Government Extension Service Impact Assessment

AUTHORS

Dr. Engjell Skreli
Faculty of Economics and Agribusiness, Agriculture University of Tirana
eskreli@ubt.edu.al

Dr. Drini Imami
Faculty of Economics and Agribusiness, Agriculture University of Tirana
dimami@ubt.edu.al

Dmitry Zvyagintsev
FAO
Dmitry.Zvyagintsev@fao.org

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Abstract

This study analyzes the impact of Albanian public extension services, using a quazi-experimental design by applying Propensity Score Matching Method, based on a structured survey administrated in 2013, focusing on olive and vineyard sectors. The study results show that the government extension service has had no net impact on increasing farm size and on increasing area under fruit plantation. The impact of the government extension service on new technology adoption and on crop yields and on-farm employment is limited. The study recommends that government should consider establishing model farms to promote government policy priorities; restructuring and upgrading the public extension service is needed to achieve policy objectives.

Key words: Extension Services, Propensity Score Matching, Albania

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1. Introduction

1.1. Background of extension services in Albania

The extension service in Albania started to operate in 1993 with the support of the European Union (EU). Initially the extension service was centrally based due to limited funding. In 1998 the regional advisory centres started to operate in the main agricultural production areas.

Despite the potentials and the mandate of the public extension services, its effectiveness is limited due to quantitative (e.g. number of staff) and qualitative limits (e.g. skills, know-how). The large number of farms and the small farm size in Albania lead to a very high ratio of farms per public extension worker. On average each extension worker in Albania covers more than one thousand farms, whereas for the United States, the ratio is about 1:245 (USDA, 2012). In addition, extension services face other constraints such as: insufficient financial support in the form of investment in agricultural information centres and operational costs to accomplish the extension activities; high average age of extension specialists and their limited IT skills and limited capacities in farm management, marketing and business planning (MARDWA, 2014).

As a result of the limited resources, the public extension services play a relatively small role in providing support and technical assistance to off-farm subsectors (i.e. processors, wholesalers, retailers). The limited supply for knowledge is important due to the need for more technological skills and reduced education levels in rural areas.

The benefit for the farmers by the extension services is monitored by the Ministry of Agriculture, Rural Development and Water Administration (MARDWA) according to which about 5 – 10% growth rates in production values is achieved due to increased quality, increased productivity and better organization of production and trade (MARDWA, 2014). However, one should question, to what extent this growth can be attributed to the role of extension services and to what extent to the overall growth trends of agriculture sector/households which characterize both beneficiaries and non-beneficiaries of public extension support.

1.2. Sectors and area selected

Vineyard and olive tree production are the sectors included in the study given their importance for the sector for the agricultural sector. These are among the most important and fastest growing agri-food sectors in Albania. Production of olives has increased significantly the last years. The production in 2012 was about 100,000 ton, which implies a drastic increase compared to 27,600 ton in 2007. After 2007, there was a marked expansion of plantations stimulated by national support schemes, and the number of olives plantations has increased by about 60% since 2007. Also the production of grape has increased significantly by almost 1/3 compared to 2007 (MARDWA, 2014). Fier and Shkoder are the regions selected based on their potential for growing vineyard and olive trees but also based on intensity of related government support scheme.

1.3. Study objectives and evaluation questions

The study objectives:

1. Assess the outcomes of the extension service – direct benefits to beneficiaries;
2. Assess the impact of the extension service – indirect benefits of other beneficiaries.

Evaluation questions specify the study objectives. Actually they provide the hypothesis to be tested.

Table 1: Impact assessment evaluation questions

Chain of results and other issues	Evaluation questions
Outcomes or direct benefit of targeted beneficiaries	1. Has extension service had any net effect on increased area under fruit trees? Has it affected farm size? 2. Has extension service had any net effect on introducing new technologies? Has it any net effect in crop yield increase 3. Has extension service had any net effect on farmers' productivity increase?
Mobilization of additional resources by targeted beneficiaries	4. Has extension service had any effect on investment? Has it contributed to mobilizing additional resources from other sources, including other grants, farmers own money, bank loans?
Impact or indirect benefits of other beneficiaries from government subsidy scheme	5. Has extension service had any net effect on increased demand for inputs both raw materials and advice from extension service and consultancy? Has it had any impact on increased sales to farmers own benefit and to the benefit buyers downstream? 6. Has extension service had any net effect on promoting cooperation among farmers and cooperation with other value chain actors? 7. Has extension service had any net effect on farmers overall status?

The paper is structured as follows: Methods and procedures where data collection, research design and data processing procedure are described, Study results following the logic of evaluation questions, Summary of findings and recommendations ad Study limitations.

2. Methods and procedures

2.1. Data

A survey of 234 farmers – treated (advised intensively) and not treated (advised less intensively)[1] - has been conducted; farmers have been selected randomly. The questionnaire has been designed such that it allows assessing outcome and – where possible – impact of public extension service. Data collection has been performed by well-trained master students.

[1] The distinction between "intensively contacted farmers" by extension workers and "less intensively contacted farmers" has been proposed by extension service managers themselves, based on current practice

2.2. Research design

Quasi-experimental designs using Propensity Score Matching has been used in to create two similar groups from a randomly selected sample, an experiment group (intensively contacted farmers) and a control group (less intensively contacted farmers). The groups are formed to be similar in a number of key characteristics, except for treatment. Hence, the difference in outcomes and impact is supposed to be attributed to the treatment. For more in depth understanding of Propensity Score Matching procedure, refer to Annex 1: Methods and procedures

2.3. Data processing

In our analysis, we assess – where possible - net treatment effect as a result of double difference – the difference between 2012 and 2008 outcome for treatment and control groups, and the difference between difference of treatment and difference of control group , as visually represented by Table 2.

Table 2: Net treatment effect

Treated Group	Outcome 2008	Outcome 2012	Δ_1 in Outcome treated = Outcome 2012- Outcome 2008 for treated group
Un treated Group	Outcome 2008	Outcome 2012	Δ_2 in Outcome non-treated = Outcome 2012- Outcome 2008 for treated group
		Net treatment effect = difference of differences	Δ_1 in Outcome treated - Δ_2 in Outcome non treated

Measuring net treatment effect – difference of differences - is done also by running simple linear regressions to find out whether the subsidy make any statically significant impact. The simple regressions take the following form:

$$Y = \alpha + b_1 * X + b_2 * T + \varepsilon$$

where Y is the post-score of an outcome variable, α is the estimated intercept, X is the pretest score of the same variable, and T is a (0,1) indicator for treatment or control group, in our case 1 stands for having been consulted intensively and 0 for having been consulted less intensively. Treatment effects were hence computed as difference in the outcome between treatment and control groups conditional on pre-test score. Actually, the b_2 coefficient associated with T (Treatment) provides a measure of net treatment effect, or difference of differences.

3. Study results

3.1. The similarity of treatment and control group

Two similar groups of farmers have been formed using propensity score matching procedure. Farmers are similar on sectors they belong to. Sixty nine farmers are olive farmers and the rest, 71 farmers, are vineyard farmers. The majority of farmers come however from Fier qark, 104 farmers, and only 36 farmers come from Shkoder qark. Farmers in both treatment and

control groups are similar in term of age of household head. The average age for the household heads included in the survey is 57 years old. The average age of contact farmers is only one year higher than that of non-contact farmers - 57.46 years old for contact farmers versus 56.56 years old for non-contact group of farmer. The education level is similar for both groups. The median value for both groups is 4 corresponding to Agriculture high school, and the farmers' distribution through different education levels is similar. Groups are also similar in terms of main employment with "Self-employed on farm" representing the most frequent main employment, followed by on "Employed on farm". ANOVA supports the similarity by informing on no significant difference between the two groups. Farm size is quite similar for both groups of farmers, with only a small difference in favor of contact group of farmers. The average farm size for contact group is slightly larger than that of non-contact group of farmers – 15.4 versus 14.6 – and the difference still remains if average without outliers (5% trimmed mean) is considered.

The outcome and impact of extension service is described in the following discussion.

3.2. Farming production capacities, investment and technology

Government extension service has no impact on increased farm size. The double difference – between contact and non-contact farmers in two points in time (2012 and 2008) is only -0.42 dynyms (0.4 ha), meaning that there is a decrease in farmer size for treated farmers (Table 3) compared to non-treated farmers. The difference is not significant however as supported by significance of coefficient B associated with Contact_2008[2] (Table 4). The non-significance of net effect (double difference) should be interpreted as not really different from zero.

Table 3: Extension service impact on farm size

		Farm size in 2012	Farm size in 2008	Diff. Farm Size (2012-2008)
		Dynyms (1 dynym = 0.1 ha)		
Contact farmer	Non-contact	15.20	14.80	.37
	Contact	14.70	14.75	-.05
Double difference				-0.42

Table 4: Significance of extension service impact on farm size

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	.683	.648		1.055	.294
B3. Farm size in 2008	.979	.037	.926	26.105	.000
Contact_2008	-.418*	.463	-.032	-.902	.369

a. Dependent Variable: B2. Farm size in 2012

*The figure measures the double difference. The slight difference with double difference (Table above) is explained by calculation errors

The two groups have rather the same farm size in 2008 (Table 3) – the average farm size at the start (2008) was 14.8 dynym (1.48 ha) for non-contact farmers and 14.7 (1.47 ha) dynym

[2] Sig > .05 support no significant impact

for contact farmers. While farm size for non-contact farmers increased to 15.2 dynym (1.51 ha) in 2012, it remains virtually unchanged for contact farmers.

While farm size for subsidized farmers remains unchanged, in two cases, subsidized farmers have rented land to establish fruit plantations. The areas rented were 5.5 and 6 dynyms. Qualitative information from the field supports that land rental market may be an opportunity, particularly regarding land managed by rural communes. The rental of private land market for establishing new fruit plantations does not function due to land ownership titles insecurity.

The government extension service has no net impact on increased fruit area. The double difference – between contact and non-contact farmers in two points in time (2012 and 2008) in terms of fruit tree area is -0.1 dynym (-0.1 ha), as shown in Table 5. The difference is clearly insignificant as supported by Sig. (Table 6)[3]

Table 5: Extension service impact on fruit area

		Total area in 2012	Total area in 2008	Diff. Fruit tree Area (2012-2008)
		Dynyms (1 dynym = 0.1 ha)		
Contact farmer	Non-contact	5.1	2.8	2.3
	Contact	7.4	5.2	2.2
Double difference				-0.1

Table 6: Significance of extension service impact on fruit area

	Sum of Squares	Df	Mean Square	F	Sig.
Between Groups (1=contact farmer, 0=non-contact farmer)	.227	1	.227	.021	.886
Within Groups	1490.248	136	10.958		
Total	1490.475	137			

The two groups depart on different start in terms of fruit area – the fruit area in 2008 was 5.2 dynyms for contact farmers and 2.8 for the non-contact farmers (Table 5). The intensive assistance provided by extension service to contact farmers has not impacted at all the area planted between 2008 and 2012. Though the area under fruit trees for contact farmers has increased by 2.2 dynym (0.22 ha) between 2008 and 2012, the increased is virtually the same as the one for non-contact farmers – for the last group the increase in fruit area for the studied period was 2.3 dynyms (0.23 ha). Therefore, the net impact of extension service in terms of increased fruit tree area is non-existent or at best negligible.

The government impact subsidy has no net impact in regarding the number of trees. Data analysis reveals there is only a negligible net impact in terms of number of trees (Table 7). The impact is definitely non-significant.

[3] Sig > .05 support no significant impact

Table 7: Government subsidy impact on number of trees per farm

		No of tress in 2012	No of tress in 2008	Diff. No Trees (2012-2008)
Contact farmer	Non-contact	722	362	360
	Contact	1227	863	364
Double difference				3

Actually the insignificant impact of government extension service in increased number of trees is a confirmation of missing impact in terms of area planted with fruit trees.

3.3. Investment and resource mobilization

Extension service has not had any significant impact on amount of resources invested by farmers. The overall average amount of resources invested by all farmers included in the study is ALL 426,698 (Euro 3,048). Contact farmers have invested on average ALL 478,057 (Euro 3415), and non-contact farmers have invested ALL 374,371 (Euro 2,674). Despite the positive difference in favor of contacted farmers in terms of investment, ANOVA procedure informs however that amount of resources is not significantly different between the two groups (contact ad non-contact farmers). This is most probably due to high level of standard deviation. Government extension does not count for differentiating the groups with respect to investment in the last 5 years or plans to invest in five coming year. The frequency of farmers having invested since 2008 is the same for both contact and non-contact farmers. Virtually the same pattern is observed regarding intention to invest in five coming years.

Extent to which farmers would have invested without extension worker advice support the conclusion that extension service has had no impact on motivating investment. Farmers who would have invested almost 100% of what they have invested even without extension service advice are divided in two equal parts (Table 8). The average amount farmers plan to invest (Euro 3,102) is close to amount they have already invested (Euro 3.048).

Table 8: Extent to which farmers would have invested without extension worker advice?

			To what extent would you have without extension worker advice? - part of investment already done, in %										Total
			0	10	15	30	39	40	50	60	70	99	
Contact farmer	Non-contact	Count	15	0	0	2	1	0	3	1	2	46	70
		%	10.7%	0.0%	0.0%	1.4%	0.7%	0.0%	2.1%	0.7%	1.4%	32.9%	50%
	Contact	Count	13	1	1	0	1	1	5	0	1	47	70
		%	9.3%	0.7%	0.7%	0.0%	0.7%	0.7%	3.6%	0.0%	0.7%	33.6%	50%
Total		Count	28	1	1	2	2	1	8	1	3	93	140
		%	20.0%	0.7%	0.7%	1.4%	1.4%	0.7%	5.7%	0.7%	2.1%	66.4%	100%

While more than half of interviewed farmers state that government has had strong and very strong impact on investment, analysis of objective factual information (investment already occurred) does not support such statements.

Government extension service has managed to make some difference in terms of resource mobilization. More contact than non-contact farmers – 37 versus 29 - have applied to government subsidy scheme, and more contact than non-contact farmers – 34 versus 25 - have succeeded to receive a grant. Farmers state that extension service advice has had an important influence on their motivation and capacity to apply to government subsidy scheme. More than four in five farmers, or 81.4% of 59 farmers having provided an answer, state that extension service impacted their motivation and capacity to apply for grants strongly or very strongly. It may be tentatively concluded therefore that government has made some impact in terms of resource mobilization as far as government subsidy is concerned. The impact of extension service in improving access to commercial loans is completely missing. Out of 7 cases of application and funding, 6 are non-contact farmers and only one is contact farmer.

3.4. Technology adopted

Government extension service has a limited impact on introducing new technologies. Both contact and non-contact farmers differ only marginally regarding the investment in technological assets. Table 9 reveals that there are only small differences regarding investment in technological assets, as supported by frequency and percentage by type of technology. Additionally, the test of significance informs that in none of pairs (contact and non-contact farmers) proportion related to contact farmers is significantly different from that of non-contact farmers.

Table 9: Investment in technology

	Contact farmer			
	Non-contact		Contact	
	Count	Row %	Count	Row %
1. Introduced new fruit cultivars	21	50.0%	21	50.0%
2. Introduced drip irrigation	10	41.7%	14	58.3%
3. Introduced new spraying technology	30	46.2%	35	53.8%
4. Introduced new plant protection chemicals	33	55.0%	27	45.0%
5. Introduce new fertilizers	35	54.7%	29	45.3%
6. Introduced new agricultural machineries	19	45.2%	23	54.8%

The limited extension service impact on new technology introduction is also supported by related farmers assessment; two out of three farmers state that the extension service impact is from very weak to average and more than one in three of farmers "blames" public extension service for very weak impact in new technology introduction.

The investment in drip irrigation – still considered as new technology – also support the limited impact of extension service. In 2012, 23 out of 140 interviewed farmers, or 16% of them have invested in drip irrigation technology; the number of farmers with drip irrigation system in 2008 was only 11 farmers, or 8% of them. The extension service does not count in making a difference even in terms of drip irrigation technology.

3.5. Production and yields

Government extension service does not have any net impact on increased fruit production, for both olive and vineyard sector, as supported by information in Table 10. The net impact of

intensively assisting contact farmers, represented by double difference measure is -3.8 kv (0.38 Tons) per farm for olive sector and -1.8 kv (0.18 Tons) per farm for vineyard sector (Table 10, last raw).

Table 10: Extension service impact on fruit production

		Sector					
		Olive			Vineyard		
		Production in 2012 (kv)	Production in 2008 (kv)	DQ Production (kv) (2012-2008)	Production in 2012 (kv)	Production in 2008 (kv)	DQ Production (kv) (2012-2008)
		Average per farm, (Kv)					
Contact farmer	Non-contact	31.8	14.8	16.95	40.3	36.5	3.80
	Contact	24.9	11.7	13.14	80.2	78.2	2.00
Double difference				-3.8			-1.8

Contact and non- contact olive farmers depart on a rather similar production level in 2008 – with a small difference in favor of non-contact farmers. While production increased substantially for both groups of farmers, it has increased faster for non-contact than for contact farmers – the net impact inform of a negative impact of -3.8 kv for contact farmer (Table 10). Vineyard contact farmers start from a much high production level than non-contact farmers in 2008 – 78.2 kv versus 36.5 kv per farm. The change over years supports in vineyard sector a negative net impact of -1.8 kv for contact farmers. The net impact is statistically insignificant however, as informed by ANOVA procedure.

The non-significance of net impact in terms of production is a logical corollary of both factors determining production, change in fruit tree area and change in crop yields. Study results reveal extension service has had no net significant impact neither in terms of area under fruit trees neither in terms of crop yield (for crop yields, refer to following discussion).

Government subsidy doesn't have any net positive impact on increased yields. The data in Table 11 (last raw: Double difference) shows that there is a net negative impact in both crops (0.34 Ton per ha for Olives and 4.23 Ton per ha for vineyard).

Table 11: Government subsidy impact on yields

		Sector					
		Olive			Vineyard		
		Yield 2012	Yield 2008	Diff Yields	Yield 2012	Yield 2008	Diff Yields
		Average yield (Ton/ha)					
Contact farmer	Non-contact	5.48	4.67	.81	14.26	12.14	2.12
	Contact	3.45	2.99	.47	13.51	15.63	-2.11
Double difference				-0.34			-4.23

Olive farmers differ in 2008 yields by contact and non-contact farmers – non contact farmers have higher yields than contact farmers (4.67 versus 2.99). Yields have increased for both groups but they have increased at a faster pace for non-contact groups, resulting in a negative net impact for contact group. Vineyard farmers start on a quite similar yield level; here

contact farmers have higher yields at the start than do non-contact farmers. While the yields for non-contact farmers have increased, they have decreased for contact farmers resulting in a negative net impact for contact farmers of -4,23 Ton per ha.

One way ANOVA informs however that that this net impact is not statistically significant, meaning the difference may be due to chance. At any case, the conclusion one can safely draw from the data is that government extension service has not any impact on crop yield increase.

Some precaution should be however be taken when interpreting extension service impact on crop yield increase. Based on adopted research design, yields in two points in time have to be monitored. For start-up farmers, there are no yields to report in 2008, and therefore many pairs yields have been excluded from the analysis.

3.6. Employment and productivity

Government subsidy does not have any significant impact on increased on farm employment. While a rigorous analysis to assess the net impact of extension service on farm employment proved difficult, the indicators of number of family members working on the farm and total time spent on farm reveal that there is virtually little difference in terms of employment between contact and non-contact farmers.

The difference in the number of family members working on the farm is slightly larger for contact farmer than non-contact ones – 2.7 versus 2.5; it is virtually the same for both olive and vineyard sectors (Table 12). The total time spent on the farms is however slightly shorter for contact farmers that for non-contact farmers – 13.5 versus 14.6. There is small difference in the total time spent in favor of vineyard sector.

Table 12: Average No of family members working on the farm and average total time spent

		Non-contact		Contact		Subtotal	
		No family member working on farm	Time spent by family members on farm	No family member working on farm	Time spent by family members on farm	No family member working on farm	Time spent by family members on farm
		No	Months	No	Months	No	Months
Sector	Olive	2.5	15.7	2.7	13.4	2.6	14.6
	Vineyard	2.5	13.2	2.7	13.7	2.6	13.5
	Subtotal	2.5	14.6	2.7	13.5	2.6	14.1

The average total time worked on the farm without outliers is 12 months. Given the average number of people without outliers – 2.5 workers per farm - the average time worked by worker is 4.8 months.

One way ANOVA informs that extension service does not count for causing any difference neither in terms of number of people working on the farm nor in total time spent on the farm.

The extension service impact assessment on farmers' productivity is difficult to assess for a number of reasons, including difficulties in assessing intermediate consumption, difficulties in

assessing number of full time workers, and other difficulties in assessing yields and product prices.

Despite the above methodological difficulties, income for 2012 from olive and vineyard activity has been assessed dividing income (quantity produced multiplied by product prices) with full time employed on the farm (total time spent divided by 12). While study results reveal that contact farmers have higher income per full time worker than non-contact ones, the average income contact farmers was ALL 639,924 (Euro 4,571) versus ALL 460,288 (Euro 3,288) for non-contact farmers, the missing net impact on incased yields and no change in employment does not support any productivity increase.

3.7. Government subsidy impact or indirect benefit

Government subsidy is expected to create also indirect benefit to third parties not directly affected by the intervention. Two sorts of indirect benefits are considered in the following discussion, namely impact extension service has on businesses upstream (suppliers of inputs) and downstream (buyers of farm produce), and the impact it has on collective action.

Public extension service has generated net positive impact on increased demand for inputs. The average monetary expenses for 2008, they were ALL 41,509 (Euro 296), and for 2012 they were ALL 98,612 (Euro 704), and or 2.4 times higher than in 2008. Extension service has a net significant impact on monetary expenses. The membership to the contact group leads to a net significant impact of ALL 31,570 (Euro 225), as summarized in Table 13.

Table 13: Extension service impact on farm monetary expenses

Model		Un-standardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
	(Constant)	34168.449	10635.940		3.213	.002
	Monetary costs for inputs in 2008	1.172	.096	.710	12.195	.000
	Contact farmer	31570.193	14858.191	.124	2.125	.035

a. Dependent Variable: Monetary costs for inputs in 2012

The increase in monetary expenses for contact farmers is most probably effect of important increase in expenses per farmers since the number of farmers stating that purchased inputs have increase is not significantly different between contact and non-contact group. While a strong demand for farm inputs has been perceived during last five years for all farmers, as supported by farmers' statements - more than 9 in 10 farmers (91.2%) state that their demand for inputs has increased, the extension service net impact is missing. Fewer contact farmers than non-contact farmers perceive increased demand for inputs – 60 contact farmers versus 64 non-contact farmers.

The demand for advice has increased at a slower pace than the demand for inputs. Extension service is a not an explaining factor for changes in advice received – the number of farmers perceiving an increase in advice received is the same for both contact and non-contact group, 38 positive responses for each group.

Farmers state that their sales have increased in 2012 compared to 2008 - this is the case for two in three farmers having provided an answer. The number of farmers stating that their sales

have increased is rather significantly higher (at 0.1 level of Sig.) in contact group than in non-contact group – 51 farmers in contact group versus 39 farmers in non-contact group state that their sales have increased.

Positive change has been observed in terms of increased need for cooperation among farmers during last five years. Slightly less than 2 in 3 farmers (having provided an answer), or 59 % state that the need for cooperation has increased during studied period. The remaining 41% perceive either no change (36.6 %) or even decrease in need for cooperation (4.5%), Government subsidy has no impact in increased need for cooperation however. ANOVA procedure (looking at the impact of subsidy in explaining change in cooperation) informs that extension service is highly insignificant. The cooperation between farmers and input suppliers and buyers of farm product exhibits that same pattern in terms of change in need for cooperation with only minor differences.

The cooperation among farmers is extremely limited. Only in 17 cases, or 13% of cases, farmers are members of any farmers group. The number of cases where farmers sell their product as part of a farmers' group is much smaller - 6 cases out of 130, or less than 5% of cases (Table 14). The allocation of positive answers in contact and non-contact groups supports that extension service is not an explaining factor.

Table 14: Revealed cooperation among farmers

		Contact farmer					
		Non-contact		Contact		Total	
		Count	%	Count	%	Count	%
Are you member of any farmers' groups?	Yes	11	64.7%	6	35.3%	17	100.0%
	No	57	49.1%	59	50.9%	116	100.0%
Do you sell your product through farmers' groups?	Always	0	0.0%	0	0.0%	0	0.0%
	Often	1	100.0%	0	0.0%	c	100.0%
	Sometimes	2	100.0%	0	0.0%	2	100.0%
	Rarely	0	0.0%	3	100.0%	3	100.0%
	Never	63	50.4%	62	49.6%	125	100.0%

The comments provided by the farmers support both increased need for cooperation (for less than half of farmers) and farmers reluctance to engage in collective action (for more than half of farmers). Common reasons for cooperation are benefits in terms of joint sale, and technical and economic advice in groups. In some cases, farmers are developing their cooperation enterprise. Common reasons for reluctance are lack of trust (even two brothers cannot cooperate), lack of coordination and leadership, land fragmentation, limited sales, relative heterogeneity in terms of land and capital, and lack of government support.

3.8. Farmer's status

There is a slight improvement in overall farmers' status, measured by family income. The proportion of families belonging to the highest category is larger in 2012 than in 2008 for both contact and non-contact farmers. Though proportion of families belonging to the highest category is higher for contact groups than for non-contact groups, the significance test does not support any significant difference.

4. Summary of findings and recommendations

The current study aimed at assessing the outcomes and where possible the impact of government extension service, using a quazi-experimental design by applying Propensity score matching Method.

Two groups of farmers – treatment (contact) group and control (non-contact) group - were formed to assess the net extension service impact. The decision to distinguish between contact and non-contact group was done based extension service policy and practice; actually, it was public extension workers who provided the list contact and non-contact farmer. The distinction between treatment and control group was quite loose however, since there is no farmer who has not been advised in one way or the other by the extension service. Additionally, there are also non-contact farmers who have been contact farmers in the past. This "blurred" picture in term if "contact" and "non-contact" farmers is considered an important limitation of this study.

The study results show that the government extension service has not had any impact in increasing farm size. Further, it has had no net impact on increasing areas under fruit plantation. The impact of the government extension service on new technology adoption is limited and so is the impact on crop yields increase. Therefore, extension service has had no net impact in terms of increased fruit production and fruit farmers' income in Albania. Furthermore, impact of the scheme on employment increase is also limited. The missing impact in terms of farmers' productivity is a result of missing results in terms of area under fruit trees, yields increases and no significant change in on farm employments. Despite an increased need for collective action among farmers and between farmers and other value chain businesses, the government impact in increased need for cooperation is not significant.

Based on study results, the following recommendations may be considered by the Government of Albania:

1. *Establish model farms to promote government policy priorities and support them intensively.*

The policy of "contact farmers", or farmers who have been advised intensively has not produce tangible results. Based on the experience gained, it is recommended that a core "vanguard" farmer is identified in each region in order to establish models regarding different policy priorities, such as technology adoption, cooperation among farmers and among actors in the value chain, enhancing the quality schemes and other priorities.

2. "Creating" farmers demand for technical and economic advice

Study reveals that farmers exhibit a low demand for technical and economic advice – this is quite worrisome when it happens to contact farmers and non-contact farmers alike. Given farmers' modest knowledge, particularly in terms of new technologies, this finding must be considered seriously if one considers knowledge based economy Albania aspires for. A program of proactively creating technical and economic demand is therefore of policy relevance. This program may include training and demonstration, coaching and more assistance to farmers.

3. *Restructuring and upgrading the public extension service*

Public extension service needs restructuring and upgrading to better meet farmers needs for technical and economic advice. Quite often, particularly in fruit sector, extension service expertise lags behind farmers' needs for specific advice. This call for a radical restructuring of public extension service in order for it to be able to meets advanced farmer's needs. Restructuring may consider establishing closer links between extension service and Agricultural Technology transfer Centers, including integrating extension service and technology transfer, closer links between extensions service an agricultural universities, and considering funding of extension services from various sources (MAFCP budget, donors, users of specialized services). Investing in both knowledge demand "creation" and knowledge supply restructuring and upgrading is expected to results in a knowledge market that works better in benefits to commercial orientated farmers.

4. *Improving extension service monitoring system, by introducing a results based monitoring system*

While fruit trees production is a stated priority of Government of Albania (ISARD, 2013), the impact of extension service on increased fruit production, measured at outcome level (benefit to direct beneficiaries), is quite limited. It is therefore advisable that extension service monitoring system include outcome indicators, such as increased fruit tree area by increasing access to capital, improved technology and increased fruit tree yields, increased fruit farm sizes, and other similar indicators reflecting government policy priorities.

5. Study limitations

Two groups of farmers – treatment (intensively contacted farmers) group and control (less intensively contacted farmers) group - were formed to assess the net extension service impact. The decision to distinguish between contact and non-contact group was done based extension service policy and practice; actually, it was public extension workers who provided the list contact and non-contact farmer. The distinction between treatment and control group was quite loose however, since there is no farmer who has not been advised in one way or the other by the extension service. Additionally, there are also non-contact farmers who have been contact farmers in the past. This "blurred" picture in term if "contact" and "non-contact" farmers is considered an important limitation of this study.

Bibliography

European Commission. (2007). Agro-Food Research in Europe: Overview of the agro-food research landscape in Europe, Final report FP6- 506087. Available at: http://www.agrifoodresearch.net

MARDWA. (2014). Inter-sectorial Agriculture and Rural Development Strategy 2014 – 2020

USDA. (2012). Economic Research Service State Fact Sheets: United States. Washington, DC.

Annexes

Questionnaire

The survey instrument - the questionnaire - was designed in such a way that it allows to assess the likely outcome (and possibly impact) of public extension service. Additionally, the design would allow for implementing Quasi-experimental design as stated above. The survey instrument was properly tested and accordingly improved before used for data collection.

Sampling and survey conducting

Several issues were considered when designing sampling, such as making sure that sample contain both subsidized and non-subsidized farmers, sample size, sectors and areas. Sample size for the study was 234 farmers. Sectors selected were vineyard and olive production in two major production areas for the selected sectors, namely in Fier and Shkoder. Table 15 summarizes relevant information on sample size and interviews distribution by sector and area.

Table 15: Sample size and interviews distribution by sector and area

Sector dummy			Qark		Total
			Shkoder	Fier	
Olive	Contact farmer	Non-contact	28	35	63
		Contact	6	40	46
	Total		34	75	109
Vineyard	Contact farmer	Non-contact	21	38	59
		Contact	13	53	66
	Total		34	91	125
Total	Contact farmer	Non-contact	49	73	122
		Contact	19	93	112
	Total		68	166	234

Communes and villages to be included in the sample were selected in such a way that it allows for contrast between contacted and non-contacted farmers in both sectors. Within selected communes and villages, beneficiary farmers (contacted farmers) were selected randomly based on lists provided by Regional Department of Agriculture (extension service) while non-beneficiaries (non-contacted farmers) were selected quazi-random selection of following a random route procedure.

Interviews were conducted by well trained (Master of Science) students of faculty of Economics and Agribusiness in Agricultural University of Tirana. Their work on the ground has been facilitated by MAFCP staff (extension workers). Research team has technically supported the whole process, including survey conducting.

Propensity score matching procedure

Propensity score matching is a three-stage process. *The first stage* entails estimating the propensity score, which is the conditional probability of receiving treatment conditional upon observed covariates. This probability is found by regressing membership in the treated versus untreated group (dependent variable) on a set of observed covariates (independent variables, or predictors) typically by means of a logit regression. Our dependent variable is "Contact_2008", which is a dummy/binary variable taking the value 1 for farmers having advised intensively since 2008, and 0 for the one not having been advised intensively since the same year. The variable included in the equation designed to regress membership are described in the Table 16.

Table 16: Variable included in the logistic regression to predict membership in treatment group

Variable		Type of variable	Measured as
Contact_2008	Contact farmer since 2008	Dummy	1=Have received intensive advice since 2008 0= Have not received intensive advice since 2008
A1	Age of household head	Scale	Number years
A3	No of family members working on farm	Scale	Number of people
A7	Education level of household head	Ordinal	1= No education 2=Elementary school - four years 3=Mandatory school - 9 years 4=Agricultural high school 5=General and technical high school 6=University
Farm self-employed	Farming as main employment	Dummy	1= farming as man employment, 0=Other employment as main employment
Sector_ Dummy	Sector	Dummy	1=Vineyard 0=Olives
Qark	Qark	Dummy	1=Fier 0=Shkoder

B3	Farm size in 2008	Scale	No of dynyms
B12	Experience of HH head in chosen activity	Scale	Nor of years

The second stage of the Propensity Score Matching is the matching of the treated subjects to the non-treated subjects, in such a way that the two groups are formed. Groups are similar on all covariates including in the propensity score. In general, this entails either matching treated and untreated individuals with similar propensity scores or the re-weighting of the observations in the control group. Various algorithms are available for the matching, including metric matching, nearest neighbor matching with and without replacement, kernel matching and local linear regression. The nearest neighbor matching without replacement was used in our exercise, using MatchIt package in R software.

The results of implementing matching procedure for our assignment is that two groups are formed – one treaded group (contact) and one control group (non-contact) - each group having 7 members (Box 1); remember that for each contact farmer procedure "find" a similar non-contact farmer. The result in Box 1 have been obtained using a caliper[4] of 0.3, which is a rather standard caliper measuring the difference in propensity scores for treated versus control cases.

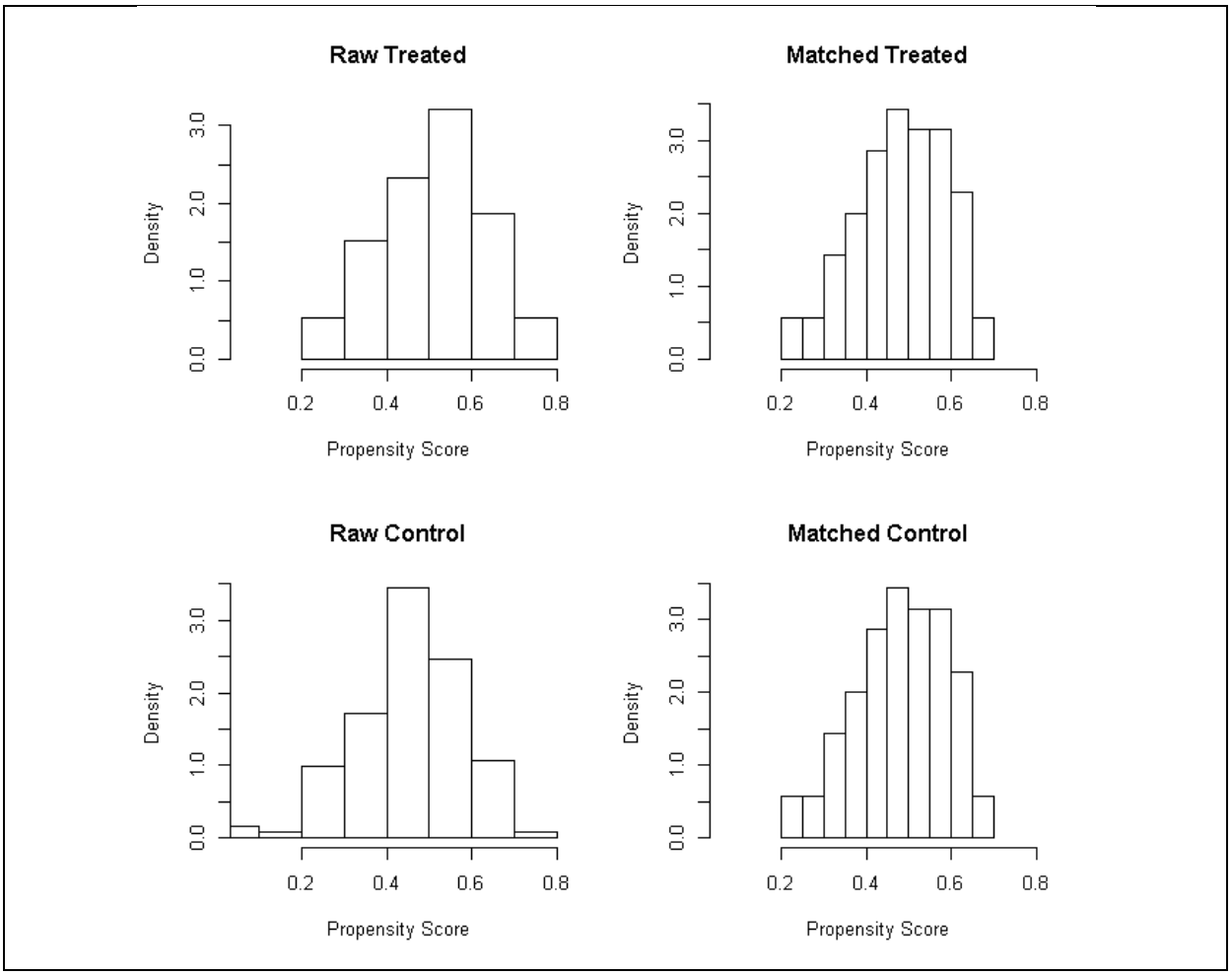
Box 1: Summary of matching procedure – MatchIt package in R software

```
Percent Balance Improvement:
                  Mean Diff. eQQ Med eQQ Mean  eQQ Max
distance             98.0126 96.4716  96.6433  97.4652
A1                   95.9333 50.0000  22.4242 -25.0000
A3                   97.3128  0.0000  53.8983  57.1429
A7                  -94.7672  0.0000 -26.3158   0.0000
B3                   98.8647  0.0000  30.0106  62.8571
B12                  55.4846  0.0000  28.8889  20.0000
Farm self-employed    23.7500  0.0000  31.4286   0.0000
Sector dummy         32.4100  0.0000  33.3333   0.0000

Sample sizes:
          Control Treated
All           122     112
Matched        70      70
Unmatched      52      42
Discarded       0       0


The improvement in propensity score right panel (matched) in the figure is
quite obvious. This means that subsidized and non-subsidized groups are
quite similar on selected co-varieties
```

[4] Caliper is measure of difference between propensity score of treated cases and control cases. Caliper is expressed in standard deviations of average propensity scores. A 0.3 caliper means that the difference between propensity scores should be smaller or equal to 0.3 propensity score standard deviations



Several matching procedures were run – no caliper, caliper 0.25 and caliper 0.9 - before choosing the one with caliper 0.3. The chosen alternative balances the quality of matching and creates large enough groups that allow for a proper statistical analysis.

The third stage of Propensity Score Matching consists in estimating treatment effects based on the balanced treatment and control groups. Strategies may comprise straightforward t-tests of mean differences in the outcomes between the treated and the untreated or in multivariate analyses such as generalized linear modeling, survival analysis, or structural equation.