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Impact of Medicinal and Aromatic Plants on improving the socio-economic situation of rural families in Kosovo

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Abstract: The medicinal and aromatic plants sector is considered a very important sector for the economy of Kosovo since it can provide employment, income, and export growth. Based on this, we assess the impact of the subsidy schemes from the Ministry of Agriculture, Forestry, and Rural Development (MAFRD) using a propensity score matching improving the farmers' gross income. The main purpose of the study was to assess whether subsidy schemes have an impact on the farmer's gross income by using a propensity score matching model to match beneficiaries to non-beneficiaries. Results showed that beneficiaries of subsidy schemes make 3,682.09 Euros more per year than non-beneficiaries (95% confidence interval 2,349.9 Euros to 5,012.90 Euros). Using logistic regression, we found that subsidy schemes, market prices, and reductions of unfair competition are the three most important factors affecting farmers' decisions to collect and cultivate MAPs.

Key words: MAPs, Economic, Employment, Income, propensity score matching

Introduction

Medicinal and aromatic plants (MAPs) have helped improve the lives of people since ancient times. Ancient people became aware of the value and attractiveness of MAPs (Inoue, et al., 2017), and the use of MAPs in the health management system became traditional and part of every stage of human civilization. MAPs are produced and offered in a wide variety of products ranging from crude materials to processed and packaged products such as pharmaceuticals, herbal remedies, teas, spirits, cosmetics, sweets, dietary supplements, varnishes, and insecticides (Bodeker, et al., 1997). Recent estimates revealed that more than 9,000 plants have active substances capable of being used for known medical treatments in various cultures and countries (Rawal, et al., 2005). The elder population may remember medicinal and aromatic teas with traditional recipes prepared by their mothers or grandmothers. Many different different drinks, jams, and foods from traditional Albanian cuisine are prepared using MAPs, and such tradition continues today in many Kosovar families.

The Republic of Kosovo has rich, diverse, and interesting flora and vegetation (Millaku, 2010). In the former Yugoslavia (of which modern day Kosovo was a part), the collection of non-wood forest products (NWFPs) and MAPs was carried out mainly through agricultural cooperatives. Kosovo was part of the supply chain and sold products to large companies in Serbia, Croatia, and Slovenia; however, these market ties were cut during the 1998 -1999 war between Serbia and Kosovo. In the beginning of 2000, new linkages with international markets were initiated through Macedonia and Albania (ORGANIKA, 2020).

Based on current research in Kosovo, approximately 1,800 vascular flora species have been inventoried. However, the true number of species that exist in Kosovo is assumed to be a much larger number (approximately 2,500 species). Within the species investigated to date, approximately 200 of them are endemic, endemorelic, and sub endemic. Of particular importance is the group of local endemics, whose number is still not fully defined (only 14 species of vascular flora are known at present) and some of which have very limited distribution (MMPH, 2011). The regions of Kosovo with the greatest abundance of MAPs are the Sharri Mountains and the Albanian Alps of Kosovo (locally known as Bjeshkt e Nemuna). In these terrains, especially in the subalpine zone, bilberry *(Vaccinium myrtillus),* juniper *(Juniperus communis)*, cowslip *(Primula veris)*, stinging nettle *(Urtica dioica)*, silver birch *(Betula pengula)*, elder *(Sambucus nigra),* and wild apple *(Malus sylvestris)* dominate. (Millaku, 2010).

In one way or another, many of these plants have been integral to the health and living systems of Kosovar families. The MAP sector has served to employ families in rural areas and improve their well-being. Based on the report of ORGANIKA (2020). In 2019 the NWFP and MAP sectors in Kosovo employed a total of 344 full-time workers and 1,070 seasonal workers (ORGANIKA, 2020). The total export sales for 2019 were 8.156 million Euros, of which 6.765 million Euros were NWFP and 1.391 million Euros were MAPs. To strengthen this sector, the Kosovo Ministry of Agriculture, Forestry and Rural Development (MAFRD) implemented a direct payments subsidy scheme in 2009 (Miftari, 2017).

Over the past several years, agricultural economists have been concerned with the effects of direct payments (Bajrami & Ostapchuk, 2019. The purpose of the study was to estimate the impact of subsidy schemes on main three outcomes (increasing income, increasing employment in rural areas, and improving farm technology). Secondarily, we also investigated factors that influenced farmers' decisions to collect and cultivate MAPs.

A Propensity Score Matching (PSM) model is applied to assess the effectiveness of the Subsidy Scheme program in increasing the gross income for farming families of the MAPs sector. One approach to understanding the gross income differences between the beneficiaries and non-beneficiaries farmers is the use of matching to compare beneficiaries to similar non-beneficiaries. A matching method known as genetic matching was selected to estimate the causal treatment effects of the farmers who received a MAFRD subsidy schemes. Using Logistic Regression, we assessed the impact of some economic and market factors on the decision of farmers to continue their activity in the collection and cultivation of MAPs.

Materials and Methods

Study Area and Sample Selection

Kosovo is positioned in the central part of the Balkan Peninsula (Lat. 42° 34' 59.88" N and Long. 21° 00' 0.36 " E) and has a surface area of 10,908 km^2. Kosovo is ranked among the top European countries for floristic assets due to its favorable physical and geographical conditions. The country lies in the northern latitude band and is characterized by a continental medium climate (MMPH, 2004).

Figure 1: Study area

During this study, visits to 100 collectors and cultivators of MAPs were made from April 2019 to September 2019. Primary data (e.g., demographic data; types, yields, area and price of collected and cultivated MAPs; costs and problems faced by farmers) were collected through a structured questionnaire using a random sampling technique. This approach enables a better understanding of the conditions of collectors and cultivators of MAPS, as well as the development of the MAP sector. The study also combines the analysis of primary and secondary data.

Data Analysis

Descriptive statistics were used to describe the gathered data and variables. The gross income calculations were made according to the relevant reports for all types of MAPs. The gross income from selling MAPs (GI) was calculated as the mass of dried MAPs multiplied by the price of dried MAPs in the collection center as shown in equation 1.

$$GI_{MAPs} = \sum_{i=1}^{n} Qty\ x\ P_{MAPs} \qquad Equation\ 1$$

Where Qty denotes the mass (weight) of the dried MAPs, P_{MAPs} denotes the price received by the farmer for sale of the MAPS at the collection center, and n denotes the number of farmers who sold MAPs

Estimating the effect of participating in a specific program is the main goal of evaluation studies. A number of evaluation techniques can be utilized to estimate treatment effects (Bajrami, et al., 2019). We used a propensity score matching (PSM) model to estimate the mean effect (impact) of the subsidy schemes on farm income, employment rate in rural areas, and improvement of technology on the farm in two groups of MAP farmers (beneficiaries of subsidies and non- beneficiaries of subsidies. The propensity score P (x_i) for each individual farmer were generated using a probit model (Kabunga, 2014). Probit is the standard approach for estimating a model with limited dependent variables (Caliendo & Kopeining, 2005), and this model is used to identify the effect of one or several predictor variables (X) on a binary response variable (Y) (Lusiana, 2017). The probit regression model formed through the processes that are shown in equations (2) to (4) followed (Leslie & Jeffrey, 1993):

Consider there is a latent variable y_i^* where:

$$y_i^* = xi\beta + ei \qquad Equation\ 2$$

in this case, the observed variable is binary variable y_i which determined the sign for latent variable rather than y_i^* itself, that is:

$$y_i = \begin{cases} 1 \text{ if } y_i^* > 0 \\ 0 \text{ if } y_i^* \leq 0 \end{cases} \qquad Equation\ 3$$

from this, the probit model function becomes:

$$f(y_i|x_i\left[\Phi\left(x_i i\beta\right)^{yi}\right][1-\Phi(x_i\beta)]^{1\text{-yi}} \qquad Equation\ 4$$

Additionally, Sianesi, (2004) suggests re-estimating the propensity score on the matched sample (i.e., only on participants and matched nonparticipants), and comparing the pseudo-R^2 before and after matching. The pseudo-R^2 indicates how well the regressors *X* explain the participation probability. After matching, there should be no systematic differences in the distribution of covariates between both groups and, therefore, the pseudo-R^2 should be fairly low (Rosenbaum & Rubin, 1983). The most prominent evaluation parameter is the so-called average treatment effect on the treated (ATT), which focuses explicitly on the effects on those for whom the program is actually intended (Heckman & Smith, 1995).

$$\text{ATT} = \text{E}(\text{g} \mid \text{x}, \text{di} = 1) = \text{E}(\text{y1i} \mid \text{x}, \text{di} = 1) - \text{E}(\text{y0i} \mid \text{x}, \text{di} = 1) \qquad Equation\ 5$$

where E is the expectations operator, y_{1i} is the observed outcome of farmer i (participant), y_{0i} – is the observed outcome of the same farmer i (non-participant), and d_i = 1/0 denotes whether the farmer participated in grantees or not. The missing data here relates to the counterfactual mean E (y_{0i} | x, d_i = 1). One might be tempted to use the mean outcome for non-participants E (y_{0i} | x, d_i =0) as a proxy for the above counterfactual mean (Essama-Nssah, 2006). The expected value of ATT is defined as the difference between expected outcome values with and without treatment for those who actually participated in treatment.

We assessed a few economic and market factors that might influence a farmer's decision to continue in the MAP sector. We used a logistic regression statistical model which was appropriate because it took only one of two possible values (Gujarati, 2006) of the most important data that was collected for the study. Using this model, the economic market factors (X — independent variables) that affecting the continuation of MAP collection and cultivation activity and the results (Y — dependent variable) could be measured (Rayasawath, 2018). The formula for the analysis was as follows in equation 6:

$$\text{logit } Y_i = \beta_0 + \beta_{1SS} + \beta_{2PRICE} + \beta_{3COMOPETITION} + \beta_{3TAX} + u_i \qquad \text{Equation 6}$$

where, $Y_{i,}$ indicates the farmers' decision to continue collecting and cultivating MAPs *i* by *jth* respondent {1 = Yes, 0 = No}; β_0 is intercept; β1, β2 and β3 are estimators coefficients; The farmer's decision is estimated as a function of the subsidy scheme {1 = subsidy beneficiary and 0 = non-beneficiary}, market price stability {1 = YES, 0 = NO}, unfair market competition {1 = YES, 0 = NO}, and tax burden {1 = YES, 0 = NO}.

Descriptive Statistics

Agriculture in general, and the MAPs sector, in particular, continues not to be an attractive sector for Kosovo's youth. Only 13 % of the interviewed farmers were young

(18 – 30). According to the study, the main age group for MAPs collection and cultivation is 41 - 50 years (42 %). Although women are constantly being encouraged to get involved in the MAPs sector, only a small percentage do so. The data shows that only 32 % of the farmers involved in the harvesting and cultivation of MAPs are women. The relationship between education and the population of Kosovo has been limited for many years by economic and social factors. After the war (1999), education has increased significantly but is still not at a satisfactory level. Approximately 40 % of the farmers interviewed in the study had secondary education. About 37 % of farmers are primary school educated, while 12 % are highly educated. The development of the MAPs sector has started to develop rapidly in the last 4 to 5 years. Data from the field show that 40% of farmers in this sector have less than five years' experience, and only 18 % have more than ten years of experience. The collection and cultivation of MAPs are considered an important source of employment and income growth for a large number of rural families in Kosovo. In interviews with local collectors and cultivators, 2.41 (range = 1 - 7; SD = 1.223) persons per family are employed in this sector, as well as 1.59 (range = 0-60, SD = 6.128) persons hired as seasonal workers.

Results and Discussion

MAPs cultivated from the wild

The majority of MAPs in Kosovo exist in the wild. They grow in mountainous terrain where the climate is healthy and human and industrial impact is minimal. In 57 % of the wild collection, farmers collected 1 to 3 species of wild MAPs, whereas some collected as many as 12 species. The trend of cultivating MAPs in recent years is on the rise, due to the importance of this sector not only for economic but also rural development. In this study, 66 % of farmers cultivated 1 to 3 species of plants (Table 1).

Table 1: Proportion of families who collected wild MAPs or cultivated MAPs stratified by the number of species collected or cultivated.

PLANT SPECIES	WILD MAPS COLLECTED	CULTIVATED MAPS
0	35 %	18 %
1-3	57 %	66 %
4-6	3 %	13 %
6-8	3 %	3 %
10-12	2 %	0%

The wild-type MAPs that were most commonly collected were cowslip (*Primula veris*), elder (*Sambucus nigra*), lime (*Tilia cordata*), wild apple (*Malus sylvestris*), whitethorn (*Crataegus monogyna*), dog rose (*Rosa canina*), yarrow (*Achillea millefolium*), juniper (*Juniperus communis*), field horsetail (*Equisetum arvense*) and silver birch (*Betula pengula*). The 10 most frequently collected MAPs and the income generated from their sale are presented below (Table 2).

Table 2: Species of MAPs collected in the wild, their fresh and dried weights, and gross income generated from sale of MAPs

THE LATIN NAME OF MAPS	FAMILIES THAT COLLECTED MAPS	FRESH MASS OF MAPS COLLECTED (KG)	DRIED MASS OF MAPS SOLD (KG)	TOTAL MAP INCOME FOR ALL STUDY FAMILIES (€)	PER FAMILY INCOME DERIVED FROM SALE OF MAPS (€)
Cowslip (*Primula veris*)	35	8,650	1,236	24,714	951
Elder (*Sambucus nigra*)	20	11,185	1,864	11,185	658
littleleaf linden (*Tilia cordata*)	13	1530	306	1,989	221
Wild apple (*Malus sylvestris*)	10	23,600	4,720	5,664	708
Whitethorn (*Crataegus monogyna*)	10	4,250	708	1,416	202
Dog rose (*Rosa canina*)	12	10,400	1,733	2,080	347
Yarrow (*Achillea millefolium*)	9	2,516	629	943	157
Juniper (*Juniperus communis*)	8	36,050	9,013	9,012	1,802
Field horsetail (*Equisetum arvense*)	7	10,240	2,048	3,072	805
Silver birch (*Betua pengula*)	5	9,600	2,400	3,600	1,200

The data from Table 2 shows that the main MAPs collected during 2019 were *Primula veris* (35 families), *Sambucus nigra* (20 families), and *Tilia cordata* (13 families). From the spontaneous collection of MAPs, the highest per family income was from *Juniperus communis*, while the lowest per family income was from *Achillea millefolium.*

Cultivated MAPs

Increasing market demand for some types of MAPs led to an increase in the population collecting them. This increased incidence of harvesting wild MAPs had some negative consequences, such as a marked reduction in native supply and risk of extinction of some high-value or special species. For these reasons, as well as to meet market demands, the cultivation of some types of MAPs became necessary (Pazari, 2014). Beginning of 2000 some Kosovo farmers diverted a portion of their arable land to growing of MAPs. However, famers who chose to cultivate MAPs faced many challenges such as market price fluctuations, lack of marketing facilities, and absence of value

addition by processing, lack of technical know-how of cultivation and marketing, and limited processing capacity (ORGANIKA, 2018).

Although problems of the MAP sector are still present, the cultivation of MAPs is presently considered very important for the livelihood of farmers in rural areas of Kosovo. The cultivation of MAPs on family farms usually is a marginal activity, and only a few farms specialize in MAP production (Baricevic, et al., 2004). In our study we interviewed 100 farm families who grew MAPs, and the most cultivated MAPs and the income generated from their cultivation are presented in Table 3.

Table 3: Land area in which MAPs are cultivated MAPs, their fresh and dry yields, and gross income generated from their sale

THE LATIN NAME OF MAPS	CULTIVATED AREA (HECTARES)	FRESH MASS OF CULTIVATED MAPS (KG)	DRY MASS OF CULTIVATED MAPS (KG)	TOTAL INCOME GENERATED BY MAP FARMERS (€)	TOTAL PER FAMILY INCOME GENERATED FROM SALE OF MAPS (€)
Chamomile *(Matricaria chamomilla)*	96.50	200,050	40,010	80,020	829
Peppermint *(Mentha piperita)*	16.40	82,800	20,700	41,400	2,568
Nettle *(Urtica dioica)*	14.20	89,750	22,437	33,656	2,370
Oregano *(Orīgano heracleoticum)*	12.40	23,695	5,924	8,885	716
Leek *(Allium porrum)*	8.10	200,500	22,278	6,683	825
Marigold *(Calendula officinalis)*	5.10	36,980	7,396	33,282	6,526
Cornflower *(Centaurea cyanus)*	5.40	8,095	2,698	24,285	4,497
Cowslip *Primula veris*	4.85	4,362	623	12,464	2,570
Mallow *(Malva sylvestris)*	4.55	13,868	2,774	36,057	7,925

The study revealed that the four most cultivated MAPs for 2019 were chamomile (an area of 96.50 ha), peppermint (16.40 ha), nettle (14.20 ha), and oregano (12.40 ha). From the cultivated MAPs, the greatest per family income per ha came from common mallow, whereas the lowest per family income per ha came from oregano.

Impact of government subsidies on the MAP sector

Analysis of data collected during this study demonstrated that gross income was improved ($p < 0.05$) by the direct payment subsidy scheme implemented by the Kosovo government to incentivize participation in the MAP sector. Contrarily, the subsidies were not effective in increasing employment or improving technology (Table 4). The pseudo-R^2 of the probit model (0.25) indicated good model fit.

Table 4: Probit coefficient estimates for the propensity score matching model that matched MAP farmers who did and did not receive direct payment subsidies by the Kosovo Ministry of Agriculture, Forestry, and Rural Development

DEPENDENT VARIABLE	COEFFICIENTS		S.E.[1]	TREATED (RECEIVED SUBSIDY)	CONTROL (DID NOT RECEIVE SUBSIDY)
Gross Income	0.006**		0.00	36	64
Employment	0.019		0.04	36	64
Technology	0.349		0.46	36	64
Constant	-0.761		0.47		
Number of farms		100			
$\chi 2$ (logistc regression)		20.87			
Pseudo- R^2		0.25			

*Significance levels: '***'0.001 '**' 0.01 '*' 0.05 '.'0.1*
[1] S.E. - Standard Error

We estimated possible differences in gross income between farmers who did and did not receive MAFRD direct payment subsidies. The average effect of treatment on the treated (ATT) estimates revealed significant differences in gross income among subsidy beneficiaries (N = 36) and non-beneficiaries (N = 64). Table 5 shows a positive and significant ($p < 0.05$) ATT among MAPs farmers. The estimate of a difference of 3,682.09 Euros in gross income was estimated for beneficiaries relative to non-beneficiaries. The 95 % confidence interval is 2,349.9 Euros to 5,012.90 Euros per gross income. The findings here suggest that it is possible MAFRD subsidy programs have a positive impact on the gross income levels of beneficiary farmers to whom awarded subsidies.

Table 5: Gross income difference for MAP Subsidy Beneficiaries compared with non-beneficiaries

					95 % CONFIDENCE INTERVAL	
OUTCOME VARIABLE	UNIT	MEAN	T-STAT	P-VALUE	LOWER	UPPER
Gross Income ESTIMATE	Eur	3,682.09	5.4863	3.156e-07***	2,349.9	5,012.90

*Significance levels: ***0.001, ** 0.01, * 0.05*

Factors influencing a farmer's decisions to continue or discontinue participation in the MAP sector

Among the four predictor variables studied, tax burden was the only factor that did not influence ($p > 0.05$) a farmer's decision to continue or discontinue participation in the MAP sector. One reason for this result may be that Kosovo has a low tax burden on farmers (Cojocaru, 2017). Although the findings of this research show that tax burden does not influence farmers to continue with collection and cultivation of MAPs, it may still be an active factor in other countries.

The continuation of MAP collection and cultivation activity was, however, influenced by receipt of government subsidies for MAP ($p < 0.01$), MAP market price stability ($p < 0.01$), and fair market competition ($p < 0.05$). Beneficiaries of subsidies are more likely to continue operating in the MAPs sector. The Exp (B) column (the Odds

Ratio) indicates that farmers who are not beneficiaries of subsidies are 2.16 times less likely to continue MAP activity than those who were beneficiaries of subsidies. With respect to stability of market price, the Exp (B) column (the Odds Ratio) indicates that stability in the sales prices of MAPs will make farmers 21.6 times more likely to continue MAP activity compared with times when there market prices for MAPs are unstable (fluctuating wildly). When fair domestic MAP market competition exists, farmers are 18.2 times more likely to remain engaged in MAP collection and/or cultivation activity than when unfair market competition exists.

The value of the Chi-square model, in accordance with the maximum likelihood methodology, was 103.033, with the level of significance at 0.006. This technically means that at least one of the coefficients of the independent variables is not zero, and demonstrates that the model is suitable. In addition, the model has good predictive ability based on the Pseudo - R^2 (Cox and Snell = 0.127 and Nagelkerke = 0.185). The percentage of correct predictions shows that the model can predict correctly 73.0 % of the time.

Table 6: Logistic regression coefficients for the factors potentially influencing farmers' decision to continue or discontinue participation in the MAP sector

DEPENDENT VARIABLE	COEFFICIENTS	S.E.[1]
MAP subsidy scheme	-1.534**	0.601
MAP market price stabilityE	0.771**	0.898
Fairness of MAP market competition	0.600*	0.833
Tax burden	-0.383	0.787
Constant	1.642*	0.771
Number of farms	100	
−2 Log-Likelihood	103.033	
Cox and Snell R^2	0.127	
Nagelkerke R^2	0.185	
Chi-square	3.854**	
Percent Correct Prediction	73%	

*Significance levels: '***'0.001 '**' 0.01 '*' 0.05 '.'0.1*
[1] *S.E. - Standard Error*

Although Kosovo has a small land area compared with many other countries, the potential for development of the MAPs sector is high. The six most common plants collected from the wild in our study were cowslip (*Primula veris*), elder (*Sambucus nigra*), littleleaf linden (*Tilia cordata*), wild apple (*Malus sylvestris*), whitethorn (*Crataegus monogyna*), and dog rose (*Rosa canina*). This result was not surprising because these species are widespread in the mountains of Kosovo (Millaku, 2010; ORGANIKA, 2018). Care must be taken to ensure that these plant species are not harvested to the point where there become limmited in number and at risk of becoming extinct in our locale.

In recent years, there has been a dramatic increase among Kosovo's rural population in the cultivation of MAPs (especially chamomile). Throughout the territory of Kosovo, there were 170 hectares cultivated with medicinal and aromatic plants in 2017 (MAFRD, 2017). The three main MAPs cultivated during our study (2019) were chamomile (*Matricaria chamomilla;* total area of 96.50

ha), peppermint (*Mentha piperita;* 16.40 ha), and nettle (*Urtica dioica;* 14.20 ha). Our study showed that MAPs can play an important role in improving the livelihoods of rural residents by generating income. From the sale of spontaneously collected plants, the per-family income varied across plant species from 157.25 Euros to 1,802.50 Euros. The income per ha from the sale of cultivated MAPs varied from a low of 716.59 Euros (oregano) to a high of 7,924.57 Euros (mallow). The high profit potential per hectare of some cultivated MAP plant species greatly exceeds the gross national income per capita (Atlas method) of Kosovars which in 2020 was 3,738 Euros (World Bank, 2021).

In order to have sustainable development in agriculture, financial support of farmers through government subsidies is typically required. Government subsidies reduce the cost of production, increase opportunities for rural employment, and increase farmer income (MAFRD, 2017). In the agricultural sector, government subsidies in the form of direct payments to farmers constitute a frequently used policy tool, especially across European countries (Bajrami, et al., 2019). Unfortunately, the effectiveness of various subsidy schemes in Kosovo have not been fully studied, and the perception is that many agricultural subsidies have not always had a positive/stimulatory effect. In this study, subsidies were effective in increasing the gross income for rural farms, but they were not effective in increasing employment opportunities in rural areas or improving farm technology. Beneficiaries of the MAP subsidy are expected to earn substantially more (3,682.09 Euros more) than farmers who have not received subsidy from the MAFRD Although the MAPs sector is considered by some as a "miracle market", farmers in this sector are constantly faced with economic and market challenges. Improving the stability of market prices of MAPs and ensuring that there is no unfair competition in the domestic market will positively influence the decision of farmers to continue their activities in the MAP sector. In addition, a favorable subsidy scheme will influence the continuation of this activity. According to our study data, farmers have a 2.1 times higher chance to continue the activity if they were to be continuously supported than if they did not receive a subsidy. A concern for farmers in Kosovo (and not just for the MAP sector, but for all agriculture) is the fluctuation of agricultural product prices and unfair competition in the domestic market. Price stability and eliminating unfair competition increase the chances that a farmer will continue MAP activity by 21.6-foldand 18.2-fold, respectively.

The above-mentioned factors have a direct impact on the production of cultivated medicinal and aromatic plants. This study provided new information on the status and importance of the MAP sector in Kosovo's rural economy, as well as useful information to guide further investigations. One need, for example, is to devise an alternate subsidy scheme that will maintain or increase the income-boosting feature of the MAP subsidy while also improving rural employment opportunities and increasing access of farmers to technological advancements. Although the current study provided a considerable amount of information regarding the MAP sector in Kosovo, much remains to be studied.

Conclusion

Kosovo has an abundance of native medicinal and aromatic plants (MAPs), which contribute to its socioeconomic development. The presence of the government subsidy program as an agricultural policy may provide the opportunity to promote Kosovo’s

MAPs sector. This will be the best way to reduce imports, reduce poverty and increase farm incomes. Based on the importance of subsidy program, we measured their impact on gross impact for MAPs farmers.

Overall, we find large and statistically significant impact of subsidy program for MAPs farmers. Policy researchers in Kosovo may take interest in the evidence of the positive gross income difference of 3,682.09 Euros more than non-beneficiaries farmers. These results provide a valuable lesson for policy makers in Kosovo to continue to support the MAP sector as well as to create sustainable policies to improve market factors. Additionally, the results of the study may be of interest to non-profits and development agencies that invest to help MAFRD efforts in Kosovo to improve farms of MAPs efficiency.

Apart from subsidy support, stable selling prices and competitive markets also significantly influence the farming of MAPs. In conclusion, these overall results suggest that subsidies provided to MAPs farmers have improved their gross income levels. Beneficiaries of MAFRD subsidies for MAPs have achieved higher levels of seasonal gross revenues compared to non-beneficiaries.

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