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Explaining Local Action Groups heterogeneity in a South Italy Region within Measure 311 Axis III notice of LDP

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Abstract

Providing programmes to modernize and to sustain both agricultural and non-agricultural activities in rural areas is the main aim deriving from EU and national policies. The Local Action Groups (LAGs) implement local development strategies processing the Measures of Local Development Programme (LDP) and managing financial funds for Firms Modernization Plans (FMP) in order to increase the farm income sources. Starting from our previous work (Fiore et al., 2014), here we address the problem related to the impact of some variables on the farm income; we try to analyze in more detail the influence of these variability sources and their interactions. Our case study is Apulia Region - in Southern Italy – where 25 Local Action Groups cover entirely it. This paper provides suggestions on possible heterogeneity sources between the LAGs. After a policies and literature review on the role of the LAGs for enhancing economic and sustainable competitiveness of rural areas, we present our case study. Statistical analysis and a tree classification method are carried out.

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Keywords: Local Action Groups, Non-agricultural activities, CHAID decision tree algorithm, Farm income, Sustainability, Apulia region

1. Introduction

The rural development policy has long been supporting the development of sustainable activities, social capital at the local level by means of the creation of stable relationships between institutional and non-institutional actors, networking of stakeholders, strengthening of local identity (Ciappetti, 2010; Arabatzis et al., 2010). The EC Reg. No 1698/2005 promotes the sustainable development of rural areas by means of a focus on a limited number of core

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objectives at Community level relating to agricultural competitiveness, land management and environment, quality of life and diversification of activities in those areas. Pursuant to art. 62 of above mentioned EC Reg., partnered local development approach with a bottom-up planning have to be implemented by Local Action Groups (LAGs) that have a crucial role (Fiore et al., 2014); they set up and establish local partnership, implementing a local development strategy, making decisions about the distribution of its financial resources and administrating them (ENRD, 2010).

LAGs achieve synergies to improve the sustainable and economic competitiveness of rural areas by means of strengthening cooperation between local actors, who often have little experience in networking. The main purpose is to make possible the processes of change in the agricultural sector, the integration of sustainable issues, the diversification of the rural economy and the improvement of quality of life (Strahl and Dax, 2011). A LAG is generally composed by public and private partners (at the management level, the private partners and associations must constitute at least 50% of the local partnership), that are representative of the active local interest groups, drawn from the diverse socioeconomic sectors in the area (Contò et al., 2011). So the LAG represents an organizational model able to positively influence the delivery of policies. The role of LAGs have also changed over the last years in some EU countries, as awareness with the LEADER approach has full-fledged (Council Regulation (EC) No 1698/2005). LAGs generally choose the local rural development strategy, and the different projects to be financed; a paying authority make payments considering the project selection made by the LAG. Axis III of the National Strategy Plan for Rural Development - Quality of life and diversification –highlights the importance and the crucial role of the sustainability, multifunctionality and social dimension within the context of practices and professions in agriculture in order to promote improvement in the quality of life; the addresses of the measures relevant to Axis III can participate in the public tenders only through a LAG (Fiore et al., 2014; ENRD, 2010; Scott, 2004). This insight on the key importance of sustainability and multifunctionality is corroborated by several scholars and researches (Contò et al., 2013; OECD, 2005, 2006, 2008; Wilson, 2008; Jongeneel et al., 2008; Scuderi et al., 2014).

Focusing on Measure 311 Axis III, it aims at diversification into non-agricultural activities in order to support farm businesses restructuring through the development of diversified activities that provide alternative income sources. Some scholars (Ramos and Garrido, 2014) demonstrate that the most effective rural development strategies based on quality differentiation are successfully implemented by LAGs; another scholar (Lagravinese, 2013) have shown LAGs represent an effective planning tool for the local development in particular in the Apulia region where there are old nice rural structures in the farms. The effectiveness depends also on the formation of partnerships and networks and on the principles of collaboration among the representatives of local authorities, businesses and rural communities, and consultations with local population (Chevalier et al., 2012; Tamosiunas, 2011); therefore, the weakness of the LAGs derives by the formal and legal problems regarding the financing rules and lack of power in implementation of local strategy measures (Chmieliński, 2011). In processing the Measures of Local Development Programme (LDP) and managing financial funds for Firms Modernization Plans (FMPs) by the European Union and by the European Agricultural Fund for Rural Development (EAFRD), the transparency and public accountability of some LAG activities are not always on a high level (Lošťák and Hudečková, 2010). The EAFRD shall contribute to the support of sustainable rural development throughout the Community in a complementary manner to the market and income support policies of the common agricultural policy. Nevertheless, the implementation of FMPs can lead to develop rural areas and to increase the farm income; previous studies (Fiore et al., 2014) demonstrated how favoring a multi-functional approach is crucial for creating innovative organizational models able to develop new jobs and improve competitiveness.

Starting from this latter research, given the data collection of our case study, Apulia region (South Italy), the aim of this paper is to analyze the difference among the selected LAGs covering the regions in order to understand if the elected variables assume different values with respect to the belonging to the 6 provinces of the region; in addition, the secondary purpose is to verify the possibility to classify the annual farm income, before the FMPs investments, and the same investments respect to the some defined variables in order to select groups and predict how their responses to some variables affect other variables.

2. Data

The data collection is related to 411 farms representing the total number of firms which have applied for aid of Measure 311 in Apulia Authority until November 2013. Apulia – a South Italy region – has implemented 25 LAGs covering the entire Region and belonging to the 6 Apulia provinces: Bari, BAT (Barletta, Andria, Trani), Foggia, Lecce, Brindisi, Taranto. Figure 1 shows the Apulia region and its recognized LAGs. Every LAG has on average 18 farms submitting the Firms Modernization Plans to the same LAGs in order to require for public aid for the different actions of the Measure 311; each of the 411 farms aims to diversify farm activities into non-traditional and so non-agricultural activities (including social ones) in order to increase the farm income by means the Measure 311 that represents a good opportunity of investment. In detail, Measure 311 has 3 Actions: the Action 1 is related to investment in the provision of accommodation agro-tourism in the business environment in accordance with local regulations; Action 2 foresees investments for the provision of educational services and training for the population, with particular reference to the school and the students and in synergy with the national education system; Action 3 is related to investment in the provision of health services for the benefit of vulnerable groups.

The data collection can be considered exhaustive and official: it is exhaustive because all 25 LAGs are analyzed except 3 LAGs – 'Murgia Più', 'Terre dei Trulli e del Barsento' and 'Isola Salento' - as the ranking list is actually ongoing; and it is also official because data represent the all firms info deriving from Firms Modernization Plans, co-financed by EU funds 2007-2013, related to the implementation of Meas. 311, Action 1, 2, 3 and submitted by farms to the LAGs, following the related notice.

Figure 1. LAGs covering the Apulia Region

Source: our processing on data by Apulia Region and the National Rural Network (http://www.reterurale.it)

Table 1 shows the main characteristics of the 22 Apulia LAGs; the number of municipalities, the province of belonging, the inhabitants/km, the aid requests, splitted in received and approved request. Firstly, we can notice the LAG Meridaunia has the higher number equal to 30, while the LAGs Le Città di Castel del Monte, Ponte Lama and Terre di Murgia have, for example, only 2 municipalities. Furthermore, as you can see, relating to the latter item of the table, the following LAGs - Alto Salento, Le Città di Castel del Monte, Terre di Primitivo - have a percentage of the ratio between received aid request and approved aid request over 87%. In addition, the table highlights the LAG composition, splitting in Public Partners and Private Partners; then, within of the Private Partners, the presence of Touristic firms and Tourism promotion agencies was considered because it can represent a crucial driver for implementing agro-tourism or nontraditional agriculture activities. Indeed, a strong participation of Touristic firms and Tourism promotion agencies in the LAG partnership can led to take in account and to promote touristic and sustainable activities, cultural and wine and food paths and routes and so on. It is important to be noticed that the LAG Serre Salentine and Terre d'Otranto have the major number of Tourism promotion agencies (respectively 8

and 7) both belonging to the province of Lecce that is a renowned touristic area: in the last decade, it is the first touristic destination in Italy for Italian and international tourists.

Table 1. Characteristics of 22 selected Apulia LAGs

LAGs	Number of Municipalities	Province of belonging	Inhabitants /Km^2	Number of aid requests (received)	Number of aid requests (approved)	Number of Public Partners	Number of Private Partners	Within Private Partners	
								Number of Touristic firms	Number of Tourism promotion agencies
Alto Salento	7	Brindisi	199	58	51	8	45	4	1
Capo S.Maria Leuca	18	Lecce	256	52	37	25	95	3	1
Colline Joniche	11	Taranto	267	26	18	21	95	2	6
Conca Barese	9	Bari	222	65	37	4	124	2	1
Daunia Rurale	8	Foggia	88	40	32	13	38	2	1
Daunofantino	5	Foggia	154	33	19	10	5	0	0
Fior d'Olivi	3	Bari	210	74	43	10	124	2	1
Gargano	13	Foggia	154	92	50	22	39	7	1
Le Città di Castel del Monte	2	BAT	521	46	40	6	72	1	0
Luoghi del Mito	7	Taranto	122	63	41	18	42	1	4
Meridaunia	30	Foggia	43	58	26	41	44	8	4
Piana del Tavoliere	6	Foggia	156	55	20	12	79	1	1
Ponte Lama	2	Bari	615	35	27	6	107	0	0
Serre Salentine	14	Lecce	154	46	30	29	135	3	8
Sud Est Barese	6	Bari	277	83	52	17	217	8	4
Terra d'Arneo	9	Lecce	227	55	38	16	99	1	4
Terra dei Messapi	8	Brindisi	221	37	31	8	40	0	3
Terra d'Otranto	24	Lecce	192	56	44	37	83	3	7
Terre del Primitivo	11	Taranto	170	37	33	19	44	3	5
Terre di Murgia	2	Bari	158	66	38	11	60	1	2
Valle della Cupa	12	Lecce	488	49	38	9	44	1	1
Valle d'Itria	3	Bari	190	54	39	5	121	6	0

Source: our processing on data available at: http://geogal.inea.it/default.asp?p=home&regione=16

3. Materials and methods

The exploratory data analysis has been performed in several steps. Starting from our previous work (Fiore et al., 2014), we consider variables characterizing and qualifying the issue of study: the annual farm income before of FMPs (*rev_before*), the farm size (*farm_size*), the investments (*inv*) of each farm in the co-financing plan in 2011

and finally the percentage of ownership by the entrepreneur in the farm (*%_owners*). Public aid variable have not been considered as it is to completion to private investments. In addition, the considered farms have been classified according to belonging to 22 LAGs (Gal) and to the 6 Apulia provinces: Bari, BAT (that is Barletta, Andria, Trani), Foggia, Lecce, Brindisi, Taranto.

The data analysis has been performed by following an integrated statistical approach consisting in three steps: 1) difference analysis by means of ANOVA procedure in order to understand if the *rev_before*, *inv*, and *farm_size* assume different values with respect to the belonging to the 6 provinces and to the 22 Apulia LAGs; 2) verifying the possibility to classify the *rev_before* and *inv* variable respect to the predictor variables (*farm_size*, *Gal*, and *%_owners*) by means of exhaustive CHAID decision-tree algorithm: in particular a CHAID decision-tree algorithm with a splitting criterion based on a chi-square test has been used (Magidson, 1994); 3) a confirmatory analysis of exhaustive CHAID decision-tree with split-sample validation, using a training sample and testing sample has been carried out; the training sample has been considered and expressed as a percentage of the total sample size equal to 80%. CHAID is very useful to our research aims and in considering large sample sizes as it can be used for prediction as well as classification, and for detection of interaction between variables in an highly visual and easy way. Data analysis has been performed using the SPSS 16.0.

4. Results

The exploratory data analysis for *rev_before* variable (Table 2) shows that the province of Bari has the higher value (mean = € 21.823,9) and in addition there is the higher number of LAGs (n = 7), while the province of Taranto has the lower average income (mean = € 7.036,0). All provinces are characterized by a big variability, as the standard deviation values (SD) highlight.

Table 2. Statistical analysis of rev_before variable for provinces

Provinces	***No. of Farms***	***No. of LAGs***	***Mean (€)***	***SD(€)***	***Median(€)***	***Skewness***
Bari	85	7	21.823,88	47.972,38	0,00	2,82
Brindisi	43	4	11.239,30	27.361,27	0,00	2,63
BAT	15	3	15.988,33	42.555,50	0,00	2,49
Foggia	74	5	8.525,64	19.167,49	0,00	3,77
Lecce	117	5	11.156,20	46.312,87	0,00	6,62
Taranto	77	6	7.035,99	24.850,44	0,00	5,10

Source: our processing

Furthermore, it is to be noticed that half of firms involved in the co-financing plan starts from an income equal to 0, as shown by median value. In addition, the exploratory data analysis shows for *inv* variable (Table 3) that the higher value corresponds to the province of BAT (mean = € 225.085,7), nevertheless it is characterized by the lower number of LAGs. The province with the lower investments is Foggia (mean = € 149.020,4). However, it is important to notice that even in this case the variability is very high for all provinces, as highlighted by deviation standard values. As regards the *farm_size* variable (Table 3), the province with the major extension is Taranto, followed by the province of Foggia (with an huge variability equal to a value of SD = 114,12 ha), while the province of BAT and Brindisi are on the lower average values. The ANOVA has been performed with respect to the six provinces (Table 5); significant differences does not stand out for the *rev_before* variable (p-value>0.05), while for *inv* and *farm_size* variables differences are highly significant (p-value<0.001). In addition, we performed an ANOVA procedure with respect to the 22 LAGs too and the empirical differences observed in *rev_before*, *inv* and *farm_size* are found to be significant (p-value<0.001) (Table 6).

Table 3. Statistical analysis of *inv* variable for provinces

Provinces	No. of Farms	No. of LAGs	Mean (€)	SD (€)	Median (€)	Skewness
Bari	85	7	169.745,22	92.119,05	161.151,00	0,40
Brindisi	43	4	224.238,09	113.779,32	255.275,00	-0,17
BAT	15	3	225.085,67	106.032,72	270.000,00	-0,37
Foggia	74	5	149.020,35	94.979,88	100.000,00	1,11
Lecce	117	5	170.501,91	121.319,40	121.458,00	0,92
Taranto	77	6	217.998,75	126.490,67	220.545,00	0,65

Source: our processing

Table 4. Statistical analysis of *farm_size* variable for provinces

Provinces	No. of Farms	No. of LAGs	Mean (ha)	SD (ha)	Median (ha)	Skewness
Bari	85	7	45,31	67,73	21,18	3,24
Brindisi	43	4	38,85	39,13	23,58	2,00
BAT	15	3	35,81	43,31	9,75	1,19
Foggia	74	5	57,08	114,12	25,58	5,70
Lecce	117	5	17,26	21,60	8,40	2,16
Taranto	77	6	62,61	78,20	37,66	3,34

Source: our processing

Table 5. ANOVA results between 6 provinces for *rev_before*, *inv*, *farm_size* variables

	Df	Sum Sq	Mean Sq	F-value	p-value
Rev_before	5	11.694.435.881,046	2.338.887.176,209	1,652	>0.05
Inv	5	299.029.215.554,311	59.805.843.110,862	4,828	<0.001
Farm_size	5	119.398,726	23.879,745	4,951	<0.001

Source: our processing

Table 6. ANOVA results between 22 LAGs for *rev_before*, *inv*, *farm_size* variables

	Df	Sum Sq	Mean Sq	F-value	p-value
Rev_before	21	68.496.253.779,557	3.261.726.370,455	2,461	<0.001
Inv	21	1.055.799.123.954,653	50.276.148.759,745	4,599	<0.001
Farm_size	21	272.501,473	12.976,261	2,811	<0.001

Source: our processing

Moreover the ANOVA is useful to either assess the presence of eventually similarities or dissimilarities between groups but not supply a criterion of classification nor to predict the membership of cases in the classes of a dependent variable from their measurements on one or more predictor variables. All these considerations joined with the flexibility of the classification trees lead us to use the CHAID tree algorithm to predict and to explain the *rev_before* and *inv* variables with respect to the predictor variables. Both classification trees are formed from the

root (the highest node of each tree) until reaching a terminal node or leaf. Then each node of trees shows the predicted value, which is the mean value for the dependent variable at that node. The resulting classification trees for *rev_before* are shown in Figures 2a and 2b respectively (with training sample n=328 and test sample n=83). As independent variables were considered: *farm_size*, *%_owners*, *Gal* (belonging to a LAG). But the tree algorithm has included in the model only *farm_size* and *Gal* variables; it is not found to be significant for the purposes of this work the variable *%_owners*. This not-significance maybe can be due in considering that the Apulia region has been always characterized by the presence of 'masseria' that are fortified farms representing a geo-economic structure linked to the 'latifundium' (large estate) and managed by 'massari' that are sharecroppers, today become 'renters'. By the analysis of these results, it can be seen that both trees (respectively with training sample and test sample) lead to the same partition of the observations, have five child nodes suggesting the presence of five groups and that the detected portions were all statistically significant (p-value<0.05). In particular, the two groups of classification for *rev_before* were *farm_size* ≤ 27,54ha and *farm_size* > 27,54ha. For the first group, the *rev_before* mean is € 44.856,2 (n=197), whereas for the second group the *rev_before* mean is 84.430,0 (n=131). Therefore, there is in the latter group (27,5ha is the cut off) a significant (p<0.001) increase in income. These results are as expected at the theoretical level and considering the 'latifundium' structure of the Apulia region. Then, there is three child nodes for the *farm_size* <= 27.54: for the smaller farms, belonging to certain LAGs (*Gal*) seem to affect the income (p>0,05) in line with the main LAG purpose of making possible the improvement processes of the farms; in particular, the node 3 with a farm average income equal to 60.300,980 is composed by all LAGs belonging to the province of Bari and Taranto. The confirmatory analyses with split-sample (20% of whole sample, n=83) fit with the results by training sample (Figures 2b).

Figure 2a. Classification tree of rev_before by farm_size and gal training sample

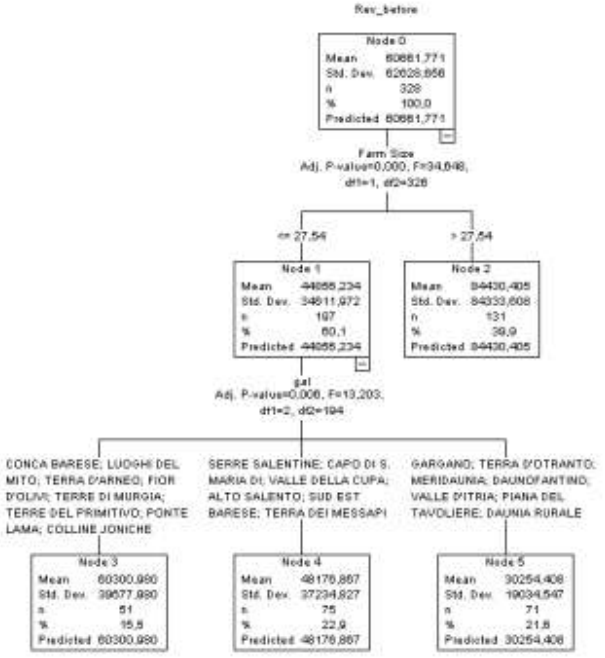
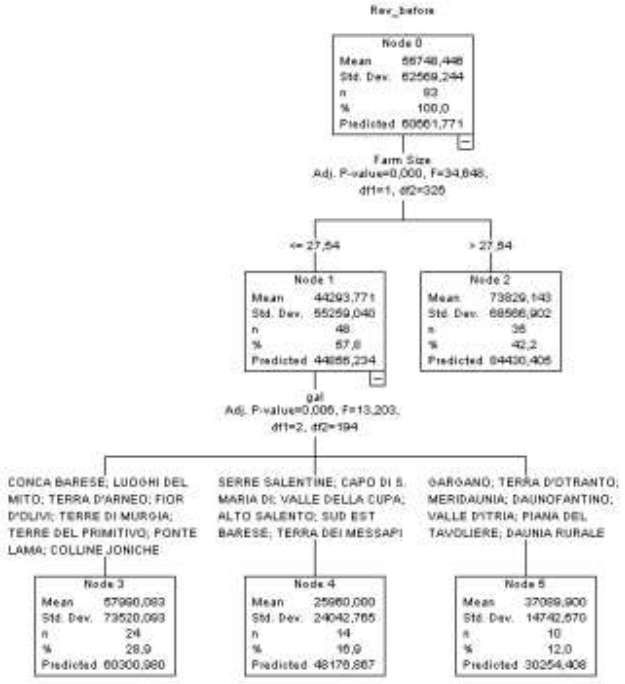


Figure 2b. Classification tree of rev_before by farm_size and gal test sample



Source: our processing

The resulting classification trees for inv (investments) are shown in Figures 3a and 3b respectively. As independent variables *farm_size*, *%_owners*, *gal* and *rev_before* have been considered; even in this case, the tree algorithm has included in the model only *rev_before* and *gal*, *farm_size*. By the analysis of these results (Fig. 3a and Fig. 3b), it can be seen that both trees (respectively with training sample n=327 and test sample n=84) lead to the same partition of the observations: they have five child nodes suggesting the presence of five groups and the detected portions were all statistically significant (p-value<0.05). In particular, it is to be noticed that the node 3 that has the major average investment equal to € 286.000,6 is composed by all the LAGs (except LAG Ponte Lama) with a high number of Tourism promotion agencies and Touristic firms. Then, there are two child nodes for the second group of LAGs (*gal* variables); only for this group, indeed, the *rev_before* affected significantly (p<0.001) on investments (cut-off € 40.320,0). The farms of this node are belonging to almost all LAGs of the province of Lecce, a main share of 'Salento' area, that is a renowned touristic area, almost anywhere planted, and the tree line is mostly made up of stretches of olive trees that make it famous and profitable and able to invest. Finally, in order to validate the information obtained by classification tree analysis, a bootstrap analysis has been also carried out by running 200 iterations of random data selection for the training sample and the test sample. The bootstrap has confirmed the bread partition for both variables at each iteration step and the stability of classification detected by the classification tree analysis.

Figure 3a. Classification tree of Inv by Gal and rev_before training sample

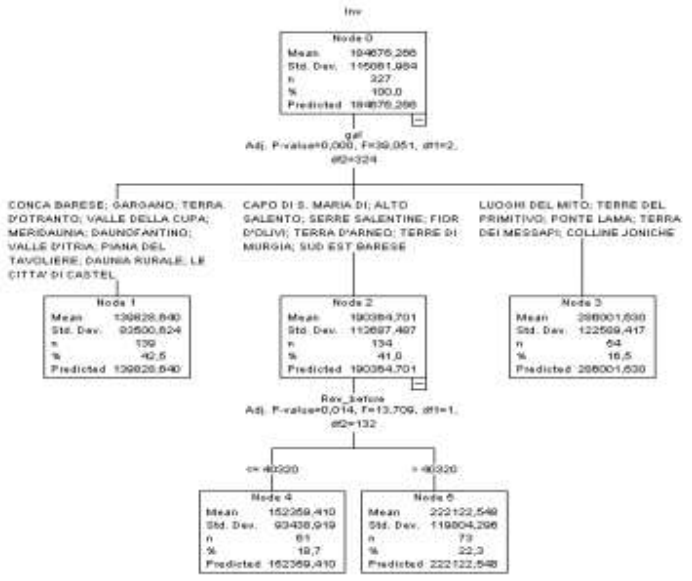


Figure 3b. Classification tree of Inv by Gal and rev_before test sample

Source: our processing

5. Conclusions

Starting from our previous research, the aim of this paper was to analyze the difference between the Apulia LAGs with respect to the belonging to the 6 provinces of the region; all provinces are characterized by a big within variability of the income, farm size and investments. In addition, the paper tried to verify the possibility to classify the annual income, before the FMPs investments, and the same investments in order to select groups and predict how their responses to some variables affect other variables. The tree algorithm have highlighted the presence of sub-groups of farms that are strictly dependent on farm size and belonging to LAGs; the latter dependence is in line with the main LAG purpose of improving revitalization processes of the farms. Finally, it can be observed that, although the big variability of the considered variables, it seem possible to track a path and give general insight. As regard the investments in non-agricultural activities, the more virtuous farms are those benefit from LAGs with a partnership formed by a consistent number of Tourism promotion agencies and Touristic firms and belonging to the 'Salento' area, famous touristic and profitable investment area. In order to draw a policy implication, it can be highlighted that a LAG can be a crucial driver to implement effective rural development strategies (Ramos and Garrido, 2014) depending on the localization and on the initial context; thank to the special typical old rural structures in the farms, (Lagravinese, 2013) the Apulia LAGs can represent, in the long period, an effective planning tool for the local development. They shall contribute to the success or failure of the programmes' implementation, including as regards sustainability, and support rural development for improving the economic and sustainable competitiveness of agriculture, improving the environment and the countryside by supporting land management. Regarding research limitations, we can notice the research is exploratory and therefore, by nature, in need of further empirical validation. The future data collection will be carried out by means of investigating the annual income after the FMPs investments (not known in this period as the implementation is actually ongoing). This further step will allow to confirm if policy strategies of each LAG can be really a crucial variable for the final results aimed at increasing the farm income sources.

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