, or extension institutions in particular, seek to achieve (Landini 2016a). Certainly, there has been very little international comparison regarding the objectives of individual extension agents (Klerkx, 2020); which is what this paper seeks to address.

Why is it relevant to understand the objectives that individual extension agents and advisors aim to achieve? Extension and advisory work is comprised of a set of complex professional practices (Christoplos 2010; Davis and Sulaiman 2014). Good extension work, as for other complex practices, is not about following a blueprint or always repeating the same activities and strategies, but about reacting appropriately and reflectively to a diversity of problems in different contexts (Schön 1983). Thus, extension requires extension agents to have capacity to act independently and to make choices to respond to different contexts, that is agency, to be effective (Minh et al. 2014). Long (2001) argues that those who implement development interventions (e.g. extension agents as part of different projects) do not put them into practice in a direct and unreflective manner, but reshape and adjust them to their preferences, interests, and values.

This is reflected in research showing that extension agents can, and frequently do, use their agency to reorganise how they conduct extension activities in the field following their own understanding of extension, and their own objectives and priorities (Abdu-Raheem 2014; Chowdhury, Hambly Odame, and Leeuwis 2014; Ingram 2008; Klerkx and Jansen 2010; Mahon, Farrell, and McDonagh 2010), including at times beyond, and even in contradiction to, what is expected by their institutions or by public authorities. For example, Chowdhury, Hambly Odame, and Leeuwis (2014) observed that in

Bangladesh extension agents identified their objective as being more about transferring information, and less about facilitating knowledge exchange among farmers and other actors. The authors argued, as have others (Rwamigisa et al. 2018; Kamara, van Hulst, and Dorward 2020), that for new extension approaches to be implemented, changes in individual extension agent attitudes and beliefs are required. Along similar lines, Mahon, Farrell, and McDonagh (2010) highlighted that extension agents in Ireland continued to aim at transferring technologies and skills to farmers, even in the context of a new programme characterised by a participatory framing. The authors concluded that extension agents had considerable power within their extension institution, which enabled them to subvert the programme's implementation. Other examples show that extension agents may not support the aims of new practices. For instance, Ingram (2008) found influential 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.

In this introduction we have shown that extension can have different objectives. However, it is apparent that academic literature tends to focus on the analysis of either the objectives of extension in general, usually from a normative perspective, or the objectives of specific institutions in the context of case studies. In contrast, less attention has been given to the objectives extension agents themselves prioritise, even though their values and beliefs have the potential to shape on-the-ground extension practices, which are potentially counter to institutional and national objectives. This paper aims to address this knowledge gap by describing, analysing, and comparing the objectives of individual extension agents in nine different countries.

Determinants of extension objectives and their connection with the fit between offer and demand of extension services

In order to theoretically frame our analysis, we assume that the practices of individual extension agents are not only shaped by their agency (including their own objectives, priorities, and values), but also by different socio-political and institutional processes (Landini et al. 2014). In our case, we consider that the objectives extension agents aim to achieve in their practices are shaped by their own priorities, the type of organisation they are part of, farmer characteristics and demands, and public regulations and incentives.

We have previously shown that extension agents may conduct extension activities in the field and aim to achieve specific objectives based on their beliefs and priorities, even when this differs from what is expected or recommended by their institutions and public authorities. However, it is also true that different types of extension and advisory organisations (public, private, non-governmental [NGO] or farmer-based organisations [FBO]) have their own objectives and performance rationale (Dhiab, Labarthe, and Laurent, 2020). Prager et al. (2016) have argued that private extension organisations in different European countries, in contrast to public ones, tend to provide a more personalised service, to prioritise affluent farmers, and to be less responsive to public interest. On the other hand, public extension organisations and NGOs tend to target agricultural producer groups. Along these lines, other authors have highlighted that advisory services aimed at environmental care, food security and other public goods, tend to be suboptimal in privatised extension systems (Klerkx and Jansen 2010), and that institutions receiving public funding are more likely to deliver services in accordance with public policy priorities (Dhiab, Labarthe, and Laurent 2020). Interestingly, despite acknowledging the diversity of advisory service providers' objectives, Faure, Desjeux, and Gasselin (2012) highlight that "the personal characteristics of individual advisors also

play an important role in explaining the diversity of the interactions between advisors and farmers" (p. 473). This reiterates that the type of extension institution does not solely determine individual extension agent priorities, and that the perspectives, values, beliefs, and priorities of extension agents also have to be considered.

In addition, farmer demands of advisory services may shape extension agents' practices and objectives, particularly in the context of demand-driven or farmer-led extension systems (Birner and Anderson 2007), or when extension services are commercialised (Prager et al. 2016).

Finally, public policies, regulations, and incentives also influence extension practices and objectives. As different authors show (e.g. Dhiab, Labarthe, and Laurent 2020; Klerkx et al. 2017), public funding of private and other non-government advisory organisations can support delivery of extension for public good objectives by private commercial providers. Furthermore, governments can also offer training (Klerkx et al. 2017) or even require certification (Borz et al. 2018) in areas that are considered of public interest and in which commercial entities are not expected to invest.

This reflection on the objectives of extension, their determinants, and the key role played by the practitioners' own agency connects with discussions on the fit between extension demand and offers by advisory services at the micro-level of interaction (Landini 2016b), and even on the farmers' individual or personal configurations of support networks understood as micro-agricultural knowledge and innovation systems (micro AKIS) (Cofré-Bravo, Klerkx, and Engler 2019; Klerkx et al. 2017). The idea of extension agents having their own 'agenda' as consequence of their agency (in this case, having their own extension objectives and priorities) suggests that extension agents are not all the same but have different personal profiles (Faure, Desjeux, and Gasselin 2012) or advisory styles (Ingram 2008; Landini 2015) to carry out their daily work. Thus, it is

apparent that identifying practitioners' extension objectives and building a typology of extension agents based on these objectives will help us to understand their advisory practices and styles, the construction of extension service offerings at the micro-level of personal interaction, and their fit with farmer demands.

Methodology

A cross-sectional study was conducted, using a questionnaire to collect socio-demographic information such as age, gender, experience as an extension agent and educational level, and quantitative data about extension practice and approach. The type of institution (e.g. public, private or other) extension agents work for was also asked. However, this information is not included because of inconsistencies in the answers , possibly because of complex and diverse contracting and financing schemes of extension activities in the different countries. For example, extension agents being publicly funded to work with specific farmer organisations, or even being paid in part by the government and in part by the farmer organisations. A convenience sampling method was used (Etikan, Musa, and Alkassim, 2016), since research participants were selected based on their accessibility and willingness to participate, rather than through random selection.

Table 2 presents the characteristics of the sample. It only includes participants who responded to the part of the questionnaire where extension objectives were addressed. For calculating the mean experience, those who had 'less than 1 year of experience' as extension agents or advisors were considered as having 0.5 years. In addition, since country sample sizes were unbalanced, each country was given the same weighting when calculating means for the complete sample (last row) in order to give the combined mean of the nine countries rather than the arithmetical mean.

Table 2. Socio-demographic characteristics of the participants

Country	n	Gender (% women)	Age			Experience (in years)			Educational level (%)			Year of sampling
			Mean	SD	Median	Mean	SD	Median	No degree	University graduates	Post-graduates	
Argentina	581	34.6	43.6	9.7	42	12.1	8.7	5	17.2	66.7	16.1	2017
Australia	35	51.4	48.5	13.4	48	17.1	14.8	5	2.9	67.6	29.4	2018-9
Brazil	261	22.2	47.0	10.8	46	18.2	11.7	5	20.2	58.0	21.8	2018-9
Chile	180	43.9	42.1	9.5	41.5	10.9	8.1	5	30.1	63.6	6.3	2018
Mexico	1483	23.1	41.6	12.4	39	8.7	8.6	5	4.0	79.0	17.0	2018
New Zealand	17	17.6	50.5	14.2	50	22.2	14.0	5	0.0	62.5	37.5	2018-9
Nigeria	86	39.5	43.6	10.7	44.5	12.1	9.8	7	0.0	12.9	87.1	2018
Paraguay	22	13.6	40.9	9.7	38	14.1	10.7	5	19.0	66.7	14.3	2018
South Africa	42	31.7	44.7	10.5	44.5	15.1	11.6	6	2.4	41.5	56.1	2018
Total / mean	2707	30.8	44.7	11.2	---	14.5	10.9	---	10.7	57.6	31.7	2017-9

Note: 'No degree, 'University graduates' and 'Postgraduates': respondents with no university degree, with university degree but no master's or doctorate, and with master's or doctorate, respectively

Respondents were given ten extension objectives and asked to select the three most important ones. The task read as follows:

> In the following list, put a tick next to the three most important objectives of advisory work, 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.

The 10 objectives included in the question are listed below. Short names are provided in brackets.

1. Productive modernisation aimed at increasing productivity and profitability (productive modernisation).
2. Improving farmers' quality of life by helping them to have access to basic services (access to basic services).
3. Integrating farmers into commercial chains and supporting the commercialization of their products in conventional markets (access to conventional markets).
4. Developing entrepreneurial and business capacity (entrepreneurial capacity).
5. Creation and strengthening of farmer organisations (farmer organisations).
6. Strengthening of farmers' productive strategies and livelihoods through the

funding of small productive projects (farmers' livelihoods - small projects).

7. Protection and management of natural resources (management of natural resources).
8. Increasing farmers' productive and commercial knowledge through training sessions (knowledge increase - trainings).
9. Resolution of productive or commercial problems posed by farmers by means of providing advice (provision of advice).
10. Provision of information regarding prices or climate in order for it to be used for decision making (provision of information).

This list of ten extension objectives was developed using the following strategy. Firstly, a list of topics and analytical dimensions in the area of extension objectives, approaches and methodologies was built following a general literature review on extension practice and theory (e.g. Höckert and Ljung 2013; Ingram 2008; Klerkx, van Mierlo, and Leeuwis 2012; Leeuwis 2004) and the analysis of a study aimed at describing how extension agents from ten Latin American countries understand their practice (Landini 2016c). Secondly, a document with preliminary topics and sub-dimensions to study how extension agents understand rural extension, including different possible objectives of their practice, was sent to 13 international extension experts from Australia, Brazil (2), Chile, France, The Netherlands, India, Mexico, Nicaragua, Nigeria, Pakistan and South Africa (2). Thirdly, a final list of objectives was written considering the inputs and recommendations of the experts. Importantly, despite the fact that the list of objectives was developed after a literature review and consultation with international experts, it is not proposed as a complete list.

The questionnaire was sent by email to all participants using the Survey Monkey online platform. There were some exceptions in South Africa, where seven respondents

printed the survey and forwarded the completed form as a scanned document. In Argentina, Chile and Paraguay the research received the support of national public extension institutions: the 'Instituto Nacional de Tecnología Agropecuaria' and the 'Subsecretaría de Agricultura Familiar' in Argentina, the 'Instituto de Desarrollo Agropecuario' in Chile, and the 'Dirección de Extensión Agraria' in Paraguay. In Australia and New Zealand participants were invited by two professional bodies of advisors, the 'Australasia-Pacific Extension Network' and the 'New Zealand Institute of Primary Industry Management'. In Brazil, the research was supported by the public extension institutions of the states of Amazonas, Pernambuco, and Santa Catarina. Additionally, extension personnel from a university, the 'Universidade Federal do Amazonas' were also invited to reply to the questionnaire. In Mexico, invitations were sent to a database of practitioners of the 'Sistema de Extensionismo Rural Mexicano' (public system of rural extension), in Nigeria to members of the 'Nigerian Forum for Agricultural Extension and Advisory Services' and in South Africa to members of the 'South African Society for Agricultural Extension'. These nine countries were selected based on accessibility, particularly the existence of local researchers who could help with the data gathering process.

Data were analysed using SPSS version 25. Firstly, the extension objectives were ranked accordingly to percentage of respondents from each of the different countries, who had prioritised them among the three most important objectives. Then, the objectives prioritised by respondents were ordered using the mean of the countries' means (not the mean of the complete sample) to avoid biases derived from unbalanced samples. At the same time, differences among countries were explored using Chi-squared and Z-test.

Secondly, a typology of agents with different profiles of objectives was developed using a two-step cluster analysis (Rubio-Hurtado and Vilà-Baños 2017). The analysis

included only the 10 variables referred to as the extension objectives. Considering the unbalanced sample size between the different countries, and that the small sample size of some of them, only those with more than 50 cases were used for the cluster analysis (Argentina, Brazil, Chile, Mexico and Nigeria). Additionally, to avoid overestimating the relationships between variables present in countries with larger sample sizes, each sample size was reduced equivalent to that of the smallest size (Nigeria = 86) using a random selection procedure in the SPSS software. Thus, the two-step cluster analysis was conducted using five national samples with n = 86. In this process, a maximum of eight clusters were established to facilitate interpretation of results. Finally, the differences between the clusters were analysed, using parametric and non-parametric statistics.

Institutional contextualisation

In order to facilitate the interpretation of results, Table 3 presents a description of key relevant features of the extension systems of the nine countries included in the study based on the experience of the authors, as well as key characteristics of the national samples.

Table 3. Key characteristics of the national extension systems and of the samples

Country	Key features of the national extension systems	Key characteristics of the samples
Argentina	Public extension is strong and focuses mainly on family farmers. Publicly funded extension services are delivered by the government	Most respondents worked for the government (only a few were working for the private sector).
Australia	Public extension is in the process of privatisation but is still relevant in some states. FBO and private providers occupy a key role in the system. Farmers are highly integrated into commercial supply chains.	Respondents work for a variety of institutions: the government, FBO, private companies and as independent consultants.
Brazil	Public extension is strong, focuses mainly on family farmers and service delivery is mainly public but also outsourced to NGOs and advisory companies.	Almost all respondents work for state public extension institutions (the rest for a public university).
Chile	Public extension is strong, focuses on both, family farmers and commercial farmers. Available subsidies usually require different percentages of co-funding. Public extension is mostly publicly delivered but also outsourced.	All respondents work for the government, mostly with small and family farmers.

Mexico	Publicly funded extension is mostly outsourced. Prioritised beneficiaries depend on the specific programs. Family farmers are acknowledged as relevant beneficiaries.	Respondents work for a variety of institutions: the government, NGOs, FBO and as independent advisors.
New Zealand	Advisory services are fully privatised and commercialised. They are commercially funded by farmer clients or provide advice with input sales. A small number of advisors are from farmer-levy funded FBOs aligned to sectors and focus on industry-good goals, e.g. improving environmental performance. Farmers are highly integrated in commercial supply chains	Most respondents work for FBOs and private advisory companies.
Nigeria	Public extension funded and run by states, backstopped by the Federal government, dominates.	Most respondents work for the government and different universities.
Paraguay	Extension services for family farmers are publicly funded, although resources are scarce, and service delivery is public.	All respondents work for the government with family farmers.
South Africa	Publicly funded extension has a key role in the country, mostly with regards to family farmers and land reform farmers.	Most respondents work for the government

Results and Discussion

Objectives Prioritised by Respondent Extension Agents in Different Countries

The objectives, as prioritised by the survey participants, are presented in Figure 1. These results show the importance of each extension objective from the point of view of extension agents, using the mean of the countries' means. Table 4 presents the detailed percentages, as well as significant differences among and between countries (differences were explored using Chi-squared and $p < .01$).

Figure 1. Objectives prioritised by extension agents (countries' mean)

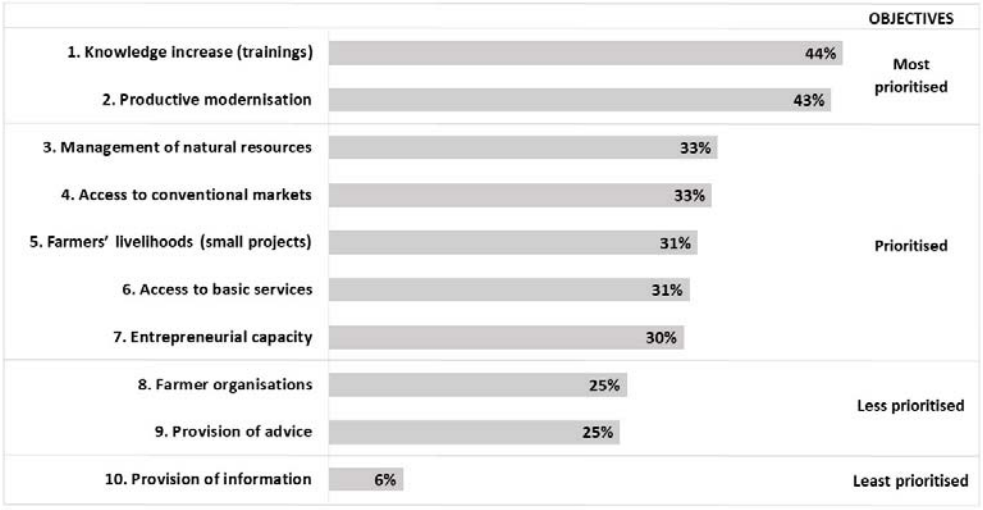

Table 4. Objectives prioritised by respondent extension agents in different countries

Objective	Countries' mean	Argentina	Australia	Brazil	Chile	Mexico	New Zealand	Nigeria	Paraguay	South Africa
Knowledge increase (trainings)	43.6%	34.1%^{a}	48.6%^{ab}	44.8%^{b}	43.3%^{b}	45.3%^{b}	47.1%^{ab}	40.7%^{ab}	40.9%^{ab}	47.6%^{ab}
Productive modernisation	42.6%	31.7%^{a}	45.7%^{abc}	42.1%^{b}	32.8%^{a}	45.1%^{b}	35.3%^{abc}	59.3%^{c}	36.4%^{abc}	54.8%^{bc}
Management of natural resources	33%	27%^{c}	51.4%^{de}	29.1%^{c}	33.9%^{c}	22.4%^{b}	58.8%^{e}	7%^{a}	36.4%^{bcde}	30.9%^{bcd}
Access to conventional markets	32.5%	34.6%^{cd}	14.3%^{ab}	32.9%^{cd}	27.8%^{bc}	44.6%^{e}	5.9%^{a}	41.9%^{de}	45.4%^{cde}	45.2%^{de}
Farmers' livelihoods (small projects)	31.3%	35.1%^{b}	17.1%^{a}	35.2%^{bc}	53.3%^{d}	40.5%^{c}	11.8%^{a}	20.9%^{a}	36.4%^{abcd}	30.9%^{abc}
Access to basic services	30.6%	35.5%^{c}	17.1%^{ab}	46.4%^{d}	30%^{bc}	20.2%^{a}	5.9%^{a}	55.8%^{d}	40.9%^{cd}	23.8%^{abc}
Entrepreneurial capacity	30.1%	25.1%^{b}	31.4%^{bcd}	17.2%^{a}	33.9%^{cd}	33.2%^{cd}	52.9%^{d}	30.2%^{bcd}	18.2%^{abc}	28.6%^{abcd}
Farmer organisations	25.3%	56.3%^{c}	14.3%^{a}	40.6%^{b}	17.2%^{a}	19.5%^{a}	11.8%^{a}	15.1%^{a}	40.9%^{bc}	11.9%^{a}
Provision of advice	24.7%	19.8%^{b}	42.9%^{cd}	10.7%^{a}	27.2%^{c}	28%^{c}	52.9%^{d}	12.8%^{ab}	4.5%^{ab}	23.8%^{bc}
Provision of information	6.3%	0.9%^{a}	17.1%^{b}	0.8%^{a}	0.6%^{a}	1.1%^{a}	17.6%^{b}	16.3%^{b}	0%^{a}	2.4%^{a}

Note: Letters in superscripts (for instance $^{a\,b}$) express homogeneous subsets which percentage does not differ between them using z test and $p < .05$ without Bonferroni correction (see superscripts per row).

Figure 1 can be sub-divided into four levels of prioritisation of extension objectives: the *most prioritised*, the *prioritised*, the *less prioritised*, and the *least prioritised*. Overall, survey participants prioritised the objective 'increase of farmers' productive and commercial knowledge through training sessions' the highest. This corresponds with Sulaiman and Davis (2012) who highlight that training of farmers and communication of technical information is part of the traditional role of extension and advisory services. The second *most prioritised* extension objective was 'Productive modernisation aimed at increasing productivity and profitability'. This prioritisation was not unexpected, since it was historically the core role of public extension services (Davis and Sulaiman 2014), and continues to be fundamental in many countries, such as South Africa (Abdu-Raheem 2014) and globally (Davis, Babu and Ragasa 2020).

There are a set of five prioritised objectives: 'Management of natural resources', 'Access to conventional markets', 'Farmers' livelihoods (small projects)', 'Access to basic services' and 'Development of entrepreneurial capacity'. These results align with previous studies. For instance, different authors have pointed out the important role extension plays (or may play) in natural resource management and conservation in diverse contexts such as Pakistan (Baloch and Thapa 2019), New Zealand (Botha, Coutts and Roth 2008), and Europe (Klerkx and Jansen 2010; Klerkx et al. 2017) and particularly in the case of public extension and that supported by non-profit organisations (Knierim et al. 2017; Minh et al. 2014). Likewise, it has been argued that supporting access to markets is a relevant role of extension, particularly when working with commercial farmers (Abdu-Raheem 2014; Baloch and Thapa 2019).

The next two objectives in the *prioritised* group are 'strengthening of farmers' productive strategies and livelihoods through the funding of small productive projects' and 'improving farmers' quality of life by helping them to have access to basic services'.

Interestingly, both extension objectives can be related to a pro-poor extension approach (Zwane and Davis 2017), that is promoted in Africa and Asia, and characterised by supporting poor, marginalised and vulnerable farmers (e.g. Davis and Sulaiman 2014; Minh et al. 2014). Finally, the 'development of entrepreneurial and business capacity' is the last prioritised extension objective, one that has gained attention in the last decade and is currently considered by some authors as part of extension work in countries such as South Africa (Stevens 2017) and New Zealand (Hilkens et al. 2018). The differences between countries are large for this last objective and this will be discussed later.

The group of *less prioritised* objectives includes two, the 'creation and strengthening of farmer organisations', and the 'resolution of farmers' problems by means of providing advice'. Regarding the support of farmer organisations, different authors have emphasised this as a potential way of increasing farmers' bargaining power in commodity and input markets in Eritrea (Habtom 2019), and facilitating horizontal learning processes and empowering farmers as social actors in Latin America (Landini et al. 2017). On the other hand, the 'resolution of farmers' problems by means of providing advice' is also very relevant to extension work in diverse country contexts (Abdu-Raheem 2014; Albore 2018; Ingram 2008), even to the point of considering rural extension and agricultural advisory services as synonyms (Davis and Sulaiman 2014).

Finally, the 'provision of information regarding prices or climate in order for it to be used for decision making' was the *least prioritised objective*. Despite the importance of information for decision making (Christoplos 2010), this objective was only mentioned by a small percentage of respondents

Differences in Prioritised Objectives Among Countries

Table 5 synthesises the objectives that characterised the different countries.

Table 5. Prioritised objectives per country

Countries	Characteristic objectives
Argentina	< Productive modernisation; < Entrepreneurial capacity; + > Farmer organisations.
Australia	+ > Management of natural resources; < Access to conventional markets; < Farmers' livelihoods (small projects); < Access to basic services; > Provision of advice; > Provision of information.
Brazil	> Access to basic services; < Entrepreneurial capacity; > Farmer organisations; < Provision of advice.
Chile	< Productive modernisation; + > Farmers' livelihoods (small projects).
Mexico	< Management of natural resources; > Access to conventional markets; > Farmers' livelihoods (small projects); < Access to basic services.
New Zealand	+ > Management of natural resources; < Access to conventional markets; < Farmers' livelihoods (small projects); < Access to basic services; + > Entrepreneurial capacity; + > Provision of advice; > Provision of information.
Nigeria	+ > Productive modernisation; < Management of natural resources; > Access to conventional markets; < Farmers' livelihoods (small projects); + > Access to basic services; < Provision of advice; > Provision of information.
Paraguay	> Access to conventional markets; > Access to basic services; < Entrepreneurial capacity; > Farmer organisations; < Provision of advice.
South Africa	+ > Productive modernisation; > Access to conventional markets.

Notes: '+' = mentioned by more than 50% of the country respondents, '>'/'<'= higher and lower percentage than most of the countries respectively (considering statistically significant differences).

Results show the existence of different and multiple country profiles. Australia and New Zealand appear to have a similar profile of objectives. This could be explained by shared characteristics of the extension systems in both countries, including the high degree of privatisation (although stronger in New Zealand) (Turner et al. 2016), and also that the client farmers are highly market-oriented. In this context, supporting market access, helping farmers improve their livelihoods, or accessing basic services is less relevant since farmers are highly integrated into the market. The latter two objectives are both characteristic of pro-poor extension (Zwane and Davis 2017), usually supported by public or donor funding. Likewise, greater importance given to provision of advice to solve problems is expected, as private extension tends to be more personalised to meet individual farmer needs (Prager et al. 2016; Klerkx, de Grip, and Leeuwis 2006; Knuth and Knierim 2013).

In contrast to our expectations, and to findings of Botha et al. (2008), respondents from Australia and New Zealand prioritised protection and management of natural

resources, despite the fact that both extension systems are largely privatised, and that most respondents do not work for the government (particularly in the case of New Zealand). Here, as Klerkx and Jansen (2010) suggest for the case of The Netherlands, and Klerkx et al. (2017) for Norway more recent public regulations and incentives may be encouraging non-public advisors to address sustainability issues; a clear public good.

Nigeria and South Africa also showed similar objective profiles. In both countries the respondents work mostly for the government, and with small scale farmers who are poorly integrated into formal markets. The key objectives are 'productive modernisation' and 'supporting farmers to access conventional markets'. These tend to be common interventions of public top-down extension globally (Davis, Babu, and Ragasa 2020). Nigeria differed in some ways from South Africa, in particular, Nigerian respondents had the least support for the management of natural resources, which contrasts with the tendency of public extension to support public-good provision, such as environmental sustainability, at least in the European context (Klerkx and Jansen 2010; Prager et al. 2016). In the Nigerian context, this is possibly because of the high importance given to productive modernisation in terms of green revolution principles, which overshadow the importance natural resources conservation.

The profiles of extension objectives of the samples of Argentina, Brazil, Chile, Paraguay and Mexico are similar, however, there are also relevant differences. In all five countries, an important part of extension services is publicly funded, and mostly publicly delivered (with the exception of Mexico where it is usually outsourced), and respondents work mostly for the government (again with the exception of Mexican respondents who work for different types of organisations). In no case was productive modernisation seen as a top priority; particularly so in Argentina and Chile, where it is less frequent than in the other countries. In contrast, the support of farmer organisations seems to be stronger

in some of these countries, since it is mentioned more frequently in Argentina, Brazil and Paraguay. In Chile and Mexico, its relevance is below average. In addition, in some Latin American countries, supporting farmers' livelihoods through small projects has greater importance, while in others helping farmers to gain access to basic services is a priority. There is no clear reason why one objective is more important than the other in each country.

These results show that, despite similarities, the different country profiles are not always easy to include in a general typology. In some cases, differences in the characteristics of the beneficiaries or clients, or the respondents' type of extension institution contribute to potentially explaining the extension objectives prioritised by advisors. However, these differences do not appear to adequately explain the differences observed among countries. For example, why in some countries does public extension prioritise productive modernisation, while in others farmer organisations or support to smallholders to gain access to basic services are the priorities? While some extension objectives may be explained by the type of institution, farmer characteristics, and public incentives, and regulations, there are also unaccounted differences in institutional and individual traditions, and extension agents' educational trajectories, as has previously been found in diverse country contexts such as Sierra Leone (Kamara, van Hulst, and Dorward 2020) and Ireland (Mahon, Farrell, and McDonagh 2010).

Types of Extension Agents with Different Objectives

A two-step cluster analysis was conducted to identify extension agents with different profiles of objectives. Only participants from Argentina, Brazil, Chile, Mexico and Nigeria were included in this analysis due to insufficient data from the other countries. Four clusters were identified in the process (Table 6). In Table 7 the differences among members of each cluster are explored. Results show that cluster members differ in the

objectives they prioritise and their countries.

Table 6. Clusters of extension agents based on the objectives they prioritise

Cluster	Frequency	Percent
1	128	29.8
2	89	20.7
3	107	24.9
4	106	24.7
Total	430	100

Table 7. Differential characteristics of the clusters

Variable	**Sample's mean**	**Clusters**				**Test**
		1	**2**	**3**	**4**	
Productive modernisation	42.3%	16.4%	78.7%	35.5%	38.7%	$\chi^2(3)=86.4$**
Knowledge increase (trainings)	42.1%	50.0%	27.0%	91.6%	0.0%	$\chi^2(3)=194.6$**
Access to conventional markets	39.3%	28.1%	47.2%	34.6%	47.2%	$\chi^2(3)=12.7$**
Farmers' likelihoods (small projects)	36.5%	5.5%	7.9%	54.2%	78.3%	$\chi^2(3)=180$**
Access to basic services	35.1%	57.8%	0.0%	31.8%	50.9%	$\chi^2(3)=85.4$**
Entrepreneurial capacity	29.6%	22.7%	50.6%	13.1%	32.1%	$\chi^2(3)=36.6$**
Farmer organisations	26.6%	52.3%	14.6%	17.8%	21.7%	$\chi^2(3)=52.7$**
Management of natural resources	23.5%	53.9%	15.7%	0.0%	24.5%	$\chi^2(3)=95.9$**
Provision of advice	21.2%	13.3%	57.3%	7.5%	6.6%	$\chi^2(3)=106$**
Provision of information	3.8%	0.0%	1.1%	14.0%	0.0%	$\chi^2(3)=42.4$**
Gender	M:66.5%, W:33.5%	M: 64.8%. W: 35.2%	M: 69.7%. W: 30.3%	M: 61.7%. W: 38.3%	M: 69.8%. W: 30.2%	$\chi^2(3)= 2.18$
Mean age	43.5	45.3	42.5	42.0	44.2	$F(3,426)=2.22$
Mean experience	11.7	12.8	11.1	10.8	12.3	$F(3,426)=1.18$
Educational level	ND: 15% UD: 58% PGD: 27%	ND: 17% UD: 59% PGD: 24%	ND: 8% UD: 67% PGD: 24%	ND: 15% UD:55% PGD: 30%	ND: 17% UD: 52% PGD: 31%	KW: $\chi^2(423)= 2.04$
Country						
Argentina	20%	22.7%	21.3%	17.8%	17.9%	$\chi^2(12)=33.7$**
Chile	20%	17.2%	24.7%	12.1%	27.4%	
Mexico	20%	18.0%	23.6%	19.6%	19.8%	
Nigeria	20%	11.7%	22.5%	29.9%	17.9%	
Brazil	20%	30.5%	7.9%	20.6%	17.0%	

Notes: * = p < 0.05, ** = p < 0.01, M = Men, W = Women; 'ND' = no university degree; 'UD' = University degree; 'PGD' = Post-graduation university degree.

Characteristics of each cluster were categorised as 'main', 'relevant', and 'secondary', depending on the percentage they differ from the mean of the entire sample.

Main characteristics were defined as variables that are at least 100% more or less than the mean of the entire sample, relevant characteristics as those which range between 70 and 99.9% more or less, and secondary characteristics as those which range between 40 and 69.9% more or less than the mean of the entire sample. Table 8 characterises each cluster using these categories.

Table 8. Main characteristics of the different clusters

Cluster 1 *SOCIALLY ENGAGED EXTENSIONIST*	**Cluster 2** *AGRICULTURAL PRODUCTION AND BUSINESS EXPERTS*	**Cluster 3** *TRAINER OF SUBSISTENCE FARMERS*	**Cluster 4** *PRO-POOR EXTENSION AGENT*
Main characteristics - More interest in the protection of natural resources (+129%). - No interest in providing information about climate and prices (-100%). **Relevant characteristics** - More interest in creating farmer organisations (+97%). - Less interest in improving farmers' livelihoods (-85%). **Secondary characteristics** - More support to access basic services (+65%) - Less interest in productive modernisation (-61%)- - More frequent in Brazil (+52%). - Less frequent in Nigeria (-41%).	**Main characteristics** - More interest in providing advice (+171%). - No interest in helping farmers to access basic services (-100%). **Relevant characteristics** - More interest in productive modernisation (+86%). - Less interest in improving farmers' livelihoods (-78%). - More interest in developing farmers' entrepreneurial capacity (+71%). - Less interest in providing information about climate and prices (-71%). **Secondary characteristics** - Less frequent in Brazil (-60%). - Less interest in creating farmer organisations (-45%).	**Main characteristics** - More interest in providing information about climate and prices (+270%). - More interest in training farmers (+117%). - No interest in the protection of natural resources (-100%). **Relevant characteristics** None **Secondary characteristics** - Less interest in providing advice (-65%). - Less interest in developing farmers' entrepreneurial capacity (-56%). - More frequent in Nigeria (49%). - More interest in the strengthening of livelihoods (+49%).	**Main characteristics** - More interest in strengthening of livelihoods through funding projects (+115%). - No interest in training farmers (-100%). - No interest in providing climate and market information (-100%). **Relevant characteristics** None **Secondary characteristics** - Less interest in providing advice (-69%). - More support to access basic services (+45%).

Results show that extension agents can be grouped into four types with different profiles of objectives. Interestingly, this suggests that the prioritisation of specific

objectives is not usually a stand-alone preference but part of profiling that may express different extension approaches and advisory styles.

Cluster 1 depicts a *socially engaged extension agent* who strongly supports farmers' organisations, protection of natural resources, and initiatives to access basic services, and has little interest in productive modernisation. This profile seems to relate to the agroecological movement, which values environmental and social sustainability, rejects the principles of traditional productive modernisation, questions the current organisation of the global food system, and highlights the role of grassroots organisations in farming (Altieri 2015). Considering the important role given to supporting farmer organisations (usually understood as a way of empowering farmers as social actors [Landini et al. 2017]) and the questioning of the green revolution principles, it looks like cluster 1 members make sense of their role in the context of different social struggles and the support for different social values.

Members of cluster 2 can be characterised as *agricultural production and business experts*. They provide advice to support productive modernisation and farmers' development of entrepreneurial and business capacity. They appear to work mostly with commercial rather than subsistence farmers, understand farming as a business (in contrast to farming as a way of life), and avoid questioning current trends such as the environmental impacts of productive modernisation.

In part, cluster 2 members seem to understand extension in a traditional way as transfer of modern agricultural technologies (Chowdhury et al. 2014; Leeuwis 2004). However, these results suggest that extension agents supporting productive modernisation complement and update the approach with more recent extension services, such as the provision of advice to solve productive problems and the development of entrepreneurial and business capacity (Davis and Sulaiman 2014).

Cluster 3 extension agents can be characterised as *trainers of subsistence farmers*. Their main interest is in training farmers to increase their productive and commercial knowledge, followed by the strengthening of farmers' productive strategies and livelihoods. Their interest in productive modernisation and development of farmer organisations is below average, and do not place an emphasis on environmental conservation. In general, these results depict cluster 3 extension agents as focused on subsistence farmers, technocratic and not socially engaged.

Finally, cluster 4 members can be described as *pro-poor extension agents*. The two characteristics that define this cluster are to help farmers to strengthen their livelihoods through funding small projects and to facilitate their access to basic services; what can be described as a pro-poor approach to extension and farmer development (Zwane and Davis 2017). Interestingly, in contrast to *socially engaged extension agents* (cluster 1), who prioritise farmer organisation and management of natural resources, and seem to question social dynamics that tend to marginalise farmers, cluster 4 members do not give particular attention to these two objectives. The lack of focus on supporting farmer organisations, suggests that cluster 4 members do not frame farmers' problems in terms of power struggles and social processes of marginalisation, unlike socially engaged extension agents.

Analysis of Main Results

The two most prioritised extension objectives were increased farmer knowledge through training sessions (a generic objective), and productive modernisation for improved productivity and profitability. This shows that productive modernisation is still a core extension objective both in countries with public extension systems and those with privatised extension systems, as has previously been observed in a global analysis of extension by Davis, Babu and Ragasa (2020). In addition, the objective profile of cluster

2 members (named 'agricultural production and business experts') suggests that traditional extension aimed at productive modernisation, based on training and transfer of technologies, may be evolving towards a more complex practice that includes personalised advice and support to develop entrepreneurial and business capacity as part of productive modernisation; practices that have previously been associated more with commercial advisory services (Klerkx, de Grip, and Leeuwis 2006; Knuth and Knierim 2013).

The protection and management of natural resources was one of the prioritised extension objectives, and ranked third overall (Figure 1). This result is consistent with the growing environmental challenges faced by agriculture and the key role rural extension may play in this regard (Baloch and Thapa 2019; Davis and Sulaiman 2014). In general, authors from different countries and regions argue that, as a public good, environmental conservation is a priority of publicly funded extension or delivered by non-profit organisations (Botha, Coutts and Roth 2008; Dhiab, Labarthe, and Laurent 2020; Knierim et al. 2017; Minh et al. 2014). However, some of our results seem to question this assumption, since Australian and New Zealand respondents (the two countries in our sample with mainly privatised extension systems and where most respondents do not work for the public sector) consistently prioritised the protection and management of natural resources higher than the other countries surveyed. This supports Klerkx and Jansen (2010) and Klerkx et al. (2017), who suggest that the correct mix of policy regulations and incentive measures can lead private advisors to support natural resource management in agriculture.

In addition, the case of Nigeria suggests there is a need to unpack the idea of public extension supporting the delivery of public goods. Nigerian respondents placed the highest priority on productive modernisation and the least on the protection and

management of natural resources (with a proportion of more than 8 to 1). Assuming both objectives express different public goods, public policy and public extension systems will likely prioritise some public goods over others, thus reflecting a preference for specific productive paradigms or societal values in the transformation of foods systems (Klerkx 2020). Therefore, the concept that public extension supports public goods is not straightforward, and requires consideration of which public goods are prioritised in public policy and extension.

Research results also contribute to the study of advisory styles or profiles (e.g. Faure, Desjeux, and Gasselin 2012; Ingram 2008; Klerkx and Jansen, 2010; Landini 2015). Usually, these studies describe and analyse *how* advisors and extension agents interact with farmers, expressing different extension approaches or strategies. This research adds to current literature by suggesting that to understand advisory styles it is important to understand *what* extension agents aim to achieve in their practice. This study proposed four different types of agents distinguished by their extension objectives: the socially engaged extension agent; the agricultural production and business expert; the trainer of subsistence farmers, and the pro-poor extension agent. Future research could combine results on *how* extension agents and farmers interact, with *what* extension objectives they aim for to build more complex typologies, since it is likely that specific objective profiles tend to be linked to particular advisory practices or styles. This may be because specific advisory styles may more effectively reach certain extension objectives, and because extension agents supporting certain social values may tend to select both a specific objective profile and a particular advisory style.

Research results also contribute to the discussion on pluralistic advisory systems, the access of different types of farmers to extension services, and to the study of the fit between extension service demand and offers. Usually, authors tend to analyse the

existence of a good fit at a national level, studying whether the different categories and types of farmers and other actors have access to relevant and quality services that respond to their requirements (Birner et al. 2009). However, there is a growing body of literature that highlights the need to understand extension sub-systems (Klerkx 2020), and how extension demand and offerings operate, adjust, and are shaped at the micro-level of interpersonal interaction (Cofré-Bravo, Klerkx, and Engler 2019; Klerkx et al. 2017; Landini 2016b).

Literature on quality service delivery, including advisory services, points out that services are co-produced in the interaction between the provider and the client (that is, while they are being delivered) (Landini 2020). This implies that extension services (the offer side) are not only shaped by the characteristics of the extension organisation profile and the specific products being offered but also by the extension agents' advisory style, as an expression of their agency. Thus, in order to analyse the responsiveness of extension organisations to farmers' demands, and the adjustment between service demand and offering, there is a need to study the profile and services offered by the organisation, the farmer demands and needs, and advisor objectives and styles during the delivery process.

To assist with this, the authors present a typology of agents with different profiles of extension objectives, which can be used to study extension practices, advisory styles, and more importantly, the coordination and adjustment of extension services, advisory styles and farmer demands at the micro-level of interaction. Importantly, these results suggest the possibility of finding misalignment between the objectives of extension agents, of advisory organisations, and/or farmer needs.

Contributions to Research, Policy and Practice

The results of the study, including the typology of extension agent objectives, can be used by academics and researchers to characterise extension agents in case studies or in

specific institutional settings. They also make visible the role played by agency, expressed here as agents with different profiles of objectives, in the fit between extension service offerings and demand, and the need for extending the typology by connecting advisor objectives and styles of interpersonal interaction during extension service delivery.

Moreover, this research provides a framework and invites other researchers to analyse and reflect on the characteristics and requirements of specific extension institutions and the profiles of extension agents that best fit the institution's requirements and needs. In particular, the typology can be used by institutional leaders to consider the characteristics of their extension personnel and to support informed decision making that increases the match between advisory offerings and farmer client demands. Likewise, human resource divisions can use it to define the profile (or profiles) that best fit the organisational needs and to select practitioners accordingly, for instance for scanning professional curricula vitae or posing interview questions.

Finally, these results also contribute to education and professional development, since they can be used by extension agents to explore future professional roles or to critically reflect on ones' own extension practice, individually or collectively with peers.

Limitations

This research surveyed extension agents from nine countries. Results should not be considered generalisable, because the sampling procedure was not random and may be biased by the profile of the specific institutions from which advisors were sampled. Importantly, sample sizes were small in some countries. In addition, in this study data gathered on the type of institution (public, private, NGO, FBO or other) extension agents work for was not presented because responses proved to be unreliable. Future studies should pay particular attention to gathering reliable information on this variable to relate results to the respondents' specific type of institution.

Results reached in this study are highly dependent on the list of objectives included in the questionnaire. We are confident on the relevance of all of them, however, it is apparent that a different set of objectives could lead to different results. Along this line, research participants were asked to identify the three most relevant extension objectives from their point of view. This strategy did not allow us to analyse the comparative importance or the priority order given by respondents to each of them. In future research, it would be interesting to ask participants to value objectives independently, for example using a scale, thus allowing a more detailed statistical analysis. In addition, since the research was quantitative, we do not know to what extent the participants understood each objective in the sense we do. A further questionnaire using open questions, and applied to a reduced sample, could help to better interpret and contextualise the results.

Declaration of Interest Statement

No potential conflict of interest was reported by the authors.

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