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Research article

Multifunctional farm advisory services in promoting change in agricultural systems: The case of Campania region of Italy

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Abstract: Entrepreneurial contexts may be marked by the presence of a 'cultural environment' that stimulates knowledge and innovation adoption, while other contexts may act as barriers toward change and innovation. Moreover, multiple paths of multifunctional agriculture bring about a call for "multifunctional farm advisory services" (MFAS), which consider both private and public goods provided by the farming sector. Set against the background of multiple roles of agriculture, how to identify sound and pertinent knowledge becomes of paramount, to specify the roles of agricultural extensionists and the mechanisms of governance of MFAS within the setting up of the Agricultural Knowledge and Innovation System (AKIS). Our aim of the study is either to analyze attitudes toward the privatization of extension services within a predominantly public system of regional governance and to identify advisors' profile and their suitability with the modern vision of multifunctional agriculture through the emergence of MFAS. Empirical analysis evidences the presence of a diversified set of advisory services with different degrees of coherence with the multifunctional agricultural model. Also, the more advisory services are oriented towards empowering multifunctional agriculture the less the propensity towards their privatization. The cluster analysis has demonstrated a relatively good advisor's capability to deal with the new demands of multifunctional agriculture. The idea of MFAS has important theoretical implications that the paper tries to excavate through the analysis of the mechanisms of governance (public/private) and the identification of the advisors'

profile facing the growing complexity of the farming sector, grounded on multifunctional agriculture. The study tries to fill a gap in the literature, by providing an original contribution to modeling the profile of advisors in charge of supporting the transition towards multifunctionality.

1. Introduction

The transition to the multifunctional paradigm of agriculture [1] opens new windows of opportunities but also raises the level of complexity understood as the degree to which an innovation is perceived as difficult to understand and use [2] in the adoption of innovation, due to the diversified set of actors involved [3]. As [4] put it, "While innovating, actors bundle their resources with those of other actors to create value, simultaneously reforming the networks in which they participate through their practices". This paved the way to an evolution of innovation systems perspectives based on multi-actor and multi-level governance [5], and on the development of new knowledge infrastructures to support multifunctional agriculture [6]. Against this background, the emerging interactive models of innovation adoption [7,8] have forced adjustment processes in the provision of agricultural extension services, aimed to address "transformation, plurality and disruption" in agriculture and food systems [9]. Adjustment processes are context-related, namely they depend on the socio-institutional and territorial context where the farmers operate [10]. This means that agricultural entrepreneurship may be affected by the presence of a 'cultural environment' that stimulates knowledge and innovation adoption, while other contexts may act as barriers towards change and innovation [11]. European Agricultural Policy looks with high attention at the provision of advisory services addressed to reorienting land use strategy towards sustainable and multifunctional farming activities. This policy has also played an important role in the evolution of extension services, boosting increasingly privatized systems of provisioning. Since the introduction of a cross-compliance approach in 2003, farm advisory services (FAS) have become a strategic tool for the implementation of EU Common Agricultural Policy (CAP). In the programming period 2014–2020 and in the CAP 2023–2027, advisory services have the role of supporting agricultural actors to deal with the challenges of ecological transition. This changing process has also engendered innovation in the governance models for extension services in agriculture, characterized by a growing privatization [12]. Set against the multifunctional paradigm of agriculture, the role of the public sector in addressing FAS must be preserved. This paper deals with the role of public actors in providing sound knowledge and boosting innovation in the farming sector of a region of southern Italy. We question the role of the public sector in securing adequate provisions of advisory services for addressing sustainable agricultural land use within the new paradigm of multifunctional agriculture. We aim to:

a) Explore the attitude of private advisory services, funded by European Agricultural Policy, in designing efficient governance mechanisms of MFAS;

b) analyze advisors' profiles and attitudes towards privatization of extension services within a prevailingly public system of regional governance aiming to support multifunctional agriculture.

The paper is organized as follows: Paragraph 2 is devoted to a literature review, aiming not to provide an exhaustive theoretical background but emphasizing key elements concerning the public

governance of advisory services. In paragraph 3, a methodological basis for empirical analysis is provided, the results of which are described in paragraph 4. Finally, paragraph 5 focuses on a discussion of results and conclusions.

1.1. A multifunctional farm advisory system

As recently underlined by [13], public actions must be framed within the wider perspective of sustainable development goals by emphasizing the relevance of the public sector in the provision of advisory services. This aspect deserves attention, on account of the growing privatization of extension services, which may put some rural contexts at risk of exclusion. The EU document "*The future of food and farming*" [14] reveals that access to relevant and sound knowledge is unevenly distributed around the European Union, with consequences of *elite capture* [15]. [16] point out that small farms are particularly exposed to risks of market exclusion due to the growing dismantlement of public extension services, within which a "reductionist" approach seems to emerge. This is prevailingly focused on regulatory fulfilment, such as meeting cross-compliance standards secured through farm advisory services (FAS) [17]. To confirm this, [12] talk about the "*privatization turn*" and point to the potential negative effects on small and medium sized farms. The current pluralism in agricultural extension services is a direct consequence of the privatization turn, with potential risks of greater fragmentation of advisory services. Thus, [18] find a variation in the quality of provision within pluralistic advisory services and identify the risks that small farms may be under-served or indeed not served at all by any provider.

Given the potential contribution that small farms can make towards creating virtuous pathways to multifunctional agriculture [1,19], the systemic perspective must be privileged [4] through a functional repositioning of extension services to better integrate the different functions at farm level. This draws attention to the pervasiveness and effectiveness of knowledge/innovation systems and suggests a rethinking of the role of advisory services in the normative framework of agriculture designed by the new European agricultural model [20]. In 2012, the EU SCAR report [6] identified advisory services as "*currently unable to absorb and internalize the fundamental structural and systemic shifts that have occurred*" and "*locked into old paradigms based on linear approaches and conventional assumptions*". This is particularly true when the diversified paths are considered towards transformations of agricultural systems in recent years, which pave the way to the definitive substitution of linear approaches, focused on best practices, with 'best fit' approaches, based on interactive models of innovation [21,22]. In the new interactive perspective, farmers are no longer viewed as mere end-users of an innovative project, but they are involved from the beginning and throughout the whole process, to achieve co-decisions and knowledge co-creation.

If and how advisory services can prop up trajectories of multifunctional agriculture is a relevant and widely explored field of research that may put at risk or deny multifunctional agriculture [23]. In this paper, a diversity of institutional options is emphasized for matching the multiple functions of agriculture, bringing about a call for "*multifunctional farm advisory services*" which consider both the private and public goods provided by the farming sector. In the context of multifunctional agriculture, sources of sound and pertinent knowledge are of paramount importance in defining the roles of agricultural extension agents [24] and the mechanisms of governance of MFAS. This is particularly urgent considering the new EU regulation. The regulation 2115/2021 for rural development policy 2023–2027 attributes a wider importance to the AKIS, as a combination of

organizational and knowledge flows among people developing and spreading out knowledge and innovation. Within the AKIS, advisory services play a fundamental role in stimulating knowledge transfer and innovation adoption. Therefore, when multifunctional farming becomes a policy goal, it is necessary to address governance mechanisms of multifunctional advisory services.

1.2. Governance of multifunctional farm advisory services

Regarding the transition towards multifunctional agriculture affects the setting up, management and governance of MFAS is a research topic that deserves more attention. If the normative perspective on multifunctionality is considered [25], farming activities provide not only commodities, but also non-commodity outputs, in terms of economic, environmental and social outputs. Moreover, if a strong multifunctionality perspective is adopted, in the sense expressed by [26] [1], the provision of advisory services needs adaptation and more integrated approaches. Therefore, the public sector can also stimulate innovation, within models of social innovation, aimed at strengthening rural societies [9,27]. Accordingly, market and government failure in service provision may emerge. As far as market failure is concerned [28] point out: *Will "fee for service" systems, necessarily lead towards greater efficiency and equity? What are the social and income distributional implications of commercialization, in terms of access to services by small farmers and the rural poor? Will farmers be willing to pay for the extension services?* Moreover, in another study detail new types of market failures, like failures in social institutions, network failures, capability failures in firms and other stakeholders and framework failures, related to difficulties in the broad framework conditions.

Market failure in the provision of public goods from farming calls for government intervention. Nonetheless, government failure may occur too, in cases of ineffectiveness in solving market failures, [29] which are attributable to various causes, like information asymmetry, the principal-agent problem, weak incentives, etc [30, 31, 32,].

With the aim of securing an adequate provision of public goods, policy interventions should encourage sustainable agricultural practices through targeted actions and economic support to compensate for any potential loss of income to farmers in the production of public goods. FAS therefore needs to incentivize both the commodity and non-commodity outputs generated from multifunctional agriculture [1,33]. Nonetheless, a governance issue arises, in that any appropriate (best fit) institutional arrangement should consider the heterogeneity of the farming systems. Recent research into the governance of advisory services has highlighted growing privatization and the emergent role of the public sector as a coordinating actor [19,26,34,35]. Other studies emphasize different impacts of institutional assets across various countries. For instance, [3] provide evidence of varied effectiveness of advisory services in three European countries using a 'service-dominant' logic of value [36] and suggest encouraging stronger cooperation between the public and private sector to

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[1] Actors in the strongly multifunctional agricultural regime show strong tendencies for local and regional embeddedness. High environmental sustainability plays a key role in strongly multifunctional systems, as does the focus on delocalized agri-food chains that reduce the need for long-distance food transport. Strongly multifunctional systems will also display low farming intensity and productivity. Strongly multifunctional systems will also be characterized by high(er) food quality associated with more differentiated food demand by consumers, a demand for food products with high (often regionally based) symbolic characteristics, the creation of additional value for rural regions, and enlightened visions about food and health (Wilson, 2008, p.368).

improve the performance of extension systems.

These aspects must be questioned, in that the privatization of advisory services may prioritize economic rewards, at the expense of non-commodity outputs, thereby generating incentive imbalances that hinder rather than help multifunctionality in agriculture [37]. Nonetheless, it also cannot be assumed that a predominantly public model of governance of advisory services "automatically" brings about the orientation of farming systems towards multifunctional agriculture. Rather, this would largely depend on the different attitudes and profiles of agricultural extensionists towards the provision of services to support both commodity and non-commodity output. This area of research is currently under-investigated. Therefore, we aim to fill a gap in the literature by providing an original contribution to the analysis of current models of FAS within a public system of governance. More precisely, the study focuses on two major aspects:

- advisors' propensity to the privatization of agricultural services within a predominantly public system of governance that provides MFAS;
- analyse different advisor profiles and their suitability for the new European agricultural model, based on multifunctional agriculture.

Overall, the study provides insights into advisors' perspectives on privatization within a public governance system and offers a deeper understanding of the different profiles of advisors and their alignment with the multifunctional agricultural model. By addressing these research questions, we aim to contribute to the existing knowledge and provide valuable insights for policymakers and stakeholders involved in agricultural advisory services.

2. Materials and methods

To explore the potential multifunctional role of advisory services, an empirical analysis was conducted focusing on the Campania Region in Southern Italy. The analysis was divided into two parts. The first part examined the attitudes of the advisors towards the privatization of extension services within the predominantly public regional governance system. The second part aimed to analyze and design different profiles of advisors and assess their suitability within the new European agricultural model, specifically, their coherence with the theoretical model of MFAS. Data for the analysis were collected through a dedicated survey administered to the advisors currently involved in FAS financed by Measure 2 of the Rural Development Program (RDP) 2014–2020[2]. The questionnaire comprised eight sections:

1. Advisor socioeconomic characteristics;
2. Advisory methods;
3. Analysis of farmers' and advisors' needs;
4. Self-assessment of basic skills;
5. Access to services;
6. Innovations;
7. Analysis of Measure 2 of the regional RDP (Advisory, assistance and replacement services for farm management);

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[2] Measure 2 in RDP 2014–2020 is made up of 3 sub-measures that support a wide range of operations for advisory services well-connected to different European priorities for rural development. This Measure also promotes the training of advisors to improve the quality and effectiveness of the advice offered and to better meet farmers' needs.

8.   Privatization of FAS.

Data were collected with CAWI (Computer Assisted Web Interviewing) research method, in the period between January and June 2020 with questionnaires completed anonymously. All data were processed with the statistical analysis software STATA 15.

To analyze the advisors' propensity in adopting adopt a FAS model with a significant private contribution, a probit model was employed. The probit model is a binary choice model used to determine the probability of an actor making one choice over another. In the probit model, the outcome variable y takes the value 1 if the event occurs and the value 0 if the event does not occur, given a series of explanatory variables x. The probability p that the observed value y takes the value 1 is:

$$p = P[Z \leq \beta_1 + \beta_2 x + \cdots + \beta_k x_k] = \Phi(\beta_1 + \beta_2 x + \cdots + \beta_k x_k) \tag{1}$$

The probit model uses the cumulative normal distribution function:

$$\varphi(z) = \frac{1}{\sqrt{2\pi}} e^{-0.5z^2} \tag{2}$$

and the probit function is:

$$\Phi(z) = P[Z \leq z] = \int_{-\infty}^{z} \frac{1}{\sqrt{2\pi}} e^{-0.5z^2} dz \tag{3}$$

Subsequently, the marginal effects were calculated to identify the impact on dependent variables of a unit change in explanatory variables:

$$\frac{dp}{dx} = \frac{d\Phi(t)}{dt} \times \frac{dt}{dx} = \Phi(\beta_1 + \beta_2 x)\beta_2 \tag{4}$$

where $t = \beta_1 + \beta_2 x$ and $\Phi(\beta_1 + \beta_2 x)$ is the standard normal probability density function evaluated at $\beta_1 + \beta_2 x$. Finally, to define different advisors' profiles, a factor analysis (with the varimax rotation method) was structured by grouping different variables that affect attitudes towards privatization of extension services within a predominantly public system of regional governance. Based on the factors identified, the cluster analysis was performed with the Ward hierarchical procedure [38] to obtain the profiles.

2.1. Sample description

A total of 89 questionnaires were completed by advisors engaged in FAS financed by Measure 2 in the Campania region, representing approximately 22% of the total population of advisors in the region in 2020. These respondents were either currently involved in FAS or potentially interested in such activities. Most of the advisors were between 29 and 39 years old and had master's degrees (53%). Additionally, 19% had a high school diploma, 19% had a doctorate, 5% bachelor's degree and 4% provided unclassifiable responses (Table 1). The educational background was heterogeneous: 71% of the sample had a technical/agronomic background while 17% had an economic or legal background. A small percentage (from 1 to 3%) held education in other fields such as biology, engineering, veterinary medicine, food technologies and communication. In terms of experience, 35.0% of participants had between 10 and 20 years of advisory experience while 25.0% had more than 20 years of experience. Advisors' activities spanned the entire region of Campania for a minority (11.0%) of respondents, while the majority worked within specific provinces: Salerno (22.5%), Caserta (14.5%),

Avellino (12.0%), Benevento (11.0%) and Naples (7.0%). For 66.0% of participants, the number of farms they worked with remained constant, while it increased for 27.0% and decreased for 7.0% of advisors. The advisory topics covered by the respondents included technical assistance, market orientation and rural development. Most advisors (85.0%) indicated that they primarily provided technical assistance, 28.0% offered advice on finding new markets and approximately 73.0% mentioned their involvement in rural development.

Table 1. Socio-economic characteristics of the respondent.

Age	%
<29	2%
29–39	32%
40–49	25%
50–59	25%
>60	16%
Education	
High school diploma	19%
Bachelor's degree	5%
Master's degree	53%
Doctorate or master	19%
Unclassificable responses	4%
Background	
Technical/agronomic	71%
Economic/legal	17%
Others	12%

Source: Researchers' survey.

2.2. Variables description

The dependent variables used in the probit model derived from the assessment of the propensity for privatization of FAS (section 8 of the questionnaire) measured with a 5-point Likert scale ranging from 1 (Completely disagree) to 5 (Totally agree) in response to the question "Privatization of advisory services is possible in Campania region?". The dependent variable privatization takes the value 1 if the advisors believe that privatization of advisory services is possible in the Campania region (answers 4 and 5 of the Likert scale), and value 0 if they do not believe so (answers 1, 2 and 3 of the Likert scale). As the propensity to privatize FAS is associated with:

a. the advisors' readiness to support multifunctional agriculture by privileging sustainable agricultural practices such as integrated pest management practices (IPM) and the adoption of geographical indications;
b. the type of rural areas, under the hypothesis that farming in areas with intensive agriculture is profoundly different with respect to remote inland rural areas and, consequently, affecting service provisioning;
c. the type of marketing channels, which distinguished between conventional or alternative food networks;
d. access to funds provided by regional rural development policies (RDP).

The explanatory variables in the model were selected to represent these farmers' needs and descriptive statistics are reported in table II. PDO-PGI certifications, IPM practices, requests for RDP contributions and change in sales channels are categorical variables measured on a 5-point Likert scale, where 1 represents "Not at all important" and 5 represents "Extremely important".

"Services based on types of rural areas" is also a categorical variable with values ranging from 1 to 3. These values correspond to 1 = "It is not necessary to articulate the services based on the aforementioned variables", 2 = "Yes, they are prepared to provide a wide range of advisory services", 3 = "I do not consider adequate the available services as adequate to meet the level of preparation for all territorial needs" (Table 2).

Table 2. Descriptive statistics of the variables used in the Probit model.

N.obs = 89	Mean	SD	Min	Max
Privatization	0.39	0.49	0	1
IPM	3.88	0.91	1	5
Funding RDP	4.28	0.83	1	5
PDO-PGI	3.89	0.85	1	5
Market orientation	3.76	0.85	1	5
Services in inland rural areas	2.31	0.53	1	3

Source: Researchers' survey.

3. Results

3.1. The propensity to privatize advisory services

The Probit model estimate (Table3) is:

$$Prob_{priv} = \Phi(\beta_0 + \beta_1 PDOPGI - \beta_2 IPM - \beta_3 fundingRDP - \beta_4 marketorientation - \beta_5 servicesinlandruralareas) \quad (5)$$

Results shown in Table 3 indicate that the propensity for privatization is influenced by several factors. Specifically, the propensity for privatization decreases as the importance attributed to IPM, RDP funding and change in sales channels increases. Conversely, the propensity for privatization increases as the importance assigned to PDO and PGI certifications increases. Moreover, if the level of preparation is deemed inadequate for providing agricultural advisory services in inland areas, the propensity for privatization decreases. The analysis of marginal effects reveals that as the importance attributed to IPM, requests for funding under RDP, market orientation and the ability to provide adequate services for all rural territorial needs increases, and the propensity for privatization decreases by approximately 15%, 13%, 11% and 17%, respectively.

Conversely, if the importance attributed to PDO and PGI certifications increases, the propensity for privatization increases by approximately 21%. Wald test to determine whether the explanatory variables have a significant impact on the propensity for privatization provided a *p-value* close to zero (0.0037) with strong evidence conclude that the variables indeed have a significant impact on propensity for privatization.

Table3. Estimation of Probit model.

Dep.var: Privatization	Coeff.	p-value	Marginal effects
IPM	−0.49	0.007	−0.15
Funding RDP	−0.42	0.046	−0.13
PDO-PGI	0.68	0.005	0. 21
Market orientation	−0.36	0.080	−0.11
Services in inland rural areas	−0.55	0.059	−0.17
Constant	3.47	0.007	
Pseudo R2 = 0.16			

Source: Researchers' survey.

3.2. Segmenting farm advisors

To identify different profiles among farm advisors and assess their suitability to address the new challenges in the agricultural sector, a factor analysis and a cluster analysis were conducted. The Kaiser-Meyer-Olkin measure of sampling adequacy (0.82) and Bartlett's test for sphericity (p-value 0.000) indicate that the variables were suitable for the analysis. The results of factor analysis (Table 4) revealed the presence of four factors. Collectively, these four factors explained 70% of the total variance (Table 5).

The following interpretation of each factor was made using factors loading in Table 4:

- Factor 1 is associated with the skills and expertise of advisors
- Factor 2 is linked to the provision of service by the advisors
- Factor 3 represents traits of the advisors that may not be suitable for addressing the new challenges in agriculture
- Factor 4 relates to the advisors' ability to facilitate changes in the farms they support

Based on these factors, a cluster analysis was conducted using the Ward hierarchical procedure. The appropriate number of clusters was determined by analyzing the dendrogram, which resulted in the identification of five distinct clusters (Figure 1).

Table 4. Factor loading for clustering process.

Variable	Factor1: Skills	Factor 2: Tailored service	Factor 3: Suitability with the new challenges	Factor 4: Ability to change farms' management
Influence of age and level of education on the ability to use the service	0.02	0.77	0.16	−0.26
Specific offer based on socio-demographic variables	0.08	0.78	0.08	−0.04
Influence of socioeconomic variables on the ability to use the service	0.10	0.82	−0.04	0.27

| Variable	Factor1: Skills	Factor 2: Tailored service	Factor 3: Suitability with the new challenges	Factor 4: Ability to change farms' management
Specific offer based on socioeconomic variables	0,00	0.75	0.12	0.08
Self-assessment of skills	−0.14	0.06	0.14	0.90
Ability to provide alternatives to problems	0.63	0.10	0.10	−0.46
Ability to stimulate cooperation	0.65	0.01	0.32	−0.12
Level of concern in interacting with conventional farmers	−0.00	0.19	0.79	0.12
Level of concern in interacting with sustainable farmers	−0.09	0.04	0.85	0.06
Networking skills	0.84	0.03	−0.03	0.00
Marketing skills	0.84	0.12	0.15	−0.06
Problem solving skills	0.84	0.04	−0.20	−0.15
Skills in sustainable agriculture	0.79	−0.02	−0.11	−0.03
Communication skills	0.82	0.04	−0.11	−0.09
Interdisciplinary skills	0.81	0.04	−0.04	−0.13

Source: Authors' elaborations.

Table 5. Explained variance of the factors.

Factor	Explained variance	Cumulative explained variance
Factor 1: Skills	0.33	0.33
Factor 2: Tailored service	0.17	0.50
Factor 3: Suitability with the new challenges	0.11	0.61
Factor 4: Ability to change farms' management	0.08	0.69

Source: Authors' elaborations.

Four clusters were considered for the analysis as the fifth group had only four subjects and was deemed as not significant for the analysis. The first cluster (25%) consists of "advisors in transition", who are not yet in line with the new challenges in the agricultural sector. They tend to provide a service tailored to individual farms and the farmers. The second cluster, which is the largest (42%), consists of "holistic advisors". These advisors are confident and proactive in bringing about change on farms. They possess the necessary training and skills, align with the new agricultural paradigm, and can facilitate the transition to multifunctional agricultural practices The third group (11%) comprises "traditional advisors" who provide specific solution tailored to the characteristics of the producer and the farms but lack modern skills. The fourth cluster (22%) includes "decontextualized advisors" who rely more on different skills rather than the specific territorial context (Table 6).
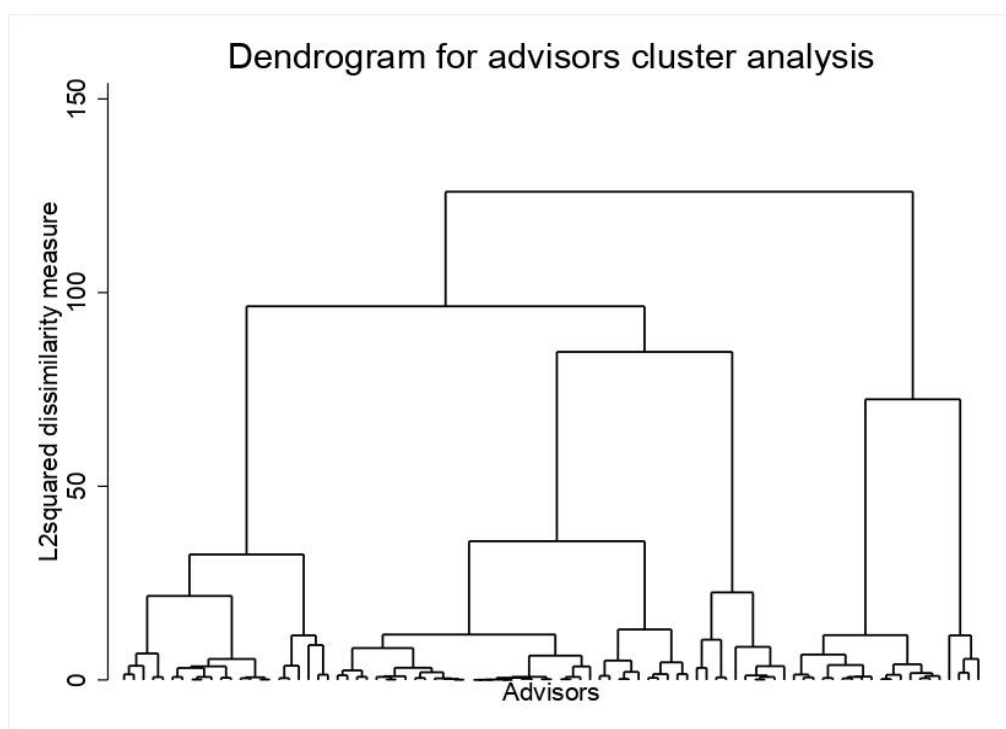
Figure 1. Dendrogram resulting from cluster analysis.

Table 6. Characteristics of the clusters.

Advisors' cluster (%)	Factor 1	Factor 2	Factor 3	Factor 4	Main characteristics
			Mean (SD)		
In transition (25%)	−0.22(0.89)	0.07 (0.85)	1.24(0.61)	−0.13 (0.81)	Not yet in line with the new challenges, provision of services tailored to individual farms and farmers
Holistic (42%)	0. 44(0.56)	0.11(0.69)	−0.24 (0.73)	0.65 (0.44)	Confident and proactive in bringing about change on farms with modern skills
Traditional (11%)	−1.77 (0.99)	0.49(0.79)	−0.76 (0.89)	0.54 (0.64)	Service tailored to the characteristics of the producer and the farms but weak modern skills
De-contextualized (22%)	0.30 (0.67)	−0.53(1.46)	−0.53 (0.54)	−1.33(0.66)	Services based on different skills rather than the specific territorial context

Source: Authors' elaborations.

4. Discussion and conclusions.

This paper is meant to provide an original contribution by modeling the profile of advisors responsible for facilitating the transition toward multifunctionality. The new paradigm emphasizes the need for a broader range of services, which require a continuous updating of advisors' knowledge to be spread out in diversified territorial contexts. While acknowledging the limitations of the study, the empirical analysis conducted in two parts provides valuable insights and rigorous answers to our research questions:

a. From the Probit model, the more advisory services are oriented towards empowering multifunctional agriculture through supporting non-commodity outputs, the less the propensity towards their privatization. This confirms recent concerns expressed in literature on the limits of privatized advisory services in granting sound knowledge transfer and innovation alongside the multifunctional paths of agriculture. As pointed out by [39], "*This may be reinforced by early AIS thinking that emphasized economic contributions and private sector engagement as opposed to sustainability transitions ambitions*". Researchers demonstrate an inverse correlation between the attitude towards privatized extension services and the importance of sustainable farming methods (IPM), access to grants under rural development policies that allocate funding to farm advisory services, and the pursuit of alternative marketing channels. These variables are strongly correlated with the multifunctional paradigm:

   i.   IPM addresses innovative approaches to agricultural production towards less intensive agriculture;

   ii. Funds obtained from rural development policies are conditionally endorsed, in that they support a multifunctional paradigm, then calling for advisory services more dedicated to boosting functional repositioning of agriculture;

   iii. Finally, the search for alternative marketing channels is often oriented towards alternative food networks and an integrated approach within deeper and integrated strategies of rural development, with the purpose of increasing the added value at the farming level and escaping the price-costs squeeze of conventional agriculture [40].

b. The potential design of new roles for advisory services under the governance of the public regional sector has been investigated in the second part of the empirical analysis, aimed at investigating the advisor's profile. To this end, the multivariate analysis provided relevant insights: Factor analysis allowed to depict key dimensions affecting the advisors' activity, like advisor's skills, provision of dedicated services, advisor's readiness to face new agricultural challenges and potential for boosting change and innovation. These key dimensions have been adopted to design the advisors' profile in the following cluster analysis, which has allowed us to identify four homogeneous groups of farmers. Advisors "in transition" require further training and adaptation to meet the demands of the evolving agricultural sector. "Holistic advisors" exhibit self-confidence and are motivated to drive change in farms. They possess the necessary skills, training and alignment with the new agricultural paradigm to foster the transition toward multifunctional agricultural practices. They are well-equipped to address the modern challenges and complexities of the agricultural sector. "Holistic advisors" demonstrated the skills and traits necessary to address new agricultural challenges and foster a transition towards multifunctional agricultural practices.

c. "Traditional advisors" expertise may be limited to more conventional practices, potentially hindering the adoption of innovative approaches. "Decontextualized advisors" possess a range of capabilities, but their services may not be effectively tailored to the unique needs and challenges

of the agricultural settings they operate. The analysis has effectively addressed the emerging demands of multifunctional agriculture. In fact, public funding of advisory services has proven to be capable of meeting both the 'traditional' needs of farm modernization and facilitating the transition towards multifunctionality. This transition encompasses both sectoral aspects, such as the qualification and valorization of agricultural products, and territorial dimensions, integrating farming activities within an endogenous and sustainable rural development framework. Against this backdrop, the cluster analysis grouped advisors into four groups with different degrees of coherence with the setting up of MFAS. Consequently, the results of the analysis indicate that public governance represents the most suitable solution for MFAS in the studied region. Nonetheless, it should not be assumed that advisory services working within a framework of public governance are ready to orient the transition toward the multifunctional paradigm. If, on the one hand, holistic advisors make up the majority of extensionists, on the other hand, intervention from the public sector is required to update the other groups: Advisors in transition are on the right path and, with adequate training and information policies, may become holistic in a relatively short time span. Traditional advisors are still anchored to a path dependency model, necessitating a more radical approach to redirect them toward new knowledge pathways.

Based on the previous consideration, the researchers agree with [41] integrative approach, which proposes a mixed governance model with the State, the market and wider society working jointly to better govern multi-functionality issues. This perspective is also mirrored in new rural development policies with the EU's drive to build stronger AKIS, which calls for more interactive and contextualized services to be implemented through innovative tools aimed at improving flows of knowledge and the quality of services. The transition towards multifunctional farming cannot disregard the challenges facing the agribusiness sector considering new geopolitical dynamics, migration flows, climate change, agroecological and digital transition, and requires a broader look and design capacity for the next EU agricultural policy 2023-2027. Training activities for agricultural advisors in the next CAP should aim at acquiring increasingly cross-cutting skills in different areas and should involve numerous sectors beyond agriculture (legal, architectural, managerial, social and economic) with the aim of guiding the agricultural producer toward a sustainable transition. This research highlights the diversity among agricultural advisors and emphasizes the importance of considering their skills, service provision, traits and ability to facilitate changes in farms. By identifying these distinct clusters, policymakers, farmers and agricultural organizations can gain valuable insights into the characteristics of advisors and make informed decisions regarding training, resource allocation, and support systems to enhance the effectiveness of agricultural advisory services. Further research and targeted interventions can be developed to assist advisors in transition and traditional advisors in acquiring the necessary skills and knowledge to adapt new agricultural challenges and promote sustainable agricultural practices.

Conflict of interest

The authors declare no conflict of interest.

Use of AI tools declaration

The authors declare they have not used Artificial Intelligence (AI) tools in the creation of this article.

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