Evaluating the Agricultural Policy in Kosovo: lessons learnt and the pathway forward

Dissertation

zur Erlangung des

Doktorgrades der Agrarwissenschaften (Dr. agr.)

der

Naturwissenschaftlichen Fakultät III

Agrar- und Ernährungswissenschaften, Geowissenschaften und Informatik

der Martin-Luther-Universität

Halle-Wittenberg

vorgelegt von

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Tag der Verteidigung:

29.01.2024

Betreuer:

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DEDICATION

To my parents and to my parents only!

ACKNOWLODGMENTS

First and foremost, I thank God for allowing me to pursue this degree!

With the lines below, I want to thank all the people who were part of this journey, who were either directly involved or helped me in different ways in this important ride of my academic and professional development.

Primarily, I would like to thank and express my gratitude to my supervisors, Prof. Dr. Thomas Herzfeld and Dr. Judith Möllers, for their constant support and guidance throughout this project. Without their support, this project would not have been possible. Moreover, I am grateful for the financial support I received during these years, which gave me a unique opportunity to work, learn and grow at the Leibniz Institute of Agricultural Development in Transition Economies (IAMO).

I want to thank also my IAMO colleagues and friends, which made my journey here even more exciting, with whom we shared good times in Halle, starting from my officemate Dr. Golib Sanaev, and other IAMO colleagues: Dr. Arjola Arapi, Dr. Thomas Dufhues, Janine, Igor, Zarema, David, Lucia, Moshfeq, Johnson, Suray, Barchynai, Jana, Zafar, Sarvarbek, Laura, Begaiym, Christa, Anna, Sira, Florian, Aleh, Dr. Antje Jantsch, Dr. Lena Kuhn and considerable thanks to Tim Illner, Gabriele Mewes and Mara Kyritz for their administrative support. Special thanks to my football-mate colleagues: Vasyl, Osama, Bekhzod, and Abdusame.

Regarding this research, I want to express my gratitude to the students involved in fieldwork and those who participated in our interviews. Also, I want to acknowledge the Ministry of Agriculture in Kosovo for providing us access to the Kosovo FADN and the Food and Agriculture Organization (FAO), for their support towards this project.

Last, I want to thank my family for their unconditional love and support throughout these years. This doctoral thesis is attributed to them!

Halle (Saale), March 2023

SUMMARY

Agricultural extension services are considered one of the key agricultural policy elements for increasing farmers` capacities toward agricultural productivity and sustainability of agricultural production. Nevertheless, worldwide extension services face the challenge of establishing a well-managed, effective, and accountable system that meets the needs of farmers engaged in diverse and complex farming systems. With over 80% of the world`s extension services being publicly funded, especially among developing countries, their effectiveness has been limited, largely attributed to not being demand-driven. Even though hundreds of millions of farmers have had contact with extension services, their extension preferences have not been examined yet.

Besides extension services, coupled direct payments constitute an important policy instrument comprising the dominant policy across direct payments, affecting millions of farmers in Europe and worldwide. Nevertheless, due to decoupling, mainly in the EU, most research has been focused on decoupled payments, while the evidence for coupled payments remains scant. Consequently, only a few scholars have lately used the most recent methods to establish causal relationships of coupled direct payments. Therefore, to address this gap, we take an example in one of the Western Balkans (WB) countries, a highly subsidized region in Southeast Europe, where coupled direct payments constitute the dominant policy. Even though WB countries distribute millions and millions of euros annually as coupled payments, the results of this policy have remained unknown to a large extent.

Accordingly, in response to this call, this doctoral thesis studies farmers` preferences for extension services and investigates the effects of coupled direct payments. The thesis aims at answering three research questions: 1) the first study quantifies farmers' preferences for specific extension service features and investigates how individual characteristics affect preferences; 2) the second study estimates the Willingness to Pay (WTP) for specific agricultural extension service features, and it examines possible cross-funding opportunities via redistribution of agricultural policy expenditures through measuring the willingness to trade off direct payments with an effective extension system, while the 3) third study estimates the effects of coupled direct payments on a couple of farm level outcomes: productivity, farm income, farm size, and environmental outcomes.

The study takes place in Kosovo, one of the six WB countries, in a region that shares a similar history and, most importantly, a similar agricultural policy predominately oriented toward coupled payments with no or minimal focus on extension services. This research study uses a combination of quantitative and qualitative methods; in particular, it employs three analytical

approaches: an experimental approach, a quasi-experimental impact evaluation approach, and qualitative fieldwork. For the latter approach, we utilize ethnographic work to provide context and explanations for the quantitative evidence.

The first study provides one of the first quantitative evidence on farmers` preferences towards extension services globally. This study uses a state-of-the-art experimental technique for eliciting preferences – a Discrete Choice Experiment (DCE). Furthermore, we include qualitative work as an additional approach to explaining quantitative results, constituting a rare case in the extension service literature. To the best of our knowledge, there has not been any study that has examined farmers` preferences towards extension services, what farmers prefer, and how they want their needs to be addressed. The findings from this study suggest that farmers prefer extension services with more direct visits to the farm, specialized expertise, farm demonstrations, and extension services using ICT. Nevertheless, farm visits and avoiding direct payment cuts were the primary drivers of choices. Regarding heterogeneity in extension preferences, it looks like the minority of farmers who use advisory services are more educated, spend more time on farming activities, have larger farms, are more market-oriented, and receive direct payments. Smallholders and non-commercial farmers strongly preferred ICT extension, while farmers previously utilizing public extension services were more interested in specialized expertise.

Further, from the second study, the WTP estimations have shown that farmers are willing to pay for a restructured extension service, particularly willing to share the cost of extension services to have more farm visits in their farms by extension agents with specialized expertise and have the opportunity to utilize ICT for their information needs. In more detail, farmers put more weight on farm visits and DP in terms of WTP; particularly, farm visits are valued higher compared to other features of the extension. For example, the estimated WTP for two farm visits is €188 as an annual fee. In terms of willingness to trade off direct payments – eliminate or reduce them with an effective extension system, combining the findings from the first two studies, results suggest that choices involving a reduction of current DP were less often selected, indicating that farmers tend to stick to direct payments, especially if they have received them already in the past. However, another substantial insight is that farmers are willing to pay a premium for two farm visits which is 1.4 times higher than the value they attach to DP reduction, indicating that farmers would be willing to reduce DP as a tradeoff with two annual farm visits by extension agents.

For the third study, we employ a mixed method approach, combining two quantitative approaches (Mahalanobis matching and Difference-in-Differences – DiD) with ethnographic fieldwork. To our knowledge, this is the first study that utilized a mixed-method approach to

evaluating coupled direct payments. Another contribution of this study is including two groups of direct payment receivers in the empirical analysis – farmers who have been supported once (only in one year) and those who have been supported twice (two years in a row)- one-time and two-time receivers. From this part's quantitative empirical results, it has been impossible to reject the null hypothesis of no effect on improving productivity and increasing farm incomes for both groups – one and two-time receivers. On the other hand, we observed positive effects on increasing farm size for both groups. Further, coupled direct payments seem to have considerable effects on the environment. Results suggest that these payments influence some land use decisions, incentivizing farmers to convert grassland into arable land and increasing the number of livestock units and chemical product usage. Our results show that participant farmers (both groups) increased the number of LU and purchased more fertilizers than non-participants. At the same time, one-time receivers reduced their grassland shares in the total UAA compared to non-participants.

Overall, these three studies bring crucial empirical and qualitative evidence on two pivotal segments of agricultural policy - extension services and coupled direct payments. Similarities that extension services and coupled direct payments share worldwide make these findings applicable beyond the region where the study took place. Subsequently, important policy implications are drawn from the findings of these studies recommending possible agricultural policy paths to move forward.

TABLE OF CONTENTS

LIST OF TABLES

TABLES IN APPENDIXES

LIST OF FIGURES

FIGURES IN APPENDIXES

ABBREVIATIONS

AAA	the Agricultural Adjustment Act
AE	Agri-Environment
AI	Artificial Intelligence
AECM	Agri-Environment Climate Measure
AECS	Agri-Environment Climate Scheme
AES	Agri-Environmental Schemes
ATT	Average Treatment Effects on the Treated
ATE	Average Effects of the Treatment
ARDP	Kosovo's National Agriculture and Rural Development Program
AMTA	Agricultural Market Transition Act
AIC	Akaike Information Criterion
ATC	Average Total Cost
BIC	Bayesian Criterion
BWS	Best-worst Scaling
CAP	Common Agricultural Policy of the European Union
CDID	Conditional DiD Estimator
CI	Confidence Interval
CIA	Conditional Independence Assumption
CVM	Contingent Valuation Method
CT	Cheap Talk
DiD	Difference in differences
DCE	Discrete Choice Experiment
DP	Direct Payments
DATS	Department of Advisory and Technical Services
EEA	European Environment Agency
EU	European Union
EC	European Commission
ELS	Entry Level Stewardship
EFA	Ecological Focus Area
EU-MS	European Union Member States

ERP	Economic Reform Program
FAO	Food and Agriculture Organization of the United Nations
FADN	Farm Accountancy Data Network
FAV	Faculty of Agriculture and Veterinary Medicine
FFS	the Farmer Field School
F2FE	The Farmer-to-Farmer Extension approach
FBS	Farm Business Survey
FAIR	Federal Agriculture Improvement and Reform act
GDP	Gross Domestic Product
GHG	Greenhouse Gas
GPS	Generalized Propensity Score
GMNL	Generalized Multinomial Logit
GMM	Generalized Method of Moments
IPA	Instrument for Pre-Accession
IE	Impact Evaluation
ICT	Information and Communication Technology
IAA	Independence of Irrelevant Alternatives
IV	Instrumental Variables
IAMO	Leibniz Institute of Agricultural Development in Transition Economies
KAS	Kosovo Agency of Statistics
LU	Livestock Units
MAFRD	Ministry of Agriculture, Forestry and Rural Development
MIXL	Mixed Logit
NN	Nearest Neighbor
NFS	National Farm Survey
NGO	Non-Governmental Organization
OECD	the Organization for Economic Cooperation and Development
PPP	Public-private Partnerships
PTA	Parallel Trends Assumption
RPL	Random Parameter Logit
RDD	Regression Discontinuity Design
RCM	Rubin Causal Model

RUT	Random Utility Theory
RDP	Rural Development Program
SPS	Single Payment Scheme
SFP	Single Farm Payments
S-MNL	Scaled Multinomial (heterogeneity) Logit Model
SEM	Simultaneous Equation Models
SUTVA	the Stable Unit Treatment Value Assumption
TFP	Total Factor Productivity
T&V	Training & Visit
ToC	Theory of Change
UNDP	United Nations Development Program
UAA	Utilized Agricultural Area
USAID	United States Agency for International Development
US	United States of America
VCS	Voluntary Coupled Support schemes
WTP	Willingness to Pay
WTA	Willingness to Accept
WHO	World Health Organization
WB	Western Balkan

1 INTRODUCTION

1.1 Users` perspective on farm extension services

The agricultural extension services have been constantly criticized for ineffectiveness and lack of sustainability. The main criticism for their ineffectiveness is largely attributed to the fact that they are not demand-driven (Gautam, 2000). The design of most extension methods is top-down, implying that farmers have a minimal role to play (if any) in the selection of extension methods (Mwololo et al., 2019). Moreover, most of the extension service models are not cost-effective, making them un-scalable and non-sustainable (Gautam, 2000; Anderson & Feder, 2004; Anderson & Feder, 2007; Birner & Anderson, 2007; Swanson, 2008; Swanson & Rajalahti, 2010). As a result, farmers have shown to be unsatisfied and critical of a number of extension service models that have been applied so far (Gautam, 2000; Siraj, 2011). These services have almost globally performed below expectations (Janvry et al., 2016).

Extension models differ with respect to their organization, funding, tools used, staff education, and expertise. To date, agricultural extension services have been offered as public, private, or via public-private partnerships (known as PPPs). The majority of countries apply a combination of these models (mixed approach); nevertheless, publicly funded extension services are the most commonly used approach, constituting around 80%[1] of the world's extension services, especially among developing countries (Anderson & Feder, 2003). However, public and third-sector extension providers face considerable challenges in ensuring that the services they supply meet their client's needs and priorities (Birner & Anderson, 2007). Even though most extension services are offered for free, a significant number of farmers have not used them. Overall, these farmers have seen these services as irrelevant, non-practical and non-responsive to their extension needs (Gautam, 2000; Birner & Anderson, 2007). Farmers' information needs vary even within small geographical areas due to variations in soil, elevation, microclimate, and farmers' means and capabilities (Anderson & Feder, 2004). Moreover, the constantly changing domestic and external environments for agriculture have also changed the information needs of farmers (Birner & Anderson, 2007). In addition to the diversity of information needs, extension services have used different methods to disseminate information. These methods are often not suitable and non-sustainable for transferring knowledge. A comprehensive review revealed that common extension models have been predominantly oriented toward mass meetings but less towards field visits and plot demonstrations, and the use of media and information and communication technology (ICT) remains limited. Besides, they tend to target larger and more commercially oriented farmers, while the access of smallholders is still limited, producing an overall low outreach. The relatively low outreach of the extension staff may be attributed to

[1] The remaining 20% is mainly delivered by universities, autonomous organizations, non-governmental organizations (NGOs), and the private sector (Anderson & Feder, 2003).

staff shortages, lack of resources, and poor use of resources (Aliber & Hall, 2012). Staff shortages and competency gaps are common, especially among public extension services. Compared to private services, the probability of having agents with lower education levels is higher among public extension services due to the lack of accountability (Bahal et al., 1992; Kahan, 2007). Lack of adequate and qualified human resources on subject matter specialists, especially in emerging areas such as high-value crops, livestock, and other enterprises, remains one of the critical constraints on developing more pluralistic and effective extension services (Swanson & Rajalahti, 2010).

Lack of resources indicates the financial resources as well or extension cost, which constitutes a significant segment for their implementation. Since most extension services have been given for free to farmers and are publicly funded, these public extension services have been criticized for high costs, problems of scale, sustainability, and low levels of accountability (Anderson & Feder, 2007). Moreover, they are often inadequately funded, and their effectiveness is limited (Anderson & Feder, 2004). In order to cope with these situations, particularly to reduce costs, improve cost-effectiveness and improve the financial sustainability of extension services, reforms have ranged from contracting with the private sector to drawing on private sector funding (Beynon, 1996, 1998). Further, some discussions lean towards participatory fee-based service, where the participation of clients (farmers) in direct service funding is seen as the most sustainable alternative (Ozor et al., 2007). In this regard, there are cases where small groups of farmers contract extension services to address their specific information needs; since this solves the accountability problem, the quality of service is likely to be higher (Anderson & Feder, 2004). Generally, farmers have a continuous demand for information and may be prepared to pay for it as they do for other inputs according to how productive they perceive it to be (Dinar, 1996). When farmers are satisfied with the service, they tend to have continuous usage of the service and put a higher value on it. Moreover, farmers who pay even a tiny part of the extension cost are more likely to be more demanding on the field advisors and have a higher probability of using the resulting information, knowledge, and skills (Swanson & Rajalahti, 2010). However, even though the economic rationale for farmers to pay for extension services is generally clear, and the practice is well-established in high-income countries (Marsh & Pannell, 2000), in developing economies, many farmers are unable or unwilling to pay for services, in part because they have not seen examples of effective and responsive extension (Anderson & Feder, 2004). Poor farmers may undervalue the benefits of an extension service if those benefits are only realized later (Birner & Anderson, 2007). Furthermore, in countries where governmental support with cash payments (e.g., with direct payment measures) is strong, the willingness of farmers to pay for additional farm services could decline drastically.

On the one hand, there is a consensus that extension services are an important tool for disseminating information (Anderson & Feder, 2003; Hidrobo et al., 2022) and constitute a crucial policy element in increasing farmers` capacities towards agricultural production. Transferring knowledge from researchers to farmers, advising farmers in their decision-making and educating farmers on how to make better decisions, enabling farmers to clarify their own goals and possibilities, and stimulating desirable agricultural developments are among the key goals of extension services (Ban & Hawkins, 1996). However, on the other hand, there is a recognition that these services have not been effective and generally have performed poorly (Gautam, 2000; Birner & Anderson, 2007; Swanson & Rajalahti, 2010; Janvry et al., 2016). Considering that the non-effectiveness of extension services is largely attributed to the fact of not being demand-driven, it remains an open question how a demand-driven extension service would look like - what would farmers` preferences for extension be, or in other words, which extension features would farmers prefer more to address their information needs and would farmers be willing to contribute to its costs? Given this background, a set of research questions have been developed and presented in 1.3.

1.2 Impact of coupled direct payments at the farm level

Direct payments constitute one of the key features of agricultural policy across the world. As a category of agricultural subsidies,[2] direct payments have a long history of application,[3] affecting millions of farmers worldwide. However, even though they remain a constant feature of governmental policies in agriculture, with millions distributed annually as direct payments, their effectiveness has been a persistent and constantly debatable topic among scholars, policymakers and other stakeholders involved in policymaking.

In general, the rationale of distributing direct payments differs on region and or country basis; however, they are mainly distributed to support farm incomes, increase production and productivity, ensure affordable prices for the rest of society (consumers), and reduce discrepancies between small and large-farm holders. For example, in the United States (US), addressing price and harvest risks while enabling poorer segments of society to purchase food at affordable prices represents their core rationale for direct payments application (Bellmann, 2019). While in contrast, the primary rationale in the European Union (EU) is to support the

[2] Other types of agricultural subsidies constitute price support instruments, input subsidies, subsidized insurance schemes, and measures on food programs for poorer consumers (Bellmann, 2019).

[3] Over 30 years of application. Direct payments were first introduced in the EU with the MacSharry reform in 1992 (Garrone et al., 2019; Hristov et al., 2020; Erjavec & Erjavec, 2021). In the US, direct payments were initially introduced as farm safety net payments in 1933 as part of the Agricultural Adjustment Act (AAA) during the Great Depression. The AAA provided subsidies to farmers for reducing their production to raise crop prices and stabilize farm incomes. The program was later replaced by other agricultural policies and programs, including the current farm safety net program, which includes crop insurance, commodity price support, and disaster assistance - see Fishback (2017) and Kammer (2021) for a longer history on the US policy towards direct payments.

income of a fragmented farm sector with relatively small farms while moving ahead to address some of the environmental challenges associated with intensive agriculture (Bellmann, 2019). Overall, most direct payment measures aim to stabilize and or to provide income support (Goetz et al., 2003), tending to address the challenges of a fragmented sector with a relatively small farm structure, often facing issues of productivity, low incomes of farmers, especially in rural areas, and overall competitiveness. Addressing these challenges requires a considerable amount of budget allocations. Consequently, direct payments constitute one of the leading agricultural policy instruments in terms of monetary spending too. Since 2015, scholars estimate that around €640 billion (Bellmann, 2019; Scown et al., 2020; Laborde et al., 2021) are allocated as annual payments by governments[4] in support to the agricultural sector, with 75 percent distributed directly to farmers (Bellmann, 2019). In the EU alone, where the Common Agricultural Policy (hereafter CAP) is financially the largest European Policy (EC, 2017; Lakner & Oppermann, 2018), with an average spending of €54 billion annually from the EU budget since 2006 (Scown et al., 2020), about 70% of this amount is allocated to direct payments.

As an agricultural policy instrument, direct payments are mainly distributed to farmers as a direct income transfer (payment). In this regard, direct payments are generally organized across two key types or forms of distribution – coupled and decoupled direct payments. In most instances, coupled direct payments are essentially payments linked to farm production – either area, production levels of specific crops, or livestock (Patton et al., 2008; Martinez Cillero et al., 2018; Weber et al., 2020; Haß, 2021). On the contrary, decoupled payments are distributed independently of the production level of a specific crop (Matthews, 2018, 2020). They are granted a fixed payment per hectare independently from the production or volume. In other words, decoupled direct payments are not tied to a producer`s type or level of output, while coupled payments are tied to the level and or type of output (Patton et al., 2008; Gibson & Luckstead, 2017; Ciliberti & Frascarelli, 2019).

Decoupled payments are mostly present in the EU and constitute the central policy of the CAP since the decoupling process, which occurred with the 2003 reform.[5] However, globally coupled payments constitute the dominant policy across direct payments. In particular, across OECD member countries, most direct income measures fall in the category of coupled direct

[4] According to the 2019 Agricultural Policy Monitoring and Evaluation report of the Organization for Economic Cooperation and Development (OECD), which surveyed 53 countries, including 36 OECD countries and the five non-OECD EU Member States, as well as twelve emerging economies: Argentina, Brazil, People's Republic of China, Colombia, Costa Rica, India, Kazakhstan, the Philippines, the Russian Federation, South Africa, Ukraine, and Viet Nam.

[5] As a consequence of the MacSharry reform in 1992, they began replacing price support with payments made directly to farmers, which was initially done using coupled payments, then were replaced in 2005 by decoupling direct payments (Scown et al., 2020). Fischler Reform of 2003 restructured most direct payments by decoupling payments from production and granting them to producers as Single Farm Payments (SFPs) (Balkhausen et al., 2008).

payments (Goetz et al., 2003). As Gautam et al. (2022) note, farmers receive direct payments that are either "coupled" to output levels and input use, amounting to an average of US$185 billion annually, while the rest of payments which are at least notionally decoupled from production, amount to US$68 billion per year.[6]

Besides this wide application, receipt of coupled support is perceived as problematic. Coupled payments have been associated with effects on distorting production and promoting extensive production (see Kazukauskas et al., 2014; O'Neill & Hanrahan, 2016; Brady et al., 2017; Pe'er et al., 2017; Trapp & Lakner, 2018), with payments being concentrated around a few crops (Agrosynergie, 2011; Bellmann, 2019; Haß, 2021), reducing farm efficiency and competitiveness (Bečvářová, 2007; Pe'er et al., 2017; Trapp & Lakner, 2018), affecting farm structure – slowing structural change (Bečvářová, 2007; Brady et al., 2017; Pe'er et al., 2017), and having immense adverse effects on the environment (Brady et al., 2017; Pe'er et al., 2017; Jansson et al., 2021). Coupled payments affect productivity, mainly through incentivizing extensive production, dictating production decisions, and keeping less competitive farmers in the market. One of the main critiques of coupled direct payments is that farmers can directly affect the payout levels, especially in terms of farm size and production decisions (Bečvářová, 2007; Pe'er et al., 2017). Further, while income is considered a centerpiece of many direct payment programs, coupled direct payments have mostly failed to deliver the objectives related to improving or increasing farm incomes. Evidence shows that coupled payments do not affect farm income (Dewbre et al., 2001; Guyomard et al., 2004; Buckwell et al., 2017; EC, 2018; Biagini et al., 2020; DeBoe, 2020). Lastly, these payments are poorly targeted and inefficiently distributed among farm-size classes (Pe'er et al., 2017). One of the positive developments that have been emphasized is that it has kept farmers in the sector (see Section 2.3 for a broader review of the coupled payments' effects).

Nevertheless, while, for example, in the US, these payments are inexistent,[7] coupled payments are still present in Europe, including the EU-Member States (MS). Across the EU-MS, these payments are distributed mainly through Voluntary Coupled Support schemes (VCS). Even though across the MS, these types of payments constitute a relatively small share of payments - accounting for less than 15% of total direct producer support (Scown et al., 2020; EC, 2021b; Haß, 2021), they have prevailed as a dominant policy instrument across the Non-EU countries (candidate and pre-candidate countries). This is particularly true in Southeast Europe (Western Balkan countries), where still coupled payments are applied on a large scale. Contrary to EU-

[6] Based on the data over the period 2017-19 from 54 countries collected by the OECD (Gautam et al., 2022).
[7] Decoupling payments in US were first introduced as a formal element of U.S. agricultural policy in 1996, through the Federal Agriculture Improvement and Reform (FAIR) act, known also as the "Farm Bill" (Monge-Arino, 2007). According to Baffes and Gorter (2005), the decoupling of US farm support began in the 1985 Farm Bill, where payments were no longer linked to current but to historical yields.

MS, where decoupled payments constitute almost 90% of direct payments,[8] there are no such payments in the Western Balkan (WB) countries (Volk et al., 2019). The vast majority of support in agriculture in WB can be classified as direct support measures coupled to production (Lampietti et al., 2009), with coupled payments (per hectare, animal, or output) being the dominant support measure (Martinovska Stojcheska et al., 2021). Notably, the WB countries – Kosovo, Albania, North Macedonia, Montenegro, Bosnia and Hercegovina, and Serbia (hereafter the WBs) are characterized by high levels of coupled payment support. To support the implementation of their agricultural policies, WBs allocate and spend considerable amounts of their budgets. The proportion of spending allocated to agricultural support out of total governmental spending ranges from 3% to 4% in Kosovo, North Macedonia, and Serbia, whereas other WBs spend around 1% of their total budget on supporting the agricultural sector (Martinovska Stojcheska et al., 2021). Half to even almost two-thirds (75%) of this annual support budget goes to first pillar payments. For instance, the proportion of first pillar measures out of the total support allocated over the period (2017-19) was greater than 75% in Bosnia and Herzegovina, North Macedonia, and Serbia, while the lowest proportion of support allocated to first pillar measures (less than 50%) was observed in Albania, Kosovo, and Montenegro (Martinovska Stojcheska et al., 2021). This amounts to €75 million spent[9] in Bosnia and Herzegovina, €108 million in North Macedonia, €188 million in Serbia, €4 million in Albania, €29 million in Kosovo and €8 million in Montenegro, respectively**.** However, even though these countries have been spending millions of euros as part of their first pillar measures (vastly as coupled payments), no evaluation has taken place. Policies are usually designed, prepared, and implemented without systematically applying monitoring and policy impact analyses (Martinovska Stojcheska et al., 2021). Policy impact assessments and evaluations are practically nonexistent in this region, resulting in low-quality policy planning and non-inclusive decision-making (Volk et al., 2017). Furthermore, these countries are candidates, pre-candidates, or potential candidates for EU membership. Considering that the EU approximation remains one of the main economic and political project for the WBs (Martinovska Stojcheska et al., 2021), besides other obligations and criteria that need to be fulfilled, these countries need to improve monitoring and evaluation.

Nonetheless, although policy evaluations in this part of the world are scant, the evidence on the effects of coupled payments is generally lacking, not just in the WBs, but in the whole EU and other countries that apply this type of direct payment. With decoupling, the vast majority of research has concentrated on decoupled payments, establishing considerable empirical

[8] In the EU, these payments have been restructured since 2003 and are distributed as decoupled payments – moved to decoupled payments (Erjavec et al., 2011; Tangermann & von Cramon-Taubadel, 2013; Pe'er et al., 2017).
[9] Out of the first pillar, only for direct payments based on current area and or animals, €30 million were distributed in Bosnia and Herzegovina, €62 million in North Macedonia, €132 million in Serbia, €2 million in Albania, €27 million in Kosovo and €4 million in Montenegro (Martinovska Stojcheska et al., 2021).

evidence. In contrast to decoupled payments, only a few scholars have lately used the most recent methods to establish causal relationships of coupled direct payments. Given this background, a set of objectives and research questions is listed in the following section.

1.3 Problem Statement, Objectives and Research Questions

Despite the fact that the non-effectiveness of extension services is largely attributed to the fact of not being demand-driven, the vast majority of research has been concentrated on the supply side of the extension, consequently with no empirical evidence on how farmers want their extension needs to be addressed. Even though hundreds of millions of farmers have had contact with extension services (Anderson & Feder, 2004) and a number of extension methods and models have been applied so far, to date and to the best of our knowledge, there has not been any study examining farmers` preferences for this service, particularly, specific preferences for certain elements or systems of extension have not been examined yet. These elements could include field visits, plot demonstrations, media, and ICT usage. This represents a gap in the literature. Lastly, besides problems of scale, sustainability, and low levels of accountability, extension services have also been characterized by high costs (Anderson & Feder, 2007). Considering that over 80% of these services are offered for free to farmers, there is almost no participation in terms of cost from the farmers' side. Participation of farmers could create circumstances that might increase the quality of the service and ensure a more sustainable service for the future. Nevertheless, although a few studies have measured farmers` willingness to pay (WTP) for extension services, see Holloway and Ehui (2001) for a study on smallholder dairy producers in Ethiopia; Ajayi (2006) measuring WTP for farmers in Nigeria; Farinde and Atteh (2009) looking at WTP for extension services of arable crop farmers' in Niger; Bostan Budak et al. (2010) on livestock producers in Turkey; Charatsari et al. (2011) with WTP evidence from Northern Greece; Uddin et al. (2014) for crop farmers in Bangladesh, and Ogunmodede et al. (2022) on smallholder farmers in Bangladesh, Rwanda, and Zambia; we do not know what farmers are willing to pay for specific extension services, i.e., specific features. Besides farmers` willingness to contribute to its costs, we do not know whether farmers would be willing to trade direct financial support measures such as direct payments with an effective extension service, especially in the context of developing countries, where farmers are highly dependent on direct payments. This represents another gap in the literature.

Besides extension services, another agricultural policy that draws our attention is coupled direct payments. As a dominant policy across direct payments, coupled direct payments affect millions of farmers in Europe and worldwide. Particularly, in the WBs, this dominant policy instrument has not changed, and decoupled payments are not still present across WBs. Moreover, coupled payments constitute the main policy instrument regarding the number of

farmers reached across all the WBs and also comprise the main budget allocation in some WBs (particularly in Bosnia and Herzegovina, North Macedonia, and Serbia). Only over 2017-19, WB countries have spent more than €1 billion[10] in coupled direct payments. Nevertheless, the agricultural policy in the WBs is characterized by irregular and rather weak monitoring and evaluation systems (Martinovska Stojcheska et al., 2021). Therefore, even though these countries distribute millions and millions of euros annually as coupled payments, the results of this policy have remained unknown to a large extent. Consequently, similar to the rest of the world, research on the potential effects of coupled payments remains scant. While these countries continue applying the same policy and allocate relatively large amounts of budget to coupled direct payments, it remains an open question whether these payments have the desired effects: particularly "Do these payments contribute to improve farm productivity, increase income, farm size?", and what are their effects towards the environment? This part represents another gap in the literature.

To address these gaps, we take the empirical example of one of the six WBs – Kosovo, as Kosovo is no exception from the other WB countries. Like the other five WBs, Kosovo applies coupled payments on a large scale, constituting its primary means of direct support. Although over €249 million have been allocated to implement the DP program, to the best of our knowledge, there have not been any impact assessments, particularly there are no studies that have evaluated the impact of this program as a whole. Moreover, besides that over the last decade, the agricultural sector in Kosovo has been heavily subsidized by the government and has received substantial support; however, its agriculture still faces issues of low productivity, improper land use, small farms, and poor infrastructure (MAFRD, 2013, 2014). According to MAFRD (2014), agricultural productivity and yields are low due to two key factors: small farm sizes and lack of access to technical expertise, resulting in outdated farming practices, inadequate use of inputs, lack of credit, and inefficient farm management practices. Most farmers rely on inherited farming skills from previous generations without having a reliable public extension source to receive useful information for their agricultural activities. Similarly to most of the world, Kosovo is no exemption also in delivering public extension services. The public agricultural extension service has been inefficient in addressing farmers' needs. This service has been characterized as an "ad-hoc" extension service, predominantly oriented into training, operating with distracted public advisors with general agricultural education, limited use of ICT, inexistent field visits, and shortages in staff members. As currently, millions of public money (budget) are being used for private goods (i.e., direct payments), and a relatively short amount is allocated for public goods (i.e., extension services). Considering that these policy instruments compete for financial resources, most studies look at single policy

[10] Based on the value reported by Volk et al. (2019) & Martinovska Stojcheska et al. (2021).

instruments. Consequently, we could not find studies in the empirical evidence that examine potential budget shifts between different agricultural policy instruments, particularly between direct payments and extension services.

In response to this call, taken together, this thesis studies farmers` preferences for a hypothetical extension service and examines cross-funding opportunities via redistribution of agricultural policy expenditures. A set of research questions has been identified and investigated through a combination of quantitative and qualitative approaches. Looking at the case of Kosovo, this monograph tries to fill these gaps. This thesis aims to provide policymakers with the first global quantitative evidence of farmers` preferences for extension services and investigate the effects of coupled direct payments in a highly subsidized region. This main goal comprises three specific research objectives:

1. Quantify farmers' preferences for specific extension service features and investigate how individual characteristics (socio-economic and production characteristics) affect preferences;
2. Estimate their Willingness to Pay (WTP) for a hypothetical extension service;
3. Establish causal effects of the direct payments program (DP) on farm productivity, income, farm size, and environmental outcomes, e.g., do beneficiaries receive a higher farm income?

The following research questions are investigated to achieve our first objective: *Which extension features are preferred by farmers, what drives choices more, and are extension preferences heterogeneous*? *If so, which individual characteristics affect them*? Analyzing and understanding farmers` preferences prior to a policy restructuring might elicit meaningful insights. Thus, this part reveals the importance of different attributes when farmers make extension service choices, or in other words, which characteristics of the proposed extension service are important for uptake. Furthermore, do these differ across farmers` individual characteristics? As public extension services have been criticized for ineffectiveness and lack of sustainability, understanding demand is essential to create a sustainable service for the future.

Subsequently, to address the second objective, we investigate the following research questions: *Would farmers be willing to contribute to its costs by paying for extension services*, and specifically, *how much would farmers be willing to pay for a service which they previously received free of charge and what amount would they be willing to pay for specific extension features*? Besides WTP, would they be willing to contribute to its costs by trading DP with a restructured and better-organized extension service? Therefore, for this part, besides quantifying farmers' preferences for specific extension features, we want to examine possible opportunities for better budget allocation, particularly cross-funding via redistribution of

agricultural policy expenditures. While demand for direct payments is much stronger from farmers - as opposed to services such as extension, addressing this research question might help develop services that fit farmers' needs and where farmers would be willing to contribute to its costs.

For the first two research questions, we use a Discrete Choice Experiment (DCE) with 362 Kosovo farmers to examine farmers` preferences toward extension services and quantify their WTP for a number of hypothetical extension packages. Literature shows that DCEs, as a well-known quantitative technique for eliciting individual preferences, were the most appropriate approach for our case due to their ability to uncover trade-offs made when choosing among multiple alternatives (Lizin et al., 2022). See the sub-chapter 4.1 for a detailed description of this approach, and see part 2.1 for other applications. As a complementary approach to the DCE, we have used qualitative interviews. We have relied heavily on qualitative work to understand the context, design a relevant experiment and explain its results by providing explanations for the quantitative evidence (refer to the sub-chapter "Qualitative Elements of the Study" for more details).

The coupled direct payments program – DP program is studied for the third objective. We investigate the following research question: *What is the average effect of participating in the DP program across farmers who participated once and twice (two years in a row) in the treatment*? Further, this question is broken into two sub-questions: (a) *what are the effects of the DP program (coupled direct payments) on increasing productivity, farm income, and farm size*, and (b) *what are the effects of the DP program on the environmental outcomes at the farm level*? We use a set of econometric methods on a panel of the Farm Accountancy Data Network (FADN) dataset from Kosovo to examine the effect of coupled direct payments on farm productivity, income, farm size, and environmental effects.

Quantitative impact assessment (evaluation) studies aim at establishing causal relationships (causal effects) between the treated and non-treated (control) groups. Among a large family of impact assessment methods, matching comes out as one of the most utilized approaches in impact assessment studies (see part 4.2.2 for a more detailed description of this approach). Taking into account the challenges that are associated with impact assessment studies, such as the counterfactual (Gertler et al., 2011; Kirchweger & Kantelhardt, 2015) and selection bias (Cerdan-Infantes et al., 2008; Bravo-Ureta et al., 2011), we utilize a combination of two quantitative approaches: a matching approach (Mahalanobis Matching) in combination with Difference-in-Difference (DiD), also known as the Conditional Did Estimator (CDID). This approach allows to account for selection bias by controlling for observables and non-observables, time-invariant variables (Kirchweger & Kantelhardt, 2015), and it allows the use of pretreatment outcomes in the matching procedure. We operationalize some of the key

objectives of the DP program by reviewing previous work and DP program documentation into a couple of outcome covariates to estimate the effects of the program (direct payments). We add to this qualitative evidence revealed from interviews with farmers and other stakeholders across the country.

This monograph comprises seven chapters, starting with an Introduction, Literature Review, Background Information, and Methods, followed by the Results of three approaches, and Conclusions with Final Remarks in the last chapter. The first chapter – Introduction, is followed by a comprehensive literature review chapter, which provides a review of the main literature on farm extension service methods and farmers` preferences for information sources and learning. Further, methods used to study preferences are described, emphasizing choice experiments. This is followed by a review of impact assessment methods, the theory behind and the most common methods utilized, primarily as empirical approaches, and further outlines the previous work on evaluating coupled direct payments. The following chapter (Chapter 3) describes the agricultural policy in the country where the study took place - Kosovo, including the extension and direct payments policies, and the program being investigated, i.e., the DP Program, is provided as the last sub-chapter. The fourth chapter (Chapter 4) describes the methods and data employed for the discrete choice experiment study and the impact evaluation study (the quantitative and qualitative approaches). Further, the fifth chapter (Chapter 5) presents the results from the DCE on preferences for extension services and the willingness to pay for this service. This chapter is followed by Chapter 6, which presents the estimated effects of the coupled direct payments program - the DP program. Lastly, Chapter 7 discusses the findings of each study, followed by specific conclusions per each study, and gives general conclusions of the research work (monograph), with final remarks including some policy implications. In addition, this final chapter discusses limitations and ideas for future research.

2 LITERATURE REVIEW & BACKGROUND INFORMATION

This chapter provides a literature review on farm extension services, followed by a description of the existing literature on impact evaluations in agricultural policy, focusing on coupled direct payments. The first part (2.1) describes farm extension services, focusing on the most common methods to deliver extension services, previous literature studying farmers` preferences for information and learning, and the methods employed to study these preferences. The second part (sub-chapter) focuses on impact assessment studies on coupled direct payments, with a particular focus on the methods employed in these impact assessment studies. Lastly, the last sub-chapter provides a rich literature review on the effects of coupled direct payments.

2.1 Farm Extension services – methods & farmers` preferences

This sub-chapter provides a literature review of the most common methods to deliver extension services, farmers` preferences concerning some of these methods, and preference elicitation methods. Considering that our experiment approach is focused on specific features of extension services, our literature review had a particular focus on these features, starting from farm visits to ICT. Literature highlights a number of commonly used approaches, starting from mass meetings (Feder et al., 2001), individual farm visits, use of mass media (Feder et al., 2001), and lastly, utilization of ICT (Zijp, 1994; Owens et al., 2003; Aker, 2011; Mbo'o-Tchouawou & Colverson, 2014) are among the most mentioned approaches. In a similar setting, farmers` preferences are examined towards a couple of learning (extension) methods, predominantly focused on the ones mentioned above. However, in a broader context, farmers` preferences are examined in several topics, predominantly focusing on policy-related preferences (Orazem et al., 1989; Kastens & Goodwin, 1994; Lusk & Briggeman, 2009; Lusk & Parker, 2009; Christensen et al., 2011; Schreiner & Hess, 2016), risk management (Hall et al., 2003; Coble et al., 2008; Nganje et al., 2008; Liu & Huang, 2013; Jin et al., 2016), marketing choices (Blandon et al., 2009; Gelaw et al., 2016; Ochieng et al., 2017; Fischer & Wollni, 2018), and crop varieties and traits (Horna et al., 2007; Timsina et al., 2016; Kassie et al., 2017).

In terms of commonly used approaches for extension services, mass meetings are known as an extension approach aiming to reduce operational costs by gathering a relatively large number of farmers in one place. The Farmer Field School (FFS) has been built on this concept (Mwololo et al., 2019). Its main training modes include oral training in large gatherings, farm demonstrations, field days, and demonstration plots. The FFS approach trains farmers in an informal setting within their environment (Ponniah et al., 2008). Since this approach was first introduced in Indonesia in 1989 with the support of FAO (Feder et al., 2004; Waddington et al., 2014; van den Berg et al., 2020), it has enjoyed popularity among farmers, governments, and

donors around the world (van den Berg et al., 2021), particularly in South-East Asia and Africa (Waddington et al., 2014; van den Berg et al., 2020). However, its expansion also has risks, such as compromised facilitators' training, losing focus on curricula, or a degraded educational process (van den Berg et al., 2021). Nevertheless, this approach seems to have been preferred by farmers in some contexts: see, for example, the case of FFS with farmers in Kenia.[11]

A farm visit is another common extension approach. It can differ from the frequency of visits, which can be annually, monthly, or weekly. Compared to other methods, the literature points out several benefits of this approach, starting from increasing production value and better land management, leading to higher production efficiency and farm value (Owens et al., 2003; Nordin & Höjgård, 2016). However, frequent farm visits are associated with high program costs (Anderson & Feder, 2003). A famous and widely used extension approach based on farm visits is the Training & Visit (T&V) model. T&V is an extension model promoted by the World Bank in over 40 developing countries in the 1970s and 1980s. This model introduced a cadre of trained agriculture extension workers operating under a single line of command (Janvry et al., 2016). However, despite the financial and technical support from the World Bank, the performance of the T&V method was relatively poor (Mwololo et al., 2019). Its high costs made it an unsustainable approach, and, finally, the T&V system was abandoned in the late 1990s (Birner & Anderson, 2007).

Further, the farmer-to-farmer extension approach (F2FE) is a known community-based extension approach, which was initiated in Guatemala during the 1970s, spreading to Nicaragua in the 1980s, followed by Mexico, Hondurans and is currently being widely practiced in several regions of the world, including Latin America, Asia and Africa (Weinand, 2002; Kiptot & Franzel, 2014). Under this approach, the provision of training is conducted by lead farmers[12] – a group of previously trained farmers who disseminate information to their farmer peers on a voluntary basis. A few authors have noted some of the key benefits of utilizing this approach, such as efficiency in disseminating information to farmers, improving trust among farmers, low cost of operation, and consistent feedback (Kiptot & Franzel, 2015). Lukuyu et al. (2012) note that using lead farmers makes it ideal for introducing new technologies since mobilizing and training fellow farmers improves trust. However, this method also has several drawbacks, mainly attributed to lead farmers and their high financial expectations. Even though this work is voluntary, these expectations have resulted in non-commitment by most of them (Mwololo

[11] https://penkenya.org/project/farmers-field-school/

[12] Lead farmers represent the trained farmers, who provide training to other farmers afterward. Depending on the region, other terms may include farmer-trainer, farmer-promoter, community knowledge worker, farmer teacher, farmer advisor, and farmer extension agent (Hawkesworth & García Pérez, 2003; Hellin & Dixon, 2008; Amudavi et al., 2009; Franzel et al., 2015).

et al., 2019). In addition, lead farmers have limited time to disseminate agricultural information due to other commitments (Franzel et al., 2014 ; Mwololo et al., 2019).

Besides the commonly known extension approaches, a meaningful discussion has been on making extension services more cost-effective by increasing their outreach and reducing operational costs. Many efforts have been made to enable ICT to deliver extension services. Initially, the most common mass media channels - radio and TV were utilized as a part of efforts to engage ICT in extension services. However, in the future, one of the critical technologies that could serve in this system is mobile phones, which could improve access to and information about agricultural technologies and potentially improve farmers` learning. For example, video-based information through ICT is particularly advantageous to illiterate farmers. It has a considerable potential to transform the typically top-down nature of information flow from extension agents to farmers (Sousa et al., 2016). Furthermore, ICT offers the opportunity to implement a demand-driven extension service, responding directly to farmers` demands for advice. However, Antholt (1994) notes that IT is better to be used as a combination with other methods and not as an isolated approach, which could enhance the effectiveness of other innovations and conventional extension methods. Finally, the rationale for including ICT in extension services is not to make extension workers redundant (Garforth & Jones, 1998) but to complement and support them in their daily tasks. They can concentrate on tasks and services where human interaction is essential, such as helping farmers individually and in small groups to diagnose problems, interpret data, and apply their meaning (Leeuwis, 1993).

In addition to the common extension methods, a number of studies investigate farmers' preference for information sources and learning[13] (see Ortmann et al., 1993; Bamberry et al., 1997; Gloy et al., 2000; Fulton et al., 2003; Kilpatrick & Johns, 2003; Ngathou et al., 2005; Nancy Franz et al., 2010). The Table 2.1 below lists some of this work.

[13] In addition to learning preferences, some studies have also tried to determine the factors that affect farmers' preferences (e.g., Schnitkey et al., 1992; Carter & Batte, 1993; Pompelli et al., 1997; Mittal & Mehar, 2015; Mwololo et al., 2019). A comprehensive finding from these studies is that farm characteristics, the farmer's socio-economic status, and the farmers' expected benefits are among the key factors that affect their preferences.

Table 2.1: Summary of literature review on preferences on information sources and learning

Preferences on information sources and learning			
Main findings	**Main preference elicitation method (approach)**	**Country**	**Authors**
• In general, farmers preferred written information, mainly from printed sources; • Cooperative extension service ranked highly as an information source; • Private firms, cooperative firms, and salespeople to be important information sources for production decisions; • Dairy farms in particular relied more heavily on specialists than did other farm types.	Ranking questions in the survey (*asking farmers to rank first, second and third most useful sources*)	U.S.	Schnitkey et al. (1992)
• Farmers gave less importance to salesmen and other farmers as sources of information, but gave greater importance to consultants; • Use of consultants tended to be greater on larger, more diversified farms with more complex financial structure; • Livestock farmers spent more on consultants than did crop farms.	Likert-type scales	U.S.	Ortmann et al. (1993)
• Farmers prefer combining hands-on learning, demonstration, farm visits, discussion, and opportunities for one-on-one with experts; • Games, comics, role-playing, and radio are methods that farmers do not prefer to learn from; • Farmers from extension want cutting-edge and relevant information and help to understand how to apply information; • The extension needs to focus education on the local context; • Information disseminated to farmers should be understandable regardless of education, experience levels and tailored to their context.	Focus groups	U.S.	Nancy Franz et al. (2010)
• Farmers also showed a higher preference for on-farm advice and training in small groups than for lectures, which would be offered to a larger audience; • In comparison to attending lectures, farmers also preferred to choose from a list of training options that includes field excursions, lectures and consultation in small groups. Farmers also preferred a more individualized approach to training.	Choice experiment approach (DCE)	Slovenia	Šumrada et al. (2022)

Source: Constructed by the author.

Preferences constitute an important component of policy-making, as they can provide valuable recommendations to policymakers, especially on policy design - what a policy should contain and which features must be considered. As farmers` preferences in policy design are rarely considered (Dolinska, 2017; Aravindakshan et al., 2021), eliciting their preferences is important, especially for the future uptake rate and successful implementation of the proposed product, service, or policy. Literature highlights a couple of learning (extension) methods that farmers prefer. Even though evidence on farmers` preferences towards information and learning is relatively mixed, there is a consensus that farmers prefer more learning methods aligned with practical hands-on demonstrations where farmers can practice the newly received information and discuss it among peers. Results from relatively recent studies lean towards participatory approaches as effective learning methods (White & Sheath, 2011; Mwololo et al., 2019). According to Andrango and Bertgold (2015), farmers prefer to learn with methods where they can have some practical experience with the information provided and be supported and reinforced in the learning process. Similarly, Bone (2005) notes that farmers` attitudes towards education are well documented with consistent references similar to "farming is best learned on the job" (Hawkins et al., 1974; Napier & Scott, 1994; Bamberry et al., 1997). Further, informal learning settings seem to be another learning approach that is preferred by farmers (Bamberry et al., 1997; Kilpatrick & Johns, 1999). Bamberry et al. (1997) highlight farmers' preference for non-organized and non-institutional learning, implying that farmers prefer one-on-one interaction with experts or peers rather than formal, organized training. Similarly, Kilpatrick and Johns (1999) find that informal learning settings such as a network of 'known contacts' or interactive training with short sessions were the preferred methods of farmers` learning. Farmers seem to prefer less formalized sessions that offer some independence while receiving new information. The same study also finds that farmers prefer independence since they can lack confidence in a formal training setting and can experience fear and apprehension when exposed to new knowledge. Some farmers also prefer gathering on the type of farm demonstrations or demonstration plots and field days (Nancy Franz et al., 2010). These gatherings, where farmers can discuss and interact with experts and their peers, especially during hands-on demonstrations and field days, were among the farmers' most preferred learning methods (Nancy Franz et al., 2010). The opportunity to interact and practice the newly gained knowledge seems to be a crucial factor that defines farmers` preference for learning. Regarding group learning, a few studies emphasize that "learning by doing" approaches might benefit farmers, particularly in a group context, utilizing the benefits of experiential learning and group discussion (White & Sheath, 2011). In addition to these methods, ICT usage comes out as a preferred method as well (Brown & Bewsell, 2010; White & Sheath, 2011). In a study

by White and Sheath (2011), it is found that farmers prefer "one-on-one"[14] help, where computers are utilized. In another study, Nancy Franz et al. (2010) note that to meet farmers' educational needs better, extension services need to often use farmers' preferred learning methods in delivering educational programs, including a more prominent online presence. Besides methods, embedding cultural factors is also important. Some authors emphasize that learning should be tailored to the local context (see, for example, Nancy Franz et al., 2010). Furthermore, peer learning is important as long as the interacting farmers share similar farm activity and context of operation. Bandiera and Rasul (2006) document that socioeconomic similarities among farmers encourage more interaction, and in the same line Feder and Savastano (2006) find that farmers learn best from peers of slightly higher but not much higher social status.

Lastly, the cost of extension services is essential to their implementation. In most cases, the extension service is provided free of charge as a social service, which makes the government bear the total cost (Ajayi, 2006). Nevertheless, there are also efforts from different stakeholders advocating to introduce a fee-based service, which could address fund shortages and provide a sustainable service (Ozor et al., 2007; Uddin et al., 2014). In this regard, besides preferred methods for information sources and general learning, there is considerable evidence indicating farmers` willingness to pay for extension services (see Ajayi, 2006; Farinde & Atteh, 2009; Bostan Budak et al., 2010; Ogunmodede et al., 2022). However, the service has to be relevant and match their needs (Ajayi, 2006; Farinde & Atteh, 2009; Spencer et al., 2018).

In terms of methods, so far, a variety of methods have been utilized to elicit preferences for farmers, predominantly on policy-related preferences. Most earlier studies rely on traditional methods such as approve/ disapprove or Likert-scale type questions to assess farmers' policy preferences (Wolf & Tonsor, 2013). The same applies to farmers' preferences for information sources and learning (see Table 2.1 above for some example studies). Later, other methods, such as best-worst scaling (BWS),[15] were employed to elicit preferences on food safety, value, and or specific product preferences (matters) (see Finn & Louviere, 1992; Lusk & Briggeman, 2009; Lusk & Parker, 2009). Qualitative approaches are another approach used: for example, the work by Nancy Franz et al. (2010), White and Sheath (2011), and Bailey et al. (2014) who used focus groups to examine farmers' preferences for learning (see Table A 1 in the Appendix for a more comprehensive summary). Further, the contingent valuation method (CVM)[16] has

[14] "One-on-one" refers to individual interaction between the farmer and the extension agent, expert, or lead farmer.
[15] BWS constitutes an approach initially developed to increase the information obtained from a DCE by providing partial or complete rankings of choice options rather than a single choice (Flynn et al., 2007). In a BWS, respondents are asked to indicate the most preferred and the least preferred or worst option (Howell & Howard, 2019).
[16] CVM constitutes another well-established valuation technique in which respondents are asked to state their maximum WTP or minimum compensation sums for hypothetical increases or decreases in the studied product, policy, or program (Hanley et al., 1998). CVM is the most commonly used method to measure WTP for environmental goods and services (Takatsuka, 2004).

been used to study farmers' preferences in different segments (topics), such as studying farmers' participation in environmental schemes (see Dupraz et al., 2003), farmers` willingness to join conservation plans (see Cooper & Signorello, 2008), farmers' willingness to adopt silvopastoral systems (see Opdenbosch & Hansson, 2023), or consumers' willingness to pay for organic products (see Gil et al., 2000). Lastly, choice experiment approaches were developed and have been used to elicit farmers' preferences in different contexts (see below examples of their application with farmers).[17]

Over recent years, DCEs have constituted the most commonly utilized method. As a well-established technique to elicit individual preferences (Viberg Johansson et al., 2021; Lizin et al., 2022) and a useful approach to predicting real-world behavior (Quaife et al., 2018), DCEs offer a window to obtain preferences on products, policies, or situations that are not existent yet – purely hypothetical (Mangham et al., 2009; Keller et al., 2021), as the case with our proposed policy on extension services. DCEs have found application in many sectors, such as health (Hanson et al., 2005; Mangham et al., 2009; Kolstad, 2011), infrastructure-transport (Nyarko et al., 2015; Gundlach et al., 2018), product market research (Anderson et al., 1992; Wägeli et al., 2016), land use (Gregg & Rolfe, 2016; Pröbstl-Haider et al., 2016) and disease-related issues in agriculture (Otieno et al., 2011; Madzimure et al., 2015; Pham et al., 2017). Regarding agriculture, a few DCEs have studied farmers` preferences toward policy issues (Espinosa-Goded et al., 2010; Christensen et al., 2011; Villanueva et al., 2015; Pan et al., 2016; Schreiner & Hess, 2016). DCEs have examined topics from animal health, land use, farmers' preferences for agri-environmental policy preferences, and other topics. However, the literature review revealed no studies with a DCE application examining farmers` preferences for extension services. Aside from being employed for preference elicitation, DCEs have been broadly used in estimating WTP/ WTA (see, for example, Christensen et al., 2011; Schreiner & Hess, 2016; Kassie et al., 2017; Ochieng et al., 2017; Latacz-Lohmann & Schreiner, 2018; Admasu et al., 2021; Ortiz et al., 2023). However, in terms of estimating WTP for extension services, the vast majority of existing evidence has relied on the CVM approach (see, for example, Ajayi, 2006; Farinde & Atteh, 2009; Bostan Budak et al., 2010; Charatsari et al., 2011; Uddin et al., 2014; Bebe et al., 2016; Ogunmodede et al., 2022).

Compared to the approaches listed above, DCEs have a couple of advantages that make this approach the state-of-the-art method for measuring preferences (Keller et al., 2021). The advantage of a DCE over simple ranking or rating scales is that behavioral factors underpinning preferences can also be evaluated (Train, 2009). For example, compared to other approaches

[17] Some other preference elicitation methods listed in the literature include structured interviews, mixed methods such as the nominal group technique, surveys with or without rating and ranking scales, standard gambling, and time trade-offs (Torrance, 1986).

such as ratings, rankings, standard gamble, and time trade-off, the main advantage of DCEs is that they enable the assessment of priorities and preferences beyond the simple ordinal scales of these other techniques (Howell & Howard, 2019).

For instance, DCEs stand as an attractive tool for research and policy as they offer a flexible methodology to estimate which attributes are important in decision-making (Quaife et al., 2018), particularly with their ability to uncover trade-offs made when choosing among multiple alternatives (Lizin et al., 2022). Revealing the importance of attributes (characteristics) within the policy is another advantage of DCE over traditional survey methods (Vujicic et al., 2010) and other methods, such as BWS, where the best and worst attributes are selected (Barber et al., 2019). Additionally, as Howell and Howard (2019), besides estimating trade-offs, the willingness to pay for services and estimation of uptake of community-wide programs can also be evaluated with the DCE (see, for example, Chuck et al., 2009; Regier et al., 2009; Kawata et al., 2014). Also, compared to CVM, even though CVM seems best suited to valuing the overall policy package (Hanley et al., 1998), CVM is viewed with some skepticism, especially in situations where multiple options and several attributes are being considered (Diamond & Hausman, 1994; Stevens et al., 2000). Thereupon, there is evidence that DCEs perform better in eliciting individual preferences, particularly in valuing the individual characteristics that make up the policy or product (Hanley et al., 1998) and in encouraging greater consideration of all attributes and providing more thorough evaluations of complex questions (Pignone et al., 2012; Wijnen et al., 2015). Lastly, as noted by Keller et al. (2021), this approach is backed up by a long-standing theory (e.g., Louviere et al., 2000), and it is a reasonably easy and straightforward approach for the respondents (Lagarde & Blaauw, 2009). Therefore, employing the DCE approach seemed appropriate considering the evidence above, the context of our study, and the nature of the studied policy; these factors have predominantly guided our analysis toward applying a DCE.

2.2 Impact assessments of agricultural direct payments – Theory & Methods

Impact assessments (evaluations) seek to acquire answers to policymakers whether the drafted policy or program is or has led towards the intended and desired results. In other words, an impact evaluation assesses the changes in the well-being of individuals that can be attributed to a particular project, program, or policy (Gertler et al., 2016). Being in the center of evidence-based policymaking, the key question of a policy evaluation is "Does this policy work?" (Saliba, 2019). However, policy evaluations are a challenging task.

For example, estimating the effect of a particular program on the income of the participants (e.g., a training program with farmers) requires two groups of respondents – participants in the training and non-participants (in impact assessment literature, these two groups are known as the treated and the non-treated, i.e., the control group). Simply taking the mean between them

may lead to biased results as training participants may differ in terms of their characteristics, such as age, education, professional background, work experience, experience with the training topics, and other characteristics. Moreover, they may also differ in terms of some other characteristics which are often not observed or cannot be observed, such as motivation, managerial skills, and others (Bajrami et al., 2019). Hence, simply observing that training participants had more income after they completed the training is insufficient to assess the program's actual impact (Gertler et al., 2016). Some training participants may have higher incomes even before participating in the training because of their efforts, market conditions for their farm product, or other factors that could have affected their income (see Gertler et al., 2016 explaining a similar example). Another reason could be that income estimates and participation in the training are simply correlated[18] with each other, and this does not imply causation (causality). The difference between correlation and causation is essential in impact assessment studies, as a famous sentence (mantra) in this literature states that "correlation does not imply causation" (Larsen et al., 2019; Negri, 2023). In other words, as per our example, income estimates and participation in the training may be correlated (i.e., increase together); however, this does not imply that training is causing the increase in the estimated income (i.e., does not imply that the increase in income is the actual impact of the training). In the impact assessment literature, the actual impact or "true" effect is referred to as the causal effect or causality (see Holland, 1986; Pufahl & Weiss, 2009). The causal effect of a treatment on a single individual or unit of observation is the comparison (e.g., difference) between the value of the outcome if the unit is treated and the value of the outcome if the unit is not treated (Angrist et al., 1996). In our example, the causal effects of the training program on farmers imply that the changes in income are directly attributable to this training program.

Thus, policy evaluations hunt for answers to specific cause-and-effect questions, such as: what is the impact (or causal effect) of a policy on an outcome of interest, implying the changes directly attributable to this policy (Gertler et al., 2016). Even though the focus on causality and attribution[19] is the hallmark of impact evaluations (Gertler et al., 2011; Gertler et al., 2016), a major concern of these studies is assuring the causality between program measures and estimated effects (Bergschmidt, 2009; Blandford et al., 2010). These studies are also associated with several challenges, mainly related to properly identifying the causal effect (Athey & Imbens, 2017). Some of these challenges constitute *selection bias* (i.e., the composition of treatment and control groups follows a non-random selection) (see Cerdan-Infantes et al., 2008; Bravo-Ureta et al., 2011; Larsen et al., 2019; Negri, 2023), *timing and time lags* of the impact

[18] Correlation is a statistical measure that indicates the extent to which two or more variables fluctuate together (Gertler et al., 2016).
[19] Attribution refers both to isolating and estimating accurately the particular contribution of an intervention and ensuring that causality runs from the intervention to the outcome (Vaessen, 2010).

assessment (timing may seriously affect the validity of the findings) (Vaessen, 2010; Morris et al., 2011; Sanjari et al., 2014), and *spillover effects* (.e.g., training participants share the training content with the non-participants) (Penfield et al., 2013; Angelucci & Maro, 2015; Larsen et al., 2019). Some other biases that arise when estimating causal effects include confounding[20] and measurement bias (see this sub-chapter below for a more detailed description of some of these challenges).

As establishing causality (i.e., causal effects) implies empirically estimating to what extent a particular program - and that program alone - caused a change in an outcome (Gertler et al., 2016), many empirical questions in economics and social sciences depend on the causal effects of programs or policies (Imbens & Wooldridge, 2009). Most of the work answering these questions has relied on econometrics and statistics literature (Imbens & Wooldridge, 2009; Athey & Imbens, 2017). Evaluating the effect of a binary treatment or program is a well-studied topic with a long history in both econometrics and statistics (Imbens & Wooldridge, 2009). The econometric literature originates from Ashenfelter (1978), followed by the work of Ashenfelter and Card (1985), Heckman and Robb (1985), LaLonde (1986), Fraker and Maynard (1987), Card and Sullivan (1988) and Manski (1990), while the statistics literature goes back to the analysis of randomized experiments by Fisher (1935) and Splawa-Neyman et al. (1990) (Imbens & Wooldridge, 2009).

However, starting from the early 1970s, Rubin (1974) developed the now dominant approach to the analysis of causal effects in observational studies, known as the "*potential outcomes*" framework (approach) or sometimes referred also as the Rubin Causal Model (RCM) (Imbens & Wooldridge, 2009; Athey & Imbens, 2017).[21] Rubin proposed the interpretation of causal statements as comparisons of potential outcomes, which constitute pairs of outcomes defined for the same unit given different levels of exposure to the treatment, with the researcher being able to observe only the potential outcome corresponding to the level of the treatment received (Imbens & Wooldridge, 2009). The other outcome that cannot be observed is known as the "counterfactual" (Kirchweger & Kantelhardt, 2015; Gertler et al., 2016). As the researcher cannot observe both potential outcomes,[22] only one, this challenge is what Holland (1986) calls the "fundamental problem of causal inference" (Imbens & Wooldridge, 2009; Athey & Imbens, 2017), while in the economics literature this is known as the fundamental problem of program

[20] In general, studies with observational data need to account for a number of estimation challenges which include endogeneity, selection bias, reverse causality, omitted variables bias, and measurement error (see McKenzie & Sasin, 2007; Larsen et al., 2019; Negri, 2023). Confounding is recognized as the mixing of effects or distortion of the association between exposure to a specific treatment and its outcomes (observed outcomes) (see Flanders & Khoury, 1990; Skelly et al., 2012). In some other disciplines, confounding bias may be referred to as omitted variable bias, endogeneity, and selection into treatment (Igelström et al., 2022).

[21] See Imbens and Wooldridge (2009) for a more extended description of this particular development.

[22] Refer to the sub-chapter "Mahalanobis Matching and Difference-in-Difference" for a longer explanation of this challenge in estimating causal effects.

evaluation (Hujer & Caliendo, 2000; Loi & Rodrigues, 2012). Nevertheless, this pair of potential outcomes constitute the hallmark of modern statistical and econometric analysis of treatment effects (Imbens & Wooldridge, 2009).

The potential outcome approach also has important antecedents in econometrics, dating from the development of structural models in the 1930s by Jan Tinbergen and especially from the work of the Cowles Commission (in particular the works of Koopmans and Klein), which came out in 1950 (LeRoy, 2006; Mouchart et al., 2020). Also, an important paper on causality and econometrics was published by Hermann Wold in 1954 (Mouchart et al., 2020). In general, structural modeling has a long tradition in econometrics and is a result of the attempts to bridge theory and empirical findings in economics (Mouchart et al., 2020). Particularly Rubin's approach relates to Haavelmo (1943) work on simultaneous equation models (SEMs) and econometric analysis of production functions (Imbens & Wooldridge, 2009). A clear distinction of this approach is that it allows for general heterogeneity in the effects of the treatment (Imbens & Wooldridge, 2009). Furthermore, Imbens and Wooldridge (2009) outline five key advantages of the potential outcome framework in comparison to a framework based directly on realized outcomes: 1) it allows to define causal effects before specifying the assignment mechanism and without making functional form or distributional assumptions; 2) it links the analysis of causal effects to explicit manipulations; 3) it separates the modeling of the potential outcomes from that of the assignment mechanism; 4) it allows to formulate probabilistic assumptions in terms of potentially observable variables, rather than in terms of unobserved components, and 5) it clarifies where the uncertainty in the estimators comes from.

However, as experimental evaluations remain rare in economics, methods based on observational data are more common in impact assessment studies (Imbens & Wooldridge, 2009). Regardless, these approaches are associated with several challenges while estimating causal effects, such as unconfoundedness,[23] exogeneity or selection on observables, and questions regarding the identification and estimation of the policy effects (Imbens & Wooldridge, 2009; Mouchart et al., 2020). All these challenges require some form of assumptions; thus, various semi-parametric estimators have been proposed (Imbens & Wooldridge, 2009). However, it is important to note that without unconfoundedness, there is no general approach to estimating treatment effects (Imbens & Wooldridge, 2009). In this regard, the literature on estimating average treatment effects under unconfoundedness is very mature, with several competing estimators and many applications and methods (Athey & Imbens, 2017). In terms of estimands, the econometric literature has focused mainly on the

[23] This assumption requires that factors correlated with both potential outcomes and with the assignment to the treatment (also known as "confounding factors") are observed, which implies that conditional on observed confounders, the treatment is as good as randomly assigned (Athey & Imbens, 2017). For a more detailed description, please refer to the "Identification of treatment effects " sub-chapter.

average effects of the treatment (ATE) as a class of estimands (Imbens & Wooldridge, 2009; Gertler et al., 2016). As a result, in impact evaluation studies, the attributable changes are estimated as an average impact of the program (Gertler et al., 2016).

In terms of methods, so far, various methods have been proposed;[24] however, a couple of these methods have gained popularity in impact assessment studies, starting from sensitivity analysis (Rosenbaum & Rubin, 1983; Rosenbaum, 1995), bound analysis (Weber & Key, 2012; Kubitza & Krishna, 2020), instrumental variables - IVs (Imbens & Wooldridge, 2009; Athey & Imbens, 2017; Mouchart et al., 2020), regression discontinuity designs - RDDs (Imbens & Wooldridge, 2009; Athey & Imbens, 2017; Mouchart et al., 2020), and difference-in-differences - DiD (Imbens & Wooldridge, 2009; Athey & Imbens, 2017; Mouchart et al., 2020).[25] Over the recent years, a better set of methods for inference have been developed, and most of them are extensions to the above-mentioned existing methods; however, the identification problems are still significant (Imbens & Wooldridge, 2009). Nonetheless, there is a much better understanding of which assumptions are most useful (Imbens & Wooldridge, 2009). Generally, program evaluation literature[26] includes theoretical econometrics and empirical work. In contrast, modern literature converges both the statistical and econometric literature, with the Rubin potential outcomes framework being the dominant framework, and the methods for estimation of the ATE under unconfoundedness are the most widely used in the literature (Imbens & Wooldridge, 2009). Furthermore, even though the unconfoundedness assumption is often controversial, in many cases, there is no superior alternative (Imbens & Wooldridge, 2009). Considering these caveats, this analytical framework is now the standard in the statistics and econometrics literature (Imbens & Wooldridge, 2009).

This analytical framework has a wide application in assessing agricultural policies as well. Specifically, for direct payments (impact assessment for direct payments), several approaches have been more common over recent years. A couple of examples of assessing direct payments` effects include matching techniques[27] (see, for example, Chirwa, 2010; Lopez et al., 2017; D'Alberto et al., 2018; Bajrami et al., 2019), IVs (Fisher & Kandiwa, 2014; Olagunju et al., 2020), RDDs (Sauquet, 2021; Zimmert & Zorn, 2022) and DiD approaches – i.e., difference-

[24] These methods are also often referred to as identification strategies or empirical strategies (Angrist & Krueger, 1999) because they are strategies for identifying the causal effect (Athey & Imbens, 2017).
[25] For an extended and more comprehensive history of each approach, see Imbens and Wooldridge (2009).
[26] Another common theory mentioned in program evaluation literature is the Theory of Change (ToC). ToC describes how a program/ intervention is supposed to deliver the desired results by describing the causal logic behind the program, particularly how and why it will reach its intended outcomes (Gertler et al., 2016). Additionally, ToC constitutes one of the first steps in the evaluation design, as constructing a theory of change at the beginning of the program/ intervention can help specify the research questions, and overall helps to clarify and improve program design (Gertler et al., 2016).
[27] Matching, among the most common methods initially developed by Rosenbaum and Rubin (1983), has had recent developments such as the Generalized Propensity Score (GPS) (see, some example applications by Michalek et al., 2014; Esposti, 2017; Bajrami & Ostapchuk, 2019).

in-differences alone (Petrick & Zier, 2011; Jaraitė & Kažukauskas, 2012; Opatrny, 2018; Han et al., 2021), and DiD in combination with Matching (Pufahl & Weiss, 2009; Chabé-Ferret & Subervie, 2013; Udagawa et al., 2014; Kirchweger & Kantelhardt, 2015). In particular, the latter has become a popular approach in assessing the effects of different agricultural policies over recent years. For a more comprehensive literature review, see Table A 2 in the Appendix, which outlines the methods used, data, and the country where each listed study to estimate direct payments' effects took place.

Regarding timing, impact assessments are mainly conducted via evaluations before the policy is introduced (known as ex-ante evaluations or prospective) and after the policy is introduced (known as ex-post or retrospective evaluations). Prospective evaluations are developed at the same time while the program is being designed, are part of the program implementation, and baseline data are collected for both groups (treated and non-treated) before the program implementation (Khandker et al., 2010; Gertler et al., 2016). On the contrary, retrospective evaluations are conducted after the program has been implemented, looking for treatment and comparison groups ex-post (Gertler et al., 2016). Prospective evaluations are more likely to produce more robust and more credible evaluation results due to three particular reasons: 1) the collection of baseline data before program implementation to ensure that groups are similar and whether or not the program is reaching its intended beneficiaries; 2) the program has well-defined measures of program`s success, and 3) the treated and control group are identified before the intervention – having the best chance to have a valid counterfactual estimate (Gertler et al., 2016). Contrarily, retrospective evaluations utilize existing data to assess programs, and under these scenarios, options to obtain a valid estimate of the counterfactual are much more limited (Gertler et al., 2016). Nevertheless, the vast majority of impact assessments on agricultural policies are focused on ex-post analysis. In contrast, the ex-ante analysis represents a minority of them, whereas this group of analyses mainly deals with simulations. Estimating outcomes after the policy or program has been implemented is more common among researchers due to a couple of reasons and or factors, mainly related to the lack of baseline data,[28] the cost of including evaluation in the program/ policy implementation, clear program objectives,[29] and clear rules on assigning benefits and or beneficiaries.[30] Furthermore, impact evaluations in the agricultural sector represent a complex field of study (Bajrami, 2016). The complexity of agricultural impact assessments arises mainly due to casual and indirect effects

[28] In prospective evaluations, baseline data are collected before the intervention.
[29] As Gertler et al. (2016), the intervention must establish well-defined measures of the program`s success, i.e., setting clear goals for the program to meet and straightforward questions for the evaluation to answer to ensure that the results will be relevant to the intervention.
[30] In prospective evaluations, treatment and comparison groups are identified before the intervention, and it is almost always possible to find a valid estimate of the counterfactual for any program with clear and transparent assignment rules (Gertler et al., 2016).

that an agricultural policy or program might have, and the heterogeneity of farms being affected (Bajrami, 2016). Considering these, selecting appropriate policy evaluation methods is often challenging (Bajrami, 2016). The selection of an evaluation approach (method) mainly depends on the program, location, and context of the affected individuals (people), data availability, and which perspective is taken on evaluating the program (Saliba, 2019).

Nevertheless, selecting the evaluation approach suited to a given impact and context is also challenging. Among different approaches, randomized controlled trials are considered the "gold" standard (Barton, 2000; Athey & Imbens, 2017; Larsen et al., 2019) and sit at the top of the hierarchy, followed by quasi-experiments, mixed methods, and qualitative methods (see Reed et al., 2021). Similarly, in our case, considering the context of the study and the type of the program, data availability, particularly limited availability at micro-level data on treated and control groups of the studied program, and taking into account the available evidence and previous examples which were highlighted above, we have selected a mixed-method approach or a combination of methods (two quantitative and one qualitative approach) for our analysis. Athey and Imbens (2017) emphasize that the project of taking causality seriously often benefits from combining these tools with other approaches. Furthermore, in response to the abovementioned challenges, there have been calls for research impact evaluation to draw on mixed methods approaches (Gaunand et al., 2015), triangulating evidence from multiple sources to demonstrate rigor (Reed, 2018; Reed et al., 2021).

2.3 Effects of the coupled direct payments

Direct payments are claimed to affect several farm-level dimensions, starting from affecting land use patterns, productivity and efficiency, farm income, farm labor, and other outcomes related to agricultural production. Subsequently, these outcomes have been the focus of researchers. Over the recent years, there has been a substantial growth of empirical studies that have investigated the effects of a plethora of food and agricultural programs and or policies, particularly direct payments.

Predominantly researchers analyzing direct payments in the agricultural sector have been asking some common questions over the last decades, more leaning towards whether these payments work, do they achieve the intended results, do they contribute to increasing farm incomes and farm productivity, do farmers utilize more land since they received particular direct payments or it has led to area shrinkages, do they affect production decisions and who benefits more from. Overall, assessments of direct payments seek to acquire information on whether the policy caused the desired changes in outcomes and find out whether there is a better way to address the perceived needs. Particularly, empirical studies have examined the effects of direct payments in general on the productivity and efficiency of farms (Goodwin & Mishra,

2006; Serra et al., 2008; Bojnec & Latruffe, 2013; Minviel & Latruffe, 2014; Mennig & Sauer, 2019), farm structure (Ahearn et al., 2005; Breustedt & Glauben, 2007; Bartolini & Viaggi, 2013), land use, rents and land capitalization (Ciaian, 2007; Kilian et al., 2012; Feichtinger & Salhofer, 2016; Trapp & Lakner, 2018), farm labor allocation and employment (Hennessy & Rehman, 2008; Petrick & Zier, 2011; Olper et al., 2014; Dupraz & Latruffe, 2015) and farm income (Guyomard et al., 2004; Udagawa et al., 2014; Severini et al., 2016). Over recent years, additional attention has been drawn to the potential effects of direct payments on the environment (see, for example, Jaraitė & Kažukauskas, 2012; Chabé-Ferret & Subervie, 2013; Pe'er et al., 2020; Jansson et al., 2021). In this regard, the CAP's agri-environmental schemes (AES) have also attracted much attention from researchers. A reasonable number of studies have assessed the effects of AES (see Merckx et al., 2009; Pufahl & Weiss, 2009; Uthes et al., 2010; Chabé-Ferret & Subervie, 2013; Arata & Sckokai, 2016; Uehleke et al., 2022). Although direct payments are seen as an important strategy to increase farm income and yields, improve farm structure, and address issues on labor allocation, empirical findings on direct payments` effects on these outcomes are mixed. These heterogeneous findings are largely dependent on several factors, starting from the complexity of direct payments - e.g., conflicting objectives, lack of clear goals, indirect effects, political interests (Skreli et al., 2015), farm type, national contexts and country of policy application (Kazukauskas et al., 2014; Pe'er et al., 2017).

Furthermore, the form of direct payment distribution can play a role. As the Introduction chapter mentions, direct payments are predominantly organized across two types/ forms: coupled and decoupled direct payments. From an empirical point of view, the empirical evidence for coupled payments is deficient compared to decoupled payments. In recent years, only a few scholars have employed the most recent methods to establish causal relationships of coupled direct payments. This could be attributed to the decoupling process. Since the decoupling of direct payments in the US and the EU, the vast majority of research has concentrated on decoupling effects and decoupled payments. Furthermore, there is a lack of recent studies quantitatively examining the effects of re-coupling EU direct payments introduced by the 2013 CAP reform (Haß, 2021). However, even with this "limited" evidence, contrary to decoupled payments, where in general, the existing empirical evidence reveals mixed results on their effects, for coupled payments, the empirical evidence is rather clear. The literature points to some critical paths that coupled payments affect farm production activity. In this context, similar to decoupled payments, outcomes of farm productivity, income, farm size, and, recently, environment have been the focus of a plethora of researchers, predominantly agricultural economists. Considering that our study is focused on similar outcomes, the paragraphs below provide a comprehensive review of the effects of coupled payments on these outcomes, starting from production to their impact on the environment. We tried to group these

five outcomes of direct payments, and per each outcome, several interlinkages are described below. In other words, we list per each specific outcome interlinkages that may affect these outcomes.

Concerning production, coupled payments have been mainly associated with promoting extensive production. Even though economic theory suggests that lump sum payments do not affect production when markets are complete (Chantreuil et al., 2013), however, under imperfect conditions, the literature points to different channels through which coupled payments might encourage extensive production, particularly affecting productivity and efficiency. First, coupled payments influence the choice of input and level of specialization. When farmers know that the payment levels are independently distributed from their production level – particularly quantity and quality- and they will receive a high share of support, they generally have fewer incentives to be cost-efficient and keep technologies up to date (OECD, 2011). Often, this translates to less input use. The literature shows that coupled direct payments influence input choices (O'Neill & Hanrahan, 2016; Brady et al., 2017; Pe'er et al., 2017; Trapp & Lakner, 2018) and also influence input intensity (Trapp & Lakner, 2018). Theoretically, this is mainly expected on payments linked to the area or the number of livestock. However, coupled payments linked to output production planning might be different as these payments may directly affect a higher demand for inputs. For example, in Norway, coupled payments have led farmers to substitute labor with inputs (Henningsen et al., 2011).

Further, theory suggests the effect of coupled direct payments might have also been minored as other actors of the value chain may benefit from these payments as well (Breen et al., 2005; Russo et al., 2011; McDonald et al., 2014; Ciliberti & Frascarelli, 2015; O'Neill & Hanrahan, 2016; Ciliberti & Frascarelli, 2019). In particular, Ciliberti and Frascarelli (2015) note that input suppliers usually capture a significant part of the coupled support in these instruments. However, the literature also mentions other potential cases of support leakages. For example, this also applies to landowners who often constitute the final beneficiaries of direct payments. The support leakage to non-target beneficiaries, particularly non-farm owners of resources (e.g., landowners), is well argued in the literature (see, for example, Rizov et al., 2013; Buckwell et al., 2017; Ciliberti & Frascarelli, 2019). Leakage of support mainly refers to the cases when the landowner receives the payments and the same is not an active farmer. Similarly, there is evidence that land capitalization (high land prices and rental prices), a large part of land and rental price increases could be attributed to direct payments (see Patton et al., 2008; Ciaian & Kancs, 2012; Brady et al., 2017; Ciliberti & Frascarelli, 2019).

Second, coupled payments have also been associated with effects on distorting farm production (Kazukauskas et al., 2014; Zhu et al., 2017; Martinez Cillero et al., 2018; Ciliberti & Frascarelli, 2019). These distortions are linked to the production portfolio, the scale of production and

exiting decisions, stimulating a different intensity of production. This review focuses mainly on these inefficiencies. Distorting effects arise as these payments influence production decisions by specifically influencing farmers on selecting their crop and or animal production. Economic theory suggests that both - coupled and decoupled direct payments impact production decisions (Patton et al., 2008). This is well argued by certain economists who note that expectations of future payments may influence farmers` current production decisions (O'Donoghue & Whitaker, 2010).

However, coupled area payments requiring the cultivation of specific crops are less efficient and more trade-distorting than payments made irrespective of the use to which the land is put (Dewbre et al., 2001; Ciliberti & Frascarelli, 2019). In theory, with coupled payments, farmers mainly have subsidy revenue maximization objectives, which, in contrast to decoupled payments, aim toward demand-oriented profit-maximizing behavior (Kazukauskas et al., 2014). Consequently, a coupled measure can create expectations that current production decisions affect future payments (Bečvářová, 2007). Initially, one of the motives behind decoupling was to increase "freedom to farm" (EC, 2003), remove production distortions, and improve competitiveness (Martinez Cillero et al., 2018), offering farmers an environment to make optimal decisions (Ciliberti & Frascarelli, 2015). Similarly, Severini and Tantari (2013) note that decoupling has been motivated by the need to increase EU farmers' market orientation and reduce the economic distortions caused by the coupled payments on the farm product markets (OECD, 2011). However, in the case of coupled payments, production decisions are influenced mainly by the payments or expectations of future payments. This is well documented in the literature as the application of coupled payments is likely to affect cropping patterns, such as shifting production towards a particular crop (see, for example, Pe'er et al., 2017; Smit et al., 2017; Trapp & Lakner, 2018; Bellmann, 2019; Haß, 2021). Contrary to decoupled payments, which have offered farmers some sort of freedom to shift their production decisions towards "easier," less demanding crops in terms of production factors, technical characteristics, and business effort (Agrosynergie, 2011), with coupled payments, farm activities tend to be concentrated towards those with eligible payments. This influences cultivation decision patterns which are based on payment and not on market signals or competitiveness level. In other words, farmers choose based on the payment, not the market, their production factors, and their competitiveness level. Farmers choose their crop or animal type based on the expected direct payment and not on expected market prices or farm production structure (Bečvářová, 2007; Trapp & Lakner, 2018; Scown et al., 2020). Moreover, this negatively affects the level playing field among crops, as support is offered only for particular crops at the expense of competing crops where no such support is offered (Smit et al., 2017; Haß, 2021). This increases the production and land allocation to those particular "supported" crops (Haß, 2021).

Additionally, this may hamper the concentration of particular crops in the most competitive regions, with production shifting to less competitive regions (see, for example, Haß, 2021). However, compared to decoupled payments which aimed to promote market-oriented production by letting farmers decide on which and what quantity of crops needs to be produced, coupled payments bring pretty much the opposite effect, as supported farmers produce to quality for a payment (Martinez Cillero et al., 2018), and or at least partly based on payments provided, and not on market demand, which eventually reduces their farm efficiency and competitiveness (Pe'er et al., 2017; Trapp & Lakner, 2018).

This also brings the third outcome of coupled payments - their effects on farm efficiency. Several scholars recognize that incentivizing the cultivation of specific crops without considering the real needs of the demand has negative consequences, both on-farm efficiency and total factor productivity (Hennessy, 1998; Zhu et al., 2012; Mary, 2013). Primarily, coupled payments affect productivity and farm efficiency by keeping less competitive farmers in the market. When farmers receive a non-conditional additional income, this may reduce their motivation to adopt more efficient production practices (see, for example, the work by Emvalomatis et al., 2008; Bojnec & Latruffe, 2009). Further, these payments, in particular area payments incentivize inefficient farmers to keep producing by covering their fixed costs, who otherwise, without the payments, would exit the sector (Chau & de Gorter, 2005; Bečvářová, 2007). In other words, they cover losses for inefficient farmers. In this line, some other authors refer to microeconomic theory as establishing linkages between direct payments and farm production (Femenia et al., 2010). From the microeconomic theory perspective, firms exit the market if the revenue they would earn from producing is less than its total costs. If firms cannot recover their fixed and variable costs,[31] they exit in the long run. Moreover, economic theory suggests that in the absence of market distortions and imperfections, agricultural production levels should fall in response to the introduction of payments that are decoupled from production and would lead to loss-making farms exiting production (Kazukauskas et al., 2011). Additionally, this should open possibilities for new entrants that contribute to a growth in productivity as new firms typically represent newer technologies, and exiting firms have older, less productive technologies (Ilmakunnas & Topi, 1999). However, this does not seem to happen in the case of coupled direct payments. Besides keeping inefficient farmers, inefficiency may also arise from potential distortions in input-output allocation decisions (Rizov et al., 2013) and from the encouragement of subsidized but perhaps less productive activities (Rizov et al., 2013; Smit et al., 2017). For example, Smit et al. (2017) found that MS countries that apply VCS had relatively low sugar beet yields; consequently, growing sugar was less profitable in the VCs-MSs. They benefit less from economies of scale than the rest of the EU. Lastly,

[31] Adding also the condition that the price is less than the average total cost (ATC).

Kazukauskas et al. (2014) also find that direct payments influence the degree of specialization on farms.

Fourth, besides effects on productivity, coupled payments are also associated with slowing structural change (Martinez Cillero et al., 2018), as they affect farm structure, hindering further expansion and making the entrance more costly for potential new farmers (Brady et al., 2017), keeping certain farms in the business longer (Bečvářová, 2007; Martinez Cillero et al., 2018), and affecting land use decisions. As coupled payments are linked to farm production, it is predominantly hypothesized that they affect farm structure as well, i.e., farm size and production decisions, since farmers can have a direct effect on the payout levels (Bečvářová, 2007; Pe'er et al., 2017). Initially, structural change from coupled payments is affected as they keep some groups of farmers longer in the sector, such as less efficient farmers and smallholders (see Ciliberti & Frascarelli, 2019), which the latter stay mainly due to equity gains related to land value (Bečvářová, 2007; Martinez Cillero et al., 2018; Ciliberti & Frascarelli, 2019). Keeping the same farmers in the sector for too long, with the majority being not or less competitive, limits the entrance of newcomers or access to additional land for new investments (e.g., for expansion). Along the same line, Brady et al. (2017) note that these payments are slowing structural change, which can hamper agricultural development, as land could be used by more efficient, larger producers with higher yields (Bečvářová, 2007), leading to improved competitiveness and an increase of farm profits. Further, structural change in farm production is also hindered by land capitalization[32] - high land and rental prices (see, for example, Patton et al., 2008; Brady et al., 2017; Ciliberti & Frascarelli, 2019). Notably, as Brady et al. (2017) note, since farmland is a scarce resource, farmers continuously compete to have more available land for production; this support leakage to landowners increases rental rates and land values (prices). Additionally, these prices are fueled by direct payments in productive regions where payments are not needed for continued production and preservation of farmland (Brady et al., 2017). In addition, the encouragement of farmers towards intensification has focused them more on fertile and readily accessible land, leading to the abandonment of marginal areas (Pe'er et al., 2017).

Fifth, due to its high volatility and vulnerability to agricultural policy, farm income has been one of the key indicators studied. When it comes to farm income, it is generally argued that direct payments are a poor income support instrument, even though they constitute a significant transfer of income from taxpayers to farmers (Brady et al., 2017). Moreover, it has been demonstrated that those support measures causing the greatest distortion to production and trade

[32] Receiving support by landowners, not farmers, in the name of direct payments is known as "land capitalization."

are also the least efficient in providing income benefits to farm households (Dewbre et al., 2001). Notably, coupled payments are the least efficient (Biagini et al., 2020) and least effective policy instrument, in particular, compared to Single Payment Scheme (SPS) and Rural Development Program (RDP) (Ciaian et al., 2015). These findings could be a result of several channels. Firstly, most support goes to large farmers in high-yielding areas with incomes above the national average (OECD, 2011). Similarly, Smit et al. (2017) note serious doubts about whether a coupled support measure is an appropriate instrument to solve the income problem. Nevertheless, it is hypothesized that coupled payments, the same as decoupled payments, have some sort of effect on farmers` income. This comes because one of the main objectives of coupled direct payments, besides increasing production, is to support farm incomes. Secondly, Matthews (2020) notes, if the intention to provide support to farm incomes requires farmers to engage in specific activities that are likely to be less profitable to be eligible for income support, this support would inevitably reduce the value of these payments compared to decoupled payments. When farmers engage in less competitive farm activities (in many cases farming the subsidy), using lower inputs, outdated machinery, and technology, their income evidently lowers. Consequently, it is found by several authors that coupled payments have no significant effect on farm income (Guyomard et al., 2004; Buckwell et al., 2017; EC, 2018; Biagini et al., 2020; DeBoe, 2020). Besides the insignificant effect, in some cases, it was found that it even lowered the income of supported farmers (see the example of coupled support for sugar beet in the EU by Smit et al., 2017). Thirdly, the hypothesis is that it might positively affect stabilizing farm income; however, this is not the case with coupled payments. Income generated from farm activities is subject to many risks, such as market changes, price fluctuations, weather events, and other relevant factors causing volatility in farm incomes. As Brady et al. (2017) note, this, in turn, may reduce incentives to engage in farming and invest in new technologies and knowledge. For income stabilization effects, direct payments provide an income floor (Mahé & Bureau, 2016); however, income fluctuations due to the above-mentioned potential risks would happen in any case, even in the absence of this floor income support – therefore, the floor raises the mean income, but this does not change the probability of losing a given amount (Brady et al., 2017). Therefore, coupled direct payments do not stabilize farm incomes; instead, all farmers receive payments in all years, irrespective of whether prices are low or high or which risks they are currently facing (Fresco & Poppe, 2016; Brady et al., 2017; Buckwell et al., 2017).

Nevertheless, an important consideration that needs to be noted is that often the estimated effect of direct payments to income might be biased, mainly due to a) the final beneficiary of the payment and b) often calculation of household income poorly reflects the actual farm income. For example, regarding income, besides leakages to other non-target beneficiaries described

above, interlinkages could be on the leakage of support to input suppliers. These payments may increase input prices, which could be a leakage or support transfer to other beneficiaries, such as input suppliers. On the other side, direct payments may lead to lower output prices, as input suppliers and buyers of agricultural commodities (i.e., wholesalers, intermediaries, processors, manufacturers) may somehow intercept an amount of such a subsidy, by lowering the price of the commodities (Alston & James, 2002; Hendricks et al., 2012; Rizov et al., 2013), thus generating policy gains for consumers. Also, these payments may interact with other markets (such as in credit constraints) or may alter farm behavior by substituting private farm activities, which ultimately may increase or reduce farm profits depending on the type of induced effect (Ciaian & Swinnen, 2009; Ciaian et al., 2015). Consequently, farmers' dependence on direct payments might be overestimated due to these leakages of support (e.g., Buckwell et al., 2017).

Lastly, coupled payments could stimulate farmers` behavior, contributing to the environment. Subsequently, environmental outcomes constitute the last outcomes of this comprehensive literature review. The considerable share of global greenhouse gas (GHG) emissions[33] from agriculture is attributed mainly to agricultural policies, with many subsidies driving unsustainable production practices, ultimately causing environmental damage. Often, agricultural policies have conflicting goals. On one side, the objective is to increase production at the cost of emitting higher environmentally damaging GHGs. Increasing production is often associated with larger farm sizes, requiring higher input use (primarily chemicals), more machinery, and sometimes even converting grassland or other types of land (such as forests) into arable land. Particularly, coupled direct payments with their objective to expand production directly affect the environment due to a larger extent of input use – contributing to higher levels of environmentally damaging GHG emissions, nutrient surpluses, and pesticide use (Brady et al., 2017). This is particularly true for coupled payments linked to output levels. Besides, they contribute to bringing marginal lands into production, promoting unsustainable intensification or incentivizing the excessive use of pesticides and fertilizers (see, for example, Pe'er et al., 2017; Bellmann, 2019). Without adequate environmental regulation, production-enhancing subsidies intensify the adverse environmental effects associated with agricultural practices (Bellmann, 2019). Another effect rarely discussed in the literature is the indirect effects of coupled subsidies on the environment and public health. Godfrey (2002) notes that coupled subsidy patterns with their emphasis on expanding production have encouraged the

[33] Over the recent years, there has been a growing body of studies examining the effects of agriculture (i.e., agricultural practices) and its policies towards the environment (see, for example, Pe'er et al., 2017; DeBoe, 2020; Jansson et al., 2021; Gautam et al., 2022). It is well known that agriculture is strongly affected by climate change and, at the same time, is a significant contributor to climate change, with agriculture and land use change accounting for one-fifth of the GHG emissions (FAO, 2021; Gautam et al., 2022). This effect is larger than all forms of transport or industrial uses. Only in EU, agriculture contributes about 11 percent of Europe`s total GHG emissions (Brady et al., 2017).

industrialization of agriculture, with a premium on the heavy use of chemical inputs, which have immediate consequences on the environment and threats to public health. The negative impact of agriculture is mainly in the form of polluting emissions and degradation of soils and habitats (EEA, 2006; Brady et al., 2017).

3 AGRICULTURAL POLICY BACKGROUND IN KOSOVO: EXTENSION SERVICES AND DIRECT PAYMENTS

This chapter provides a background on the agricultural policy in the country where the research work is taking place – Kosovo, focusing on the two agricultural policies studied with this thesis – extension services and direct payments. The first part describes the public agricultural extension service in the country, followed by a description of the coupled direct payments, particularly the evaluated program - DP Program.

3.1 The public agricultural extension service in Kosovo

Kosovo's public agricultural extension service has been inefficient in addressing farmers' needs (OECD, 2021).[34] This service has been characterized as an "ad-hoc" extension service, predominantly oriented into training, operating with distracted[35] public advisors with general agricultural education, limited use of ICT, inexistent field visits, and shortages in staff members. Consequently, many farmers have not received extension services; furthermore, based on personal field observations, even a large number of them have not heard that this service exists.

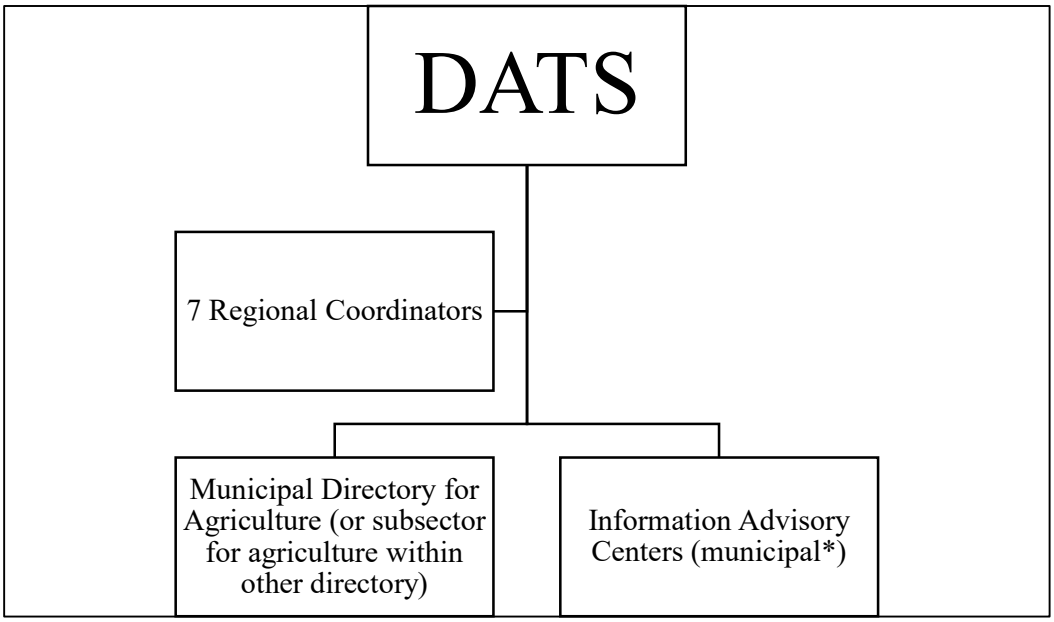
Over the pre-war period, during the 1980s and early 1990s, while Kosovo was part of the Socialist Federal Republic of Yugoslavia, there was no official public extension service in Kosovo. Extension services were mainly carried out through cooperatives and input sellers. Before the war, there were around 150 agricultural cooperatives in Kosovo (MAFRD, 2003), and each cooperative had its agriculture experts. In addition, there were two public agriculture institutes, the Agriculture Institute and the Livestock Institute, whose primary mandate was research; however, they were also partly engaged in extension services. The Faculty of Agriculture also played a similar role.

Kosovo's public extension system is established nowadays and organized within the Ministry of Agriculture, Forestry, and Rural Development (hereafter MAFRD). Since 2004, the Department of Advisory and Technical Services (DATS) has been explicitly destined for advisory services. DATS's main activities include organization, coordination, and implementation of all advisory services activities at the country level, support of municipal information and advisory centers, and drafting annual, medium, and long-term plans for the advisory services for agriculture and rural development (MAFRD, 2012). The Advisory Service for Agriculture and Rural Development is within this department, operating since 2004. This

[34] Based also on anecdotal evidence.
[35] Engaged in other regular municipal tasks.

service has several stakeholders involved in its operations. The organogram below (Figure 3.1) represents how the service is organized on paper.

Figure 3.1: Stakeholders involved in the public agricultural extension service in Kosovo



Note: *Information Advisory Centers were not established in each municipality. They were established in the majority of municipalities that have a designated directory for agriculture.
Source: Constructed by the author.

In addition, this system is also divided into three levels, central, regional, and municipal, each with a specific number of responsible entities/ stakeholders. Each level is described separately below.

Central level

The central level is constituted by DATS, which has a staff of four people. They coordinate and organize all activities regarding extension services in Kosovo.

Regional level

The regional level includes the country's seven regions, and for each region, a coordinator is employed to organize the activities related to extension services in their specific region.

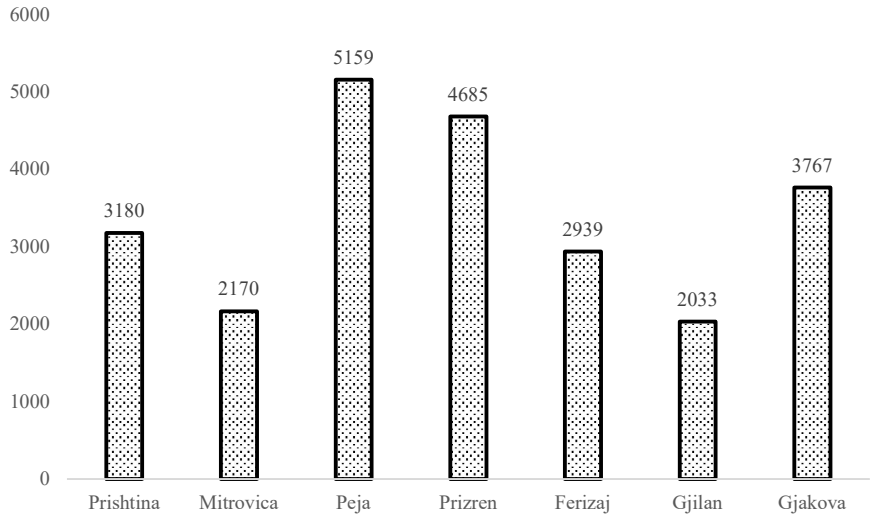
Municipal level

One of the key partners in implementing advisory services is the Municipal Directorates for Agriculture. Most municipalities in Kosovo have a Department/ Directory of Agriculture responsible for implementing the agricultural policy within that municipality. However, there are also some municipalities where this department does not exist. In these cases, these municipalities have subsectors for Agriculture within other Departments, such as the Department of Economic Development. According to (MAFRD, 2012), 27 municipalities in

Kosovo have Agricultural Departments/ Directories, while seven municipalities have agricultural subsectors within other directories.

Municipal Agricultural Directories are an important source of public sector advisers (extension agents). Moreover, the vast majority of them have a background in agriculture. According to (MAFRD, 2012), 85 department officials have agricultural faculty (agricultural education), and 17 officials have other educational backgrounds such as economist, law, or agriculture high school. Regarding staff members, the number of employees per department differs from municipality to municipality. Some municipalities have higher numbers, while others have only two staff members in the department; this mainly depends on municipality size and budget restrictions. The majority of Agriculture Departments within the municipality have from three to eight employees (MAFRD, 2012). From these staff members, one to two persons have been assigned for extension services in coordination with the regional coordinator. Correspondingly, most municipalities have only one extension agent (adviser) assigned, excluding Fushe Kosova, Podujeva, and Gjilan, with two employees assigned as extension agents. Nevertheless, these advisers are highly distracted with other municipal tasks, making the extension services different from a farmer-oriented service. The other municipal tasks (such as supporting farmers for direct payments application and processing their applications) imply less time for extension. The figure below represents the average number of farmers per region that one extension agent had to cover in 2014.

Figure 3.2: Average number of farmers per extension agent per region in 2014



Note: Calculated by the author using Census data from Agricultural Census (2014).
Source: Constructed by the author.

As can be seen, the region of Gjilan, Mitrovica, and Ferizaj has a more comfortable farm-extension agent ratio. Contrarily, extension agents in municipalities within Peja and Prizren

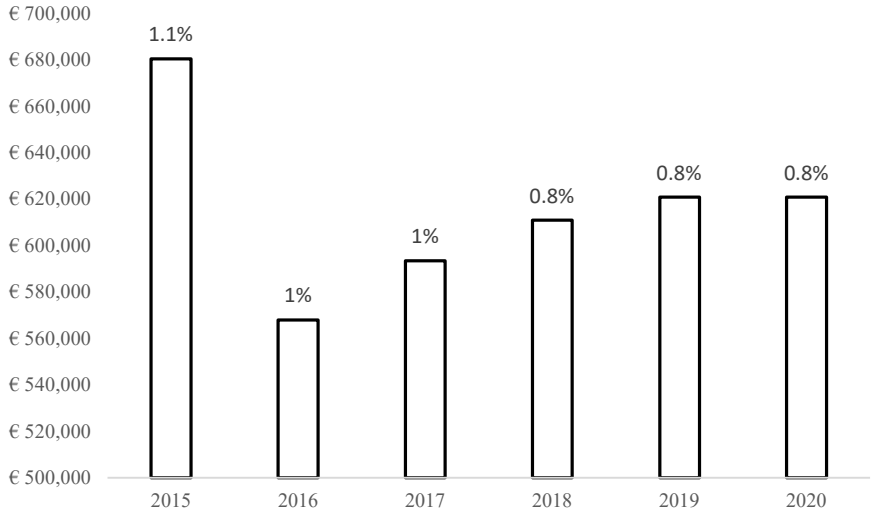
regions had to cover the largest number of farmers, an average of 5,159 in Peja and 4,685, respectively, in Prizren. The largest number of coverages can also be due to a bigger concentration of farmers in those regions.[36]

In 2014, a public extension agent had to cover 3,168 farmers on average at the country level. If the total amount of working days is included in this estimation, this translates to an average of 13 farmers per day that an extension agent had to cover daily.

Information Advisory Centers

Information Advisory Centers were established in 2014/15. DATS is responsible for managing and coordinating all these centers across the country. According to (MAFRD, 2015), it is foreseen that at least one adviser would be specifically destined for extension services to farmers to be engaged in this center. Up to date and the best of our knowledge, there is no official information on how far this objective has been achieved. Farmers then would use these centers to get information on public policies (subsidies, grants) and advice for their agricultural activity. It is also foreseen that advisers engaged in these centers will move to MAFRD contracts and be paid by the ministry budget (MAFRD, 2015). In terms of budget, MAFRD only in 2015 has allocated over six hundred thousand euros to DATS. Over the last five years (2016-20), DATS has been receiving similar budget amounts (see Figure 3.3 below).

Figure 3.3: Nominal budget for DATS over the period 2015-20 (as a percentage of total MAFRD budget)



Note: Calculated by the author using the data were provided by the Ministry of Finance. Above each column, the percentage of budgeted and projected amount for DATS relative to the MAFRD budget. 2015 to 2017- budgeted, 2019-2020 - projected.
Source: Constructed by the author.

[36] These are simple averages that do not take into account the distance between farms/ density of farms in a certain region.

As shown in the figure above, the projected budget share for DATS relative to the total budget of MAFRD has declined over the years, mainly due to the increase in other support measures (i.e., direct payments).

3.2 The Direct Payments Program (DP)

The agricultural sector in Kosovo is heavily subsidized, characterized by an agricultural policy predominantly oriented on direct payments. As part of efforts to help Kosovo farmers to increase their income, farm sizes, farm production, and quality, the Government of Kosovo, through MAFRD, has been implementing the Direct Payments (DP) program[37] since 2009 (Bajrami & Ostapchuk, 2019), even though the first direct payment schemes for heifers and wheat harvesting fuel were initiated a year earlier, in 2008 (Bajrami, 2016). The MAFRD introduced this program intending to increase the production of agricultural products and align the country`s policy to CAP, where direct payments are a significant component. The third argument favoring direct payments relates to creating a bond between farmers and the administration that encourages farmers to stay in business and engage in politics (Kastner International, 2012). Among the main general objectives, the DP program aims at increasing the production of agricultural products, increasing and stabilizing farm incomes, and improving the agriculture sector competitiveness relative to other sectors and imports (MAFRD, 2014; Bajrami, 2016; Kerolli-Mustafa & Gjokaj, 2016). Notably, in 2017, the main objectives of the DP program, outlined in the annual program document of MAFRD (2017a), were:

a) to increase the competitiveness and effectiveness of primary agricultural production,
b) increase farm incomes,
c) increase yields and their quality,
d) reduce imports,
e) reduce production costs,
f) increase processing capacities and
g) intensify the economization of agricultural activities.

Besides these main general objectives, some measures have, in addition, their specific objectives. For example, the direct payment measure for livestock has also listed specific objectives to increase farm size and reduce the negative impact on the environment (see MAFRD, 2017a).

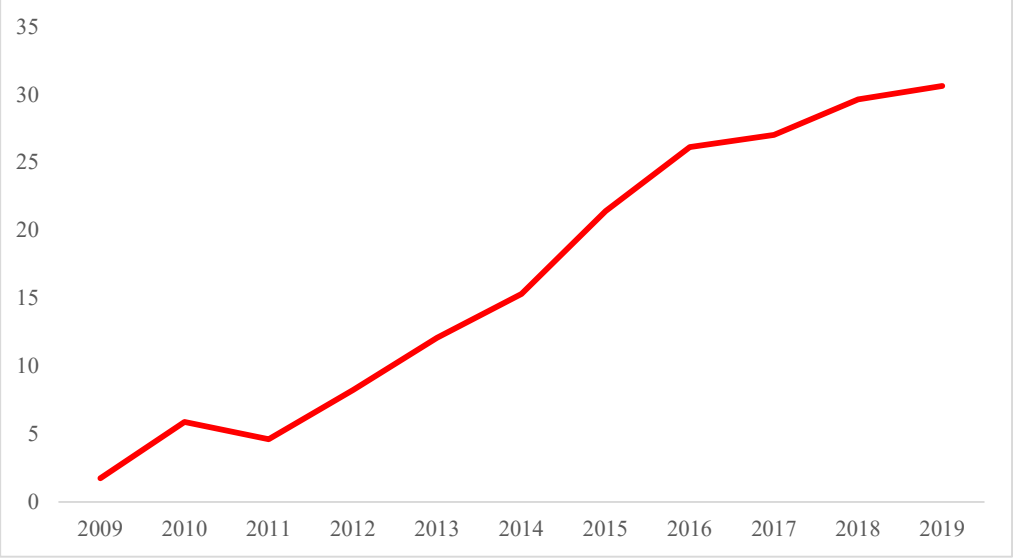
To achieve these objectives, the DP program incorporates a number of direct payment measures (schemes) covering several agricultural sub-sectors, i.e., grains, livestock, horticulture, fruits,

[37] The DP program constitutes the first Pillar of the Agricultural and Rural Development Program (ARDP). A description of this policy framework is provided in Appendix A 2: The Agriculture and Rural Development Plan (ARDP).

bees, and fisheries. These payments are coupled with either cultivated area in the case of crops and the number of animals in the case of livestock or delivered or delivered quantity and or quality to processing units or formal markets (Bajrami, 2016; Bajrami & Ostapchuk, 2019). Since 2009, the program has not changed much; however, almost every year, support measures for new crops are added, or the support amount per measure is increased. All these payments are coupled. To be eligible for support, farmers must meet a minimum set of criteria regarding farm size (cultivated area, number of livestock) or quality and quantity of products delivered to the formal market. For example, in 2017, wheat producers should have at least 2 ha of the cultivated area with wheat to receive a pre-set payment per ha (150 €/ha), or dairy cattle farmers should have at least five dairy cows to receive €70 payment per cow. Outlined objectives per sub-sector/ measure are predominantly similar, mainly related to increasing farm size, productivity, and income from agricultural activity. Interestingly, at the DP measures targeting the livestock sub-sector, one of the specific objectives is related to climate change, specifically aims to reduce the negative effect of agriculture on the environment.

To implement this program (DP program), MAFRD allocates about 50% of its budget annually. Since the program's launch in 2009, the government of Kosovo has been consistently increasing its budget for the DP program annually, from less than 2 million to 30 million in 2019. Over the eleven years (2009-19), the budget for this program has been increased by an annual average of 44.5%, spending a total of over €182 million (see Figure 3.4 below). The strongest annual increase was noted in 2012, 2013, and 2015. Besides the budget, the number of supported agricultural subsectors has also increased over this period. Back in 2008, only three sub-sectors were supported. In 2017, this policy covered 25 different subsectors.

Figure 3.4: Distributed budget amount for direct payments program over the period 2009-19 (mil. €)



Source: Constructed by the author with data retrieved from (MAFRD, 2018, 2020b).

During the period analyzed later (2015-17), MAFRD spent over €87.3 million, or this budget spending is equivalent to about 0.9 of the Gross Domestic Product (GDP) (Martinovska Stojcheska et al., 2021).[38] In 2017 alone, MAFRD dedicated almost two-thirds (64%) of its agricultural budget to DP, or €27 million (MAFRD, 2018). In this year, the DP program was constituted by a total of 22 direct payment measures, covering livestock with payments per head, grains, fruits, and vegetables with area payments, milk quality with payments based on the quality of delivered milk, wine on the quantity of processed wine and aquaculture based on the quantity of sales delivered to formal market (Bajrami & Ostapchuk, 2019). Direct payments covered about 76 thousand hectares (or 41% of the total UAA), 66 thousand cows, 15 thousand sheep and goats, 153 thousand bees, and about 870 thousand laying hens. Even though the program covers several agricultural sub-sectors, most of the budget goes for the livestock and grains sub-sectors. As mentioned above, direct payments were first offered to livestock and grain farmers (Bajrami, 2016), and even today, they constitute the biggest receivers of the DP Program. In 2017 alone, over 38% of the budget was allocated to livestock payments, followed by grains (wheat, maize, barley, and oat) with a similar percentage (Bajrami & Ostapchuk, 2019). Out of 30,321 recipients of direct payments (participant farmers in the DP program) in 2017, on average, a supported farmer received €606 as coupled support. The direct support measures per ha of agricultural land in Kosovo are among the highest ones across WBs - in 2017-19, this value was estimated at €70/ ha (Martinovska Stojcheska et al., 2021).

[38] Table A 5 in the Appendix provides a couple of similar indicators of budgetary support to agriculture in Kosovo.

4 METHODS and DATA

This research utilizes two types of data (quantitative and qualitative) which are being analyzed through three analytical approaches – a choice experiment, a quasi-non-experimental impact evaluation approach, and qualitative approaches. The quantitative and qualitative data for the choice experiment were collected in 2018 during fieldwork in Kosovo, while the FADN constitutes the quantitative data set for the impact evaluation analysis.

The following subsections of this chapter describe in detail the approaches used for this research, starting with a detailed description of the choice experiment approach provided in subsection 4.1, followed by subsection 4.2, which describes the econometric approach applied for the quantitative impact assessment, where the Canonical (traditional) Difference-in-Difference approach, in combination with a matching technique, is introduced.

4.1 Discrete Choice Experiment

4.1.1 The Discrete Choice Experiment Approach

So far, a variety of methods have been utilized to elicit preferences. The majority of earlier studies rely on traditional methods such as approve/disapprove or Likert-scale type questions to assess farmers' policy preferences (Wolf & Tonsor, 2013). Later, other methods such as best-worst scaling (Lusk & Briggeman, 2009; Lusk & Parker, 2009), focus groups (Nancy Franz et al., 2010), contingent valuation (Dupraz et al., 2003; Cooper & Signorello, 2008), and choice experiment approach (Mercade et al., 2009; Espinosa-Goded et al., 2010; Christensen et al., 2011; Broch & Vedel, 2012; Lienhoop & Brouwer, 2015) were developed. Over recent years, Discrete Choice Experiments (DCE) have constituted the most commonly utilized method to elicit people's preferences for products that do not exist yet, or real market situations that cannot be observed. DCEs are based on a long-standing, well-tested theory of choice behavior-random utility theory (RUT) that can consider interlinked behaviors (Louviere et al., 2011). DCEs have strong properties on identifying value-specific product features or attributes and trade-offs between them, which is not possible with other common preference elicitation methods such as contingent valuation (Adamowicz et al., 1998).[39] Individual preferences are elicited by asking individuals to value selected attributes (described by specific levels) of a program, product, or service and state their choice over different alternatives (Mangham et al., 2009). Nevertheless,

[39] Within DCEs, attributes are described by so-called levels. For instance, in the case of a car, an attribute could be the car's color. In this case, the color levels could be blue, green, and red.

this approach comprises a couple of underlying assumptions,[40] particularly imposing strong assumptions on respondent choice behavior (Veldwijk et al., 2023). Respondents are expected to use complex and rational decision-making processes when completing choice tasks (Lloyd, 2003; Hensher et al., 2015), assuming that respondents evaluate all alternatives and their corresponding attributes and attribute levels in each choice task and choose the alternative that maximizes their utility (Veldwijk et al., 2023).

This approach involves a set of feasible options – known as choice cards. One of the choice cards is to be chosen by the respondent. Attributes and their respective levels should carefully be assigned to represent a realistic policy, product, or, as in our case, a service that respondents might confront in the future. Thus, choices in DCE should present an implementable policy option; therefore, identifying reasonable and necessary attributes and levels is the first step. Choices should also be relevant to the stated research questions (Mangham et al., 2009); thus, only the most important attributes and their levels are used in the DCE. They are usually elicited via literature review and focus group discussions. Subsequently, preferences are collected by asking respondents to select one choice card from a set of choices, allowing the researcher to see how these individuals trade off the choice card attributes and their levels. To summarize, a DCE requires a number of consecutive stages starting from 1) identification of attributes and assignment of their respective levels; 2) experiment design and construction of choice sets; 3) development of the questionnaire; 4) data collection, and 5) lastly statistical analysis of collected responses.

4.1.2 Development of choices – identification of attributes and assignment of levels

The literature initially drove the identification of the most relevant attributes and the assignment of their levels. Later, it consulted and adapted through focus group discussions and individual interviews with farmers, policymakers, university professors, and other stakeholders[41] in Kosovo.

Three focus groups with farmers and stakeholders were conducted by employing a semi-structured guideline on agricultural activity, input sources, advisory sources, the public extension system, farming plans, and agricultural policy in the country. In addition, individual interviews were held with university professors, specifically from the Faculty of Agriculture

[40] As noted by Paul et al. (2018), the DCE approach combines random utility theory (RUT), consumer theory, experimental design theory, and econometric analysis (Louviere et al., 2000; Lancsar & Louviere, 2008; Bliemer & Rose, 2009; Hensher et al., 2015). Furthermore, Rasouli and Timmermans (2014) note that regardless of the modeling approach and the underlying theory of choice and decision-making, these models share a common assumption that decision-makers have perfect knowledge about the attributes of their choice alternatives.

[41] Other includes input sellers, agribusiness managers or owners, private consultants, and staff members of international donor organizations. All these stakeholders were or are actively engaged in the agricultural sector in Kosovo.

and Veterinary Medicine (FAV) at the University of Prishtina, and private consultants. For a longer description of the qualitative work, refer to section 4.3.

When it comes to the number of attributes used within the DCE, the maximum number is constrained by the respondents' cognitive ability and interview fatigue.[42] Focus group results helped us identify six realistic and actionable attributes that seem to be important elements of an extension service package. The identified attributes are 1) the number of farm visits included in the offered advisory package; 2) the type of expertise offered through the advisors; 3) the availability of farm demonstrations; 4) the yearly cost of participating in the package in Euro; 5) the availability of a smartphone application/ ICT platform; and 6) a possible offset of policy cost through a cut of direct payments. The attributes and attribute levels are presented in Table 4.1 below.

Table 4.1: Attributes and attribute levels used in the choice experiment

Attributes	Attribute levels	Description of attributes
Farm visits	Zero visits One visit Two visits	The number of personal farm visits (live contacts) from the extension agents.
Expertise of extension agents	General Specialized	Type of expertise offered by the extension agents.
Farm demonstrations	Included Not included	Offer of farm demonstrations organized in small groups covering specific topics/ issues of interest.
Yearly rate	50 Euro 75 Euro 150 Euro	Price to be paid per year by the farmer for the offered package of farm extension service.
Phone application (ICT platform)	Included Not included	ICT application (platform) offering access on several features that can be accessed by a smart phone, tablet or home computer.
Direct payments	Stay the same Cut by 50% Eliminated completely	Direct payments that the farmer is currently receiving or are currently offered in the sub-sector where he/she is operating.

Individual farm visits were included as an attribute since most stakeholders stressed the importance of these visits on the farm during focus group interviews. In line with the results

[42] "It is neither possible nor useful to use all existing product attributes in a choice experiment; attributes must be reduced to a manageable size. Otherwise, the choice experiment would become overly complex and easily lead to respondent fatigue, creating inconsistent and random choices" (Bennett & Blamey, 2001).

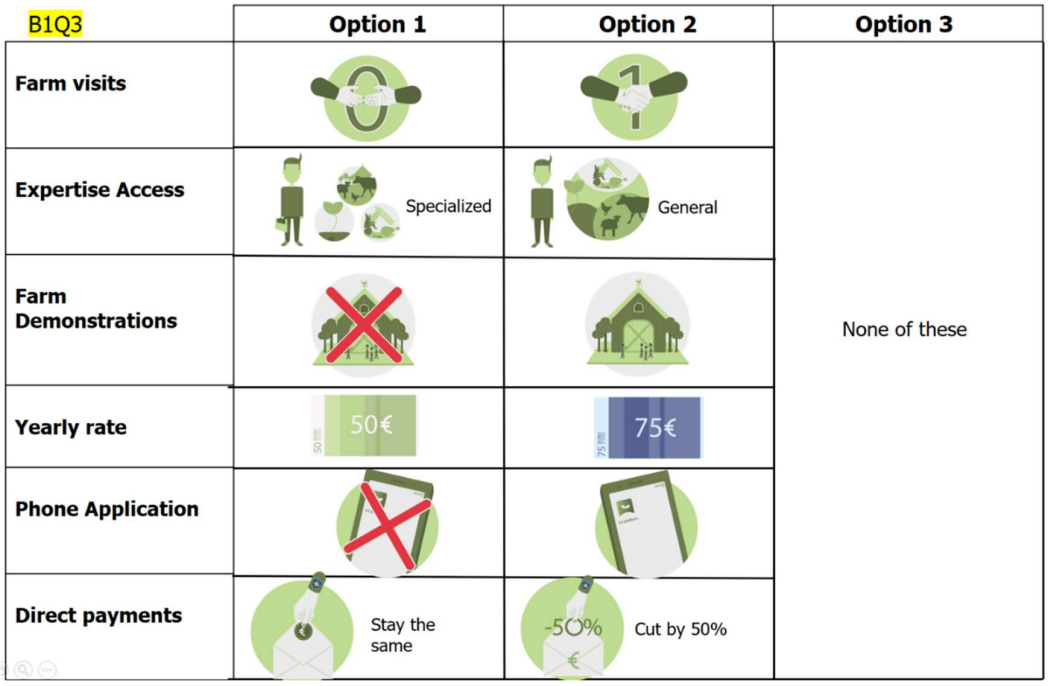
from in-depth work, the literature points out informal setting approaches where farmers' one-on-one interaction with experts or peers represents a preferred extension (learning) method (see, for example, Bamberry et al., 1997). While in the current system, most farmers are not visited predominantly due to staff shortages; the proposed restructured extension service package could offer guaranteed visits for its paying members. Subsequently, expertise access was included. Currently, there is a lack of specialized experts who can support farmers with more specific issues and requests. As Kahan (2013b) notes, in public sector extension services, there is often a considerable variation in the academic qualifications of extension workers and subject matter specialists, leading to gaps in competencies and skills. Similarly, this applies to the Kosovo context as general agronomists characterize the extension service. At the same time, subject matter specialists can be contracted privately, as they are not part of the public extension service. Such specialized expertise could be offered in an improved system and was therefore deemed a critical attribute. Similarly, farm demonstrations, farmer's costs per annum (yearly rate), and a supportive phone application (ICT platform) were included as attributes based on insights obtained from the qualitative interviews. The involvement of ICT in this extension service package constitutes a cost-effective approach that could reach a much broader audience, facilitate contacts between farmers and other stakeholders and, most importantly, offer access to the extension to the most under-served group in terms of extension – smallholder farmers. This technology can provide information on market prices, weather, and technical advice (Aker, 2011). The yearly rate attribute was included to assess farmers` WTP. Considering that lower accountability and efficiency are among the key drawbacks of free agricultural extension services, some economists argue that extension constitutes a private good for each farmer, which should be at least partly financed by the customer. According to Anderson and Feder (2003), the quality of the fee-for-service model is likely to be higher, which resolves the accountability problem. Beynon (1996) claims that much of the output of extension has stronger private good characteristics: e.g., the method of delivery of some extension (by a cadre of experts) creates the opportunity for fee payment; or other cases where information is embodied with inputs or physical interventions for which charges can be made. Furthermore, realizing a better-quality extension service, e.g., including specialized expertise, farm visits, farm demonstrations, and use of ICT, comes at a cost. Lastly, direct payments were included to examine whether farmers would accept reductions in this policy scheme (on their cash payments as subsidies) as a trade-off for receiving an improved extension service. In 2019, almost half of the farmers - about 44% received direct payments. Particularly, the vast majority of commercial farmers in Kosovo receive direct payments. Considering the coupled nature of these payments, the larger the farm, the larger the amount they receive as a subsidy. In most cases, this translates to significant amounts on their annual incomes. However, at the same time, not all farmers within a specific subsector receive direct payments, whereas mainly smallholder

farmers are excluded from these schemes. Thus, theoretically, a redistribution of public funds from direct payments to a better extension service should increase the sector's welfare. Acceptance by farmers is tested by including this attribute in the DCE.

In our experiment, each choice card had an opt-out option in addition to six attributes. Without the opt-out option, farmers would have been forced to select one of the choices; therefore, the option allows them not to choose any of the offered extension service packages. In other words, if a farmer is not interested in participating in any of the improved advisory service schemes, the opt-out decreases the likelihood of forced choices by farmers and makes the experiment more realistic (see Rockers et al., 2012; Veldwijk et al., 2014; Campbell & Erdem, 2019). Excluding the opt-out option (card), farmers were presented with 18 different combinations of extension service packages (i.e., nine choice sets).

Lastly, to ease the cognitive burden of farmers during the experiment, attribute levels were visualized so farmers could grasp easier the choice profiles and their accompanying attributes. According to Rockers et al. (2012), visual elements may also help to reduce interview fatigue. An example of a choice set is presented in the figure below.

Figure 4.1: A sample of a choice set used in the DCE



4.1.3 Experimental design

Our DCE had a total of six attributes, with fifteen levels, making 216 possible choices (3^3*2^3). Presenting all these possible choices to farmers, known as "full factorial design," was not possible; therefore, a fractional factorial design was employed to elicit choices that respect 1)

orthogonality, 2) minimum overlap, and 3) offers a level balanced design (Huber & Zwerina, 1996; Kuhfeld, 2010). Orthogonality implies that there should be minimal or no correlation between different attribute levels, implying that the attributes are statistically independent (Kuhfeld, 2010; Hensher et al., 2015). The second property characterizing efficient choice design is minimum overlap – seeking to minimize the probability that an attribute level repeats itself in each choice set (Huber & Zwerina, 1996; Maddala et al., 2003; Mangham et al., 2009). In other words, this implies that between choice cards that appear together in a choice set, they should rarely have the same attribute levels; otherwise, no information is obtained on an attribute's value when its levels are the same across all alternatives within a choice set (Mangham et al., 2009; Rockers et al., 2012). Lastly, level balance requires that each attribute level appear equally often within an attribute, thus minimizing the variance in the parameter estimates (Kuhfeld, 2010; Johnson et al., 2013).

A fractional factorial design was derived using R software's "support.CEs" package. This package derived an unlabeled choice experiment design using rotation.design[43] function, which performs a rotation design and a mix-and-match design method (Aizaki, 2012). This design derived a total of 108 alternatives, including opt-out alternatives. Choice cards were placed into 36 choice sets, organized over four blocks, nine choice sets per block. Each farmer was presented with a block of nine choice sets, randomly assigned to one of the four blocks.

4.1.4 Questionnaire development

The choice experiment questionnaire was created based on the derived choice sets from R. Using the function "questionnaire" in the same package, the questionnaire was constructed, and each farmer had to answer nine questions or choice sets per block. Each choice set comprises three alternatives, two with extension service packages and one opt-out alternative.

Besides visualization, warm-up questions and cheap talk (CT) were applied prior to the real-choice experiment. The warm-up questions were designed to reflect a scenario as farmers were purchasing a cow. Most of the farmers in Kosovo are engaged fully or part-time in livestock activities, have cows, or at least have experience in buying or selling a cow. Therefore, using this context, the warm-up section was used to familiarize respondents with the question design and experiment in general (Rockers et al., 2012). One of the choice set rounds used for warm-up questions can be found in the Appendix, Figure A 1.

[43] The rotation method uses the orthogonal main-effect array as the first alternative in each choice set (Aizaki, 2012).

Additionally, considering the hypothetical nature of the experiment, cheap talk is a well-known and recommended technique to reduce hypothetical bias.[44] Over the years, cheap talks have found application in many studies concerning peoples` preference elicitation (Taylor & Cummings, 1999; List, 2001; Bulte et al., 2005). The cheap talk was employed at the last stage before presenting the actual choices to the respondents, aiming to remind farmers about monetary attributes included in the experiment and mitigate possible hypothetical bias related to those two attributes.

4.1.5 Study area, sampling strategy, and sample size

The study was carried out in Kosovo. To date and the best of our knowledge, no clear rule specifies the sample requirements for discrete choice experiments. However, according to Rockers et al. (2012), a minimum sample size of 30 is required for econometric analysis for each predetermined subgroup of the main sample. Since the study aimed to have a countrywide scope, the DCE survey was carried out over the seven regions of Kosovo, covering all the country's regions. To reduce geographic bias and have a representative sample across the regions in terms of farm size and the number of farmers, the number of respondents per region was determined using a weighting technique on the national FADN sample population list. First, we selected based on this list, and second, we constructed the weights to achieve a closer similarity between our and FADN samples. Subsequently, the number of possible respondents per region was estimated based on those weights. In other words, the sample has been derived from a panel of farmers regularly reporting performance, thus being more representative of the commercially oriented actors in the sector. Out of 400 respondents planned in the initial sample size, about 10% refused to participate in the study or could not be reached, resulting in 362 randomly selected surveyed farmers observations.

4.1.6 DCE implementation

Overall, the DCE implementation had several critical stages that must be carried out carefully. The DCE started by introducing the study, its objectives, why and how that specific farmer was selected, and lastly, taking his/ her consent to participate. This introduction was followed by explaining each attribute and its levels using specific examples of their farm operation and showing them the respective symbol (pictogram) for each level. Warm-up questions followed this, and in the end, each respondent was also provided with a separate fact sheet containing the

[44] Hypothetical bias refers to situations when respondents report a higher WTP in an experimental setting than in a real-world setting. These deviations from real market evidence are referred to as hypothetical bias (Hensher, 2010). Usually, hypothetical bias arises in stated preference valuation studies, where respondents report a higher WTP that exceeds what they would actually pay (Loomis, 2011).

cheap talk text (see Appendix A 3: Warm up questions (example) and Cheap Talk text for the full text)).

Before the actual experiment was conducted, a pilot testing of the choice experiment questionnaire was carried out with 13 farmers in two regions, Prishtina and Mitrovica. The pilot testing was used to check whether farmers understood the experiment, understood their task, and understood the definitions of attributes and their levels and whether the number of attributes and choice cards was manageable by their side. Data were collected using a paper-based survey administered by four enumerators. Enumerators were previously trained on how to conduct the experiment in detail. Enumerators interviewed each sampled farmer individually in face-to-face interviews, where each farmer was asked to respond to nine rounds of choice sets, followed in the end by questions related to the importance of attributes in their selection, selection order of attributes, and mobile phone usage. In order to be able to investigate how farmer`s preferences differ between certain groups, information was also collected on socio-economic characteristics of farmers such as education, age, location, farming experience, income, and questions regarding their attitudes and opinions on farm work, farming objectives, risk aversion, residing in rural areas and moving abroad – through a post-experiment survey. Data were collected over two months, September and October 2018, in 140 villages in 27 municipalities across all seven country regions.

4.1.7 Quantification of preferences and WTP

a) The GMNL Model

Discrete choice experiments utilize McFadden`s random utility theory (1974) to analyze the DCE data. McFadden (1974) and Louviere and Woodworth (1983) pioneered developing econometric approaches to analyze the data from DCEs. The individual`s utility following random utility theory can be expressed with the following equation (McFadden, 1986; Louviere et al., 2000):

$$U_{njt} = V_{njt} + \varepsilon_{njt} \quad (1)$$

Therefore, based on McFadden`s random utility theory, in our case, farmers choose their most preferred alternative: one of the two "extension packages" or the "opt-out" option. Each alternative is characterized by their respective attributes (in our case: the number of farm visits, type of expertise, the offer of farm demonstrations, yearly rate fee in Euros, support through phone application, and cuts in direct payments). Farmers were required to select their most preferred advisory service alternative (choice), assuming that farmer n selects the alternative j that gives him or her the highest utility U.

The utility U associated with a particular extension package comprising two components, the deterministic component V, and a random component ε. The V is observed by the researcher, non-stochastic as a function of m extension package attributes $(x_1, \dots, x_m)$, while the random component ε_{nj} (stochastic part) is a function of unobserved attributes, individual-level variation in tastes, omitted variables, and measurement errors (Batsell & Louviere, 1991; Rockers et al., 2012).

However, the utility cannot be observed; only the farmer's decision on which alternative was selected. Therefore, the DCE data are modeled within a probabilistic framework (Rockers et al., 2012). The probability P of farmer n choosing between a pair of extension packages, choosing alternative j over k in the choice scenario t is given as follows:

$$U_{njt} > U_{nkt}\,,\ \forall j \neq k \in, \tag{2}$$

decomposing this equation further to:

$$P_{njt} = P(V_{njt} + \varepsilon_{njt}) > V_{nkt} + \varepsilon_{nkt} \qquad \forall j \neq k \tag{3}$$

$$= P(V_{njt} - V_{nkt} + \varepsilon_{njt}) > \varepsilon_{nkt} \qquad \forall j \neq k$$

In this framework, where U represents the utility of a given alternative, it is assumed that respondent n chooses between j alternative choices, opting for the one associated with the highest utility. Assuming that the utility component V_{nj} is a linear function of all attributes, a generalized regression specification can be specified as:

$$V_{nj} = \beta_1 x_{j1} + \beta_2 X_{j2} + \dots + \beta_m X_{jmn} + \varepsilon_{nj} \quad N = 1,2,\dots n \tag{4}$$

where β_m is a vector of preference parameters associated with the nth attribute of the jth alternative. In other words, β provide parameters to be estimated that provide information on the strength of preference for each attribute level, as well as trade-offs, monetary values, and predicted take-up of alternatives. Correspondingly, the X_{jmn} is the nth value for alternative j.

To estimate equation (4), an assumption on the distribution of error term ε_{nj} should be made (Rockers et al., 2012). In this regard, the most commonly used model is the multinomial logit – known as MNL (Ruto & Garrod, 2009). The classical MNL is linked to the random utility model established by McFadden (1974) and represents the baseline model for most extensions to more sophisticated models (Lancsar et al., 2017). However, among its key drawbacks, this model assumes homogenous preferences across respondents and independence of irrelevant alternatives (IAA) (Hausman & McFadden, 1984). Preferences in a sample may be heterogeneous, and the non-accounting of heterogeneity presence can lead to biased estimates. Therefore, much of the recent work is focused on extending these models to allow for heterogeneous tastes over observed attributes (Fiebig et al., 2010). More sophisticated models

include nested logit, mixed logit, and latent class. The family of mixed logit (MIXL) models (Train, 1998; McFadden & Train, 2000) constitute some of the recent innovating models aiming to account for preference heterogeneity in choice models (Ruto & Garrod, 2009). The mixed logit is recognized as a flexible model, allowing for random taste variation, unrestricted substitution patterns, and correlation of unobserved factors over time (Train, 2009). By relaxing the IAA assumption - allowing for heterogeneity of preferences for observed attributes, the utility to a person n from choosing an alternative j on a choice scenario t under the mixed logit model is estimated as follows (Fiebig et al., 2010):

$$U_{njt} = (\beta + n_n)x_{njt} + \varepsilon_{njt}$$

$$n = 1, \dots, N\ ; j = 1, \dots, J; t = 1, \dots, T. \quad (5)$$

The vector of mean attribute utility weights is represented by β, whereas n_n is the vector of person-specific deviations from the mean. Besides assuming that ε_{njt} to be i.i.d extreme value, many mixed logit applications have assumed that $\sum$ is diagonal, which rules out correlation in tastes across attributes but not in tastes across alternatives (Fiebig et al., 2010). Furthermore, Fiebig et al. (2010) note that the mixed logit is likely to be a poor approximation of the data-generating process if scale heterogeneity is important. An improvement over this econometric framework (mixed logit models) is the scaled multinomial (heterogeneity) logit model (S-MNL). The S-MNL accommodates scale heterogeneity, implying that it allows the variance in utility across respondents (Kassie et al., 2017). Fiebig et al. (2010) point out this advantage of S-MNL compared to MNL and random parameters logit specifications (MIXL), where on the latter, as a standard practice to achieve identification, the variance (scale) is normalized to 1. The S-MNL is estimated as follows:

$$U_{njt} = (\beta\sigma_n)x_{njt} + \varepsilon_{njt}$$

$$n = 1, \dots, N\ ; j = 1, \dots, J; t = 1, \dots, T, \quad (6)$$

, where equation (6) implies that the vector of utility weights β is scaled up or down proportionately across respondents n by the scaling factor σ_n (Fiebig et al., 2010).

However, in an attempt to shed light on the pointed out critiques of S-MNL, Louviere et al. (2008), Fiebig et al. (2010), and Greene (2012) developed a model which nests MIXL and S-MNL, known as the generalized multinomial logit (G-MNL). G-MNL sheds light on whether heterogeneity is better described by scale heterogeneity, normal mixing, or a combination of both (Fiebig et al., 2010). Under the G-MNL formulation, the utility to person n from choosing alternative j on a choice scenario t is estimated as follows (Fiebig et al., 2010):

$$U_{njt} = [\sigma_n\beta + \gamma n_n + (1 - \gamma)\sigma_n n_n]x_{njt} + \varepsilon_{njt}. \quad (7)$$

As Kassie et al. (2017) noted, G-MNL embodies several forms of heterogeneity in the random parameters and scaling. Furthermore, the distribution parameter (γ) lies between 0 and 1 (Fiebig et al., 2010). The scale effect on the individual idiosyncratic component of taste can be separated into two parts – unscaled idiosyncratic effect ($\sigma_n\beta + \gamma n_n$) and scaled by ($1 - \gamma)\sigma_n n_n$, where γ allocates the influence of the parameter and scaling heterogeneity (Kassie et al., 2017). Also, γ determines how the variance of residual taste heterogeneity varies with scale in a model that includes both (Fiebig et al., 2010).

Further formulations of this model led to other models with different parameter restrictions. For example, from a combination of (5) – MIXL and (6) – S-MNL, G-MNL-I is obtained (Fiebig et al., 2010):

$$U_{njt} = (\beta\sigma_n + n_n)x_{njt} + \varepsilon_{njt}$$

$$n = 1, \dots, N\,; j = 1, \dots, J; t = 1, \dots, T. \quad (8)$$

The other model - G-MNL-II, is modeled similarly, but its scale parameter has an explicit specification:

$$U_{njt} = (\beta\sigma_n + n_n)x_{njt} + \varepsilon_{njt}$$

$$n = 1, \dots, N\,; j = 1, \dots, J; t = 1, \dots, T. \quad (9)$$

Its further specification is multiplied through σ_n, and GMNL-II is obtained (Fiebig et al., 2010):

$$U_{njt} = \sigma_n(\beta + n_n)x_{njt} + \varepsilon_{njt}$$

$$n = 1, \dots, N\,; j = 1, \dots, J; t = 1, \dots, T. \quad (10)$$

The random variable σ_n captures scale heterogeneity, and n_n captures residual taste heterogeneity. The difference between these two models (G-MNL-I and GMNL-II) is that in G-MNL-I, the standard deviation of n_n is independent of the scaling of β, while in G-MNL-II, it is proportional to σ_n (Fiebig et al., 2010). The G-MNL model approaches G-MNL-I as $\gamma \to 1$, and it approaches G-MNL-II as $\gamma \to 0$, while in the full G-MNL, $\gamma \in [0,1]$ (Fiebig et al., 2010).

Following Kassie et al. (2017), the general estimation framework developed by Train (2009), Hensher and Greene (2003), Fiebig et al. (2010), Greene and Hensher (2010) and with some modifications and extensions of the framework by Greene (2012) was employed. The full model – full G-MNL (without restrictions on γ and τ) is estimated by maximum simulated likelihood, while to impose restrictions on γ, γ is re-parameterized in terms of α, where $\gamma = \exp(\alpha)\,/[1 + \exp(\alpha)]$, and α is unrestricted (Greene, 2009; Kassie et al., 2017). Similarly, to ensure that $\tau > 0$, the model is fit in terms of λ, where $\tau = \exp(\lambda)$, and λ is unrestricted (Kassie et al., 2017).

b) Estimating Willingness to Pay for extension services

The estimation of willingness to pay (WTP) in space constitutes an appealing method over the last years (Train & Weeks, 2005; Fiebig et al., 2010; Hensher & Greene, 2011; Greene, 2012; Kassie et al., 2017). Previous approaches mainly include the estimation of WTP in preference space, with the necessary distributional assumptions of the parameter estimates. WTP estimates from this approach are derived as a ratio of two coefficients (other estimated coefficients with the price/ cost coefficient). However, among the main critiques, this approach leads to implausible WTP estimates (Scarpa et al., 2008; Thiene & Scarpa, 2009; Hensher & Greene, 2011). This approach depends on the choice of coefficients` distributions, leading to possibly heavily skewed WTP distributions (Hole & Kolstad, 2012). Further, commonly assumed distributions are often inconsistent (Ben-Akiva et al., 2019). A possible solution involves specifying the monetary coefficient as fixed (Hole & Kolstad, 2012). However, as Meijer and Rouwendal (2006) noted, this approach assumes that all individuals have the same marginal utility of income. Another approach involves specifying the coefficient for the wage attribute to be log-normally distributed, allowing the preferences for income to be heterogeneous (Hole & Kolstad, 2012). However, this approach also ensures that WTP measures have defined moments, but it can still result in highly skewed WTP distribution, producing unrealistic WTP estimates (Hole & Kolstad, 2012).

Therefore, Train and Weeks (2005) recommend estimating the mixed logit model in WTP space rather than in preference space as a way to avoid the problems listed above. In other words, this type of estimation estimates the distribution of WTP directly by re-formulating the model so that the estimated parameters represent the WTP distribution rather than the parameters of the usual coefficients (Hole & Kolstad, 2012). This approach produces more realistic WTP estimates (Scarpa et al., 2008; Thiene & Scarpa, 2009; Hensher & Greene, 2011; Hole & Kolstad, 2012). Considering that models in WTP space are a specified form of the generalized multinomial logit model (GMNL), the GMNL provides a straightforward method for this re-formulation (Fiebig et al., 2010; Hensher & Greene, 2011; Kassie et al., 2017). Following Kassie et al. (2017), this re-formulation to estimate WTP in space starts by normalizing the element of β representing the price variable (yearly rate fee in Euros) to 1 while a nonzero constant is moved outside the brackets, and $\gamma = 0, \Delta = 0$:

$$\beta_i = \sigma_i \beta_i \left[\left(\frac{1}{\beta_c}\right)(\beta + n_n x_{njt} + \varepsilon_{njt}) \right] = \sigma_i \beta_i \left[(\theta_c + n_n x_{njt} + \varepsilon_{njt}) \right] \quad (11)$$

The different G-MNL formulations discussed above were used in estimating the heterogeneity in mean and WTP models. The first formulation – full-GMNL, is estimated without restriction on its main parameters (γ and τ). The second and third formulations are estimated by restricting parameter γ - the first is estimated by fixing the parameter γ to zero and is known as G-MNL-

II, also known as the scaled random parameter logit model, while G-MNL-I is estimated by fixing the same parameter γ to 1 (Fiebig et al., 2010; Greene, 2012). The last formulation (fourth) is estimated by restricting another parameter, the parameter τ is fixed to 1. The estimations were carried out in Stata 17.

4.2 Impact Evaluation Approach

4.2.1 Identification of treatment effects

In quasi-experimental evaluation studies (with non-randomized settings), the key objective is to estimate the causal treatment effect, or in other words, the true effect of participating in a program. In this case, we seek to estimate the average treatment effect (ATE) for the participating farmers in the direct payments program (DP) in a couple of outcomes of interest. A basic ATE equation is shown below:

$$ATE = E[y_{i1} - y_{i0}] \tag{12}$$

where y_{i1} denotes the potential outcome of farm i belonging to the treated group, while y_{i0} denotes the potential outcomes of farm i belonging to the control group. In our example, the key question attempted to be answered is: "*How much did farms participating in the DP program benefit compared with what they would have experienced without participating in this program*?" To estimate the causal effect of treatment on this question, the most common evaluation parameter of interest is the average treatment effect on the treated (ATT) (Pufahl & Weiss, 2009).

In our application, the ATT is the causal effect of treatment for the participating farmers in the direct payments program, or in other words, how did DP contribute to the outcomes of interest – did DP contribute to changing the outcomes of interest? Following Kabunga (2014), the ATT is defined as follows:

$$ATT = E[y_{1i} - y_{0i}|D_i = 1) = E[y_{1i}|D_i = 1) - E[y_{0i}|D_i = 1), \tag{13}$$

where E is the expectations operator, y_{1i} is the observed outcome of farm i (participant farm in the DP program), y_{0i} is the observed outcome of the same farm i (non-participant), and $D_i = 1/0$ denotes whether the farm participated in the DP. However, evaluating the effect of a treatment requires to observe at the same time the outcome of the same farm in both states, subject and not subject to the treatment (Smith & Todd, 2005), such that the treatment effect would be the difference in the outcome of interest between the two states (Arata & Sckokai, 2016) – namely the difference between the outcome of the treated farm y_{1i} and the outcome of non-treated farm y_{0i}. The treatment effect is estimated as the difference in the outcome in the presence of treatment (participation) and the outcome in the state of non-treatment (without

participation). The critical issue here (see equation 13 above) is that y_{0i} cannot be observed for the farms receiving DP (participating farms), i.e., the outcome of interest (e.g., farm income) that farm i would have generated had it not received the treatment and all factors have remained the same cannot be observed (see, for example, Pufahl & Weiss, 2009; Udagawa et al., 2014). One of these outcomes is the counterfactual, as one farm can either be a participant or non-participant (Kirchweger & Kantelhardt, 2015). In other words, we cannot observe the outcomes of the same farm in two different states simultaneously, with and without treatment. How farmers would behave without treatment remains unknown, as counterfactuals cannot be observed in a non-experimental setting (Pufahl & Weiss, 2009). Missing data in the counterfactual is a major issue in evaluation studies since we cannot observe the outcomes of participating farmers (treated) had they not been treated ($y_{1i} \mid D_i = 1$) (Pufahl & Weiss, 2009; Kirchweger et al., 2015; Bajrami et al., 2019).

Along quantifying the counterfactual, which constitutes the main analytical problem in impact evaluation (Ravallion, 2009), using an outcome from a non-participant farm i to approximate y_{0i} is not recommended as those observable attributes would likely differ from participating farms in the program, generating another evaluation challenge known as selection bias (Cerdan-Infantes et al., 2008; Bravo-Ureta et al., 2011). Even using all non-treated individuals as counterfactuals for the treated group is also not recommended as in a non-experimental setting, likely, the treatment is not randomly assigned, and the treated and control groups differ concerning the treatment status but also concerning other characteristics (Arata & Sckokai, 2016). One of the critical challenges while evaluating the effects of agricultural policy interventions is the potential heterogeneity of the treated and non-treated farms (Pufahl & Weiss, 2009; Kirchweger & Kantelhardt, 2015). First, with respect to treatment status, selection bias comes as participation is voluntary in most farm programs. Similarly, in our case, besides that the DP program is fully voluntary, there are also minimum requirements that need to be met; thus, farmers may self-select into the DP program due to the nature of coupled payments, especially larger farmers, because of lower administrative costs. Second, besides these two groups differ concerning their participation status, they differ also in other characteristics (Pufahl & Weiss, 2009). Farms may differ regarding education and experience background, production structure, socio-economic status, and other characteristics (see, for example, Udagawa et al., 2014; Kirchweger & Kantelhardt, 2015). In addition, farmers often work under very heterogenous conditions resulting in a high heterogeneity among them. These characteristics might affect the likelihood of entry to DP, subsequently affecting its consequent outcome (Udagawa et al., 2014).

Thus, simply taking the mean difference may lead to biased treatment effect estimates. A simple comparison of the mean outcomes may not result in the actual treatment effect estimates, as

participants and nonparticipants typically differ even in the absence of treatment (Caliendo & Kopeinig, 2008). Failing to account for selection bias may lead to biased treatment effect estimates (Pufahl & Weiss, 2009; Bravo-Ureta et al., 2011; Arata & Sckokai, 2016).

4.2.2 Mahalanobis Matching and Difference-in-Differences

To cope with these challenges (selection bias and the counterfactual), matching came as a solution in the early 1980s by Rosenbaum and Rubin (1983). Matching, a widely used non-experimental method of evaluation, overcomes the selection bias on observables by matching treated individuals with one or more non-treated individuals that have similar observed characteristics; the covariates X, particularly observables that are critical to program participation and the subsequent outcomes (Udagawa et al., 2014; Arata & Sckokai, 2016). In other words, matching tackles this problem by constructing a control group of farmers who are similar to treated farmers regarding several relevant characteristics. The mean effect of program participation is estimated by constructing a control group similar to the treated group, and this enables measuring the outcome that would have been observed for the treated group if they had not been treated (Bajrami et al., 2019).

Therefore, to estimate the ATT in equation (13), matching constructs these matches, or a group of farmers that are not treated (control group), are necessary for this estimation. Treated and untreated farms are matched on a group of covariates (Rubin, 1977). Since conditioning on a large set of covariates X may be burdensome, Rosenbaum and Rubin (1983) proposed the idea of conditioning on a function of X, the probability $P(X)$ of being treated, such that the conditional distribution of X given $P(X)$ is independent of the treatment assignment (Arata & Sckokai, 2016). In other words, the propensity score is defined as the probability of participation for the farm i given a set of farm characteristics (x_i) which can be specified as follows:

$$\Pr(P_i = 1|x_i) = p(x_i) \tag{14}$$

Once the matching has been performed, as mentioned above, the most common parameter used to evaluate the effect of an intervention is the ATT (Arata & Sckokai, 2016). Therefore, in our application, after adjusting for observable differences, following Kabunga (2014), the ATT of participants in the DP program is estimated as follows:

$$ATT = E[y_{1i}|D_i = 1, p(x_i)] - E[y_{0i}|D_i = 0, p(x_i)], \tag{15}$$

where ATT measures the mean difference of the outcome of interest (e.g., farm income) between the participants and non-participant farmers with similar propensity scores, $p(x_i)$. The covariate $p(x_i)$ denotes the estimated propensity score for farm i.

This approach permits the usage of the constructed control group, which is used as counterfactual to measure how the participating farms would have performed, had they not participated, assuming that after conditioning on this set of observable characteristics, outcomes are conditionally mean independent of program participation (Pufahl & Weiss, 2009). Subsequently, the difference in the estimate of the ATT is interpreted as the effect of the treatment (Smith & Todd, 2005). However, for the matching estimator of ATT to be unbiased, two assumptions must be satisfied, the Conditional Independence Assumption, known as CIA, and the Common Support assumption (Arata & Sckokai, 2016; Bajrami et al., 2019). Following Rosenbaum and Rubin (1983), CIA[45] can be specified as $(y_1, y_0) \perp \mathrm{D} \mid \mathrm{X}$, stating that a given set of observable covariates X are not affected by treatment, and the potential outcomes y are independent of treatment assignment D (Khandker et al., 2010; Bajrami et al., 2019). Besides CIA, the common support assumption must be satisfied to retrieve an unbiased matching estimator of ATT (Arata & Sckokai, 2016; Bajrami et al., 2019). The Common Support assumption, specified as $0 < P(D = 1|\mathrm{X}) < 1$ allows treatment observations to have comparison observations "nearby" in the propensity score distribution (Heckman et al., 1999), ensuring that participants and non-participants have an equal chance of being either a beneficiary or non-beneficiary (Bajrami et al., 2019).

Overall, matching is a cross-sectional technique correcting for the selection bias on the observables (Caliendo & Kopeinig, 2008; Arata, 2014; Morgan, 2018). However, Heckman et al. (1997) stresses that even after controlling observables, there may still be systematic differences between participants and nonparticipants` outcomes in the absence of the program, which, as noted by Chabé-Ferret and Subervie (2013), could lead to a violation of the identification conditions required for matching. There may be variables apart from X that are unobserved and may affect both the treatment status and the outcomes (Arata & Sckokai, 2016). For instance, factors that determine the selection into the program and or influence outcome variables may not fully be observed as each farm has specific characteristics (Pufahl & Weiss, 2009), and some characteristics are genuinely unobservable (Uehleke et al., 2019). Since DP program adoption is voluntary and mainly driven by the policy preferences of the farmer, their economic situation, and their efforts and ability to receive the cash payments, some of these observables are unobservable characteristics – which can confound the identification of causal effects (Uehleke et al., 2019). For example, motivation and ability - managerial skills could be an example of differences in unobserved characteristics (see Muehler et al., 2007; Kässi, 2013; Bajrami et al., 2019). Such variables may lead to selection bias on unobservables

[45] Rosenbaum and Rubin (1983) called this assumption also "unconfoundedness," implying that uptake of the program is based entirely on observed covariates (Khandker et al., 2010).

(Arata & Sckokai, 2016). Eventually, under this approach, one of the key assumptions of PSM – CIA - might not be satisfied, specifically for unobserved characteristics, such as differences in ability or motivation between treated (participant) farmers and non-treated (nonparticipant) farmers, as these are highly unlikely to be entirely captured by explanatory variables.

To overcome this issue, Heckman et al. (1997) proposed a combination of the PSM estimator with a Difference-in-differences (DiD)[46] estimator - known as the conditional DiD estimator (CDID). The DiD estimator (also known as double differencing) removes the time-invariant characteristics, i.e., removes biases in the second-period comparisons between the two groups (treated and control groups) that could be the result from permanent differences between these groups, and biases from comparisons over time in the treatment group that could be the result of time trends unrelated to the treatment (Imbens & Wooldridge, 2009). Thus, the idea behind CDID estimator is that it considers both observable and unobservable factors that might affect the outcomes of interest. Therefore, the CDID estimator allows control for selection bias by controlling for observables and non-observables, time-invariant variables (Kirchweger & Kantelhardt, 2015). Adding an adequately matched sample to the DID estimator is desirable because it makes it possible to address biases stemming from both observable (e.g., farm size, education) and unobservable time-invariant characteristics (e.g., managerial ability, motivation) (Angrist & Pischke, 2009). Nevertheless, similar to matching, three assumptions must be satisfied for DID-Matching estimation: the Stable Unit Treatment Value Assumption (SUTVA), the assumption of conditional parallel trends (known as PTA), and the common support assumption (Chabé-Ferret & Subervie, 2013). SUTVA assumes that the program does not affect non-participants (Chabé-Ferret & Subervie, 2013), while PTA assumes that only farmers with the same characteristics would follow the same trend in land use (and other outcomes of interest) in the absence of treatment (Callaway et al., 2024). Overall, the credibility of DID estimator relies heavily on the parallel trend assumption – in other words, supported farms would follow the same path as the non-supported farms even in the absence of support (treatment) – both groups would have followed parallel trends over time. To address this assumption, we use matching – which strengthens the parallel paths hypothesis[47] and allows us to control for time-invariant pre-treatment observables. Following Arata and Sckokai (2016), the DiD estimator combined with matching is specified as follows:

$$\text{ATT}=\left\{E\left(y_t^1 - y_t^0 \middle| D=1, p(X)\right) - E\left(y_t^0 - y_t^0 \middle| D=0, p(X)\right)\right\} \quad (16)$$

[46] Difference-in-difference (DiD) as an identification strategy has constituted an important tool for empirical researchers since the early 1990s (Athey & Imbens, 2017).

[47] Removing the bias due to time-invariant unobserved characteristics and the bias due to common time trends unrelated to the treatment (in our case, DP participation) (Arata & Sckokai, 2016).

which compares the conditional before-and-after outcomes of program participants with the outcomes of non-participants, and unlike conventional matching estimators, it allows selection to be based on potential program outcomes at time t and to control for unobserved time-invariant factors (Pufahl & Weiss, 2009). As mentioned above, instead of conditioning on X, Rosenbaum and Rubin (1983) suggest conditioning on the propensity score. In our case, the propensity score indicates the probability of a sampled farmer joining the DP program given the observed covariates X and it is derived through a probit model.[48] Even though there are different matching approaches, we have employed one of the most recent ones. We calculate the DiD-matching estimator using nearest neighbor matching on Mahalanobis distance[49] and kernel matching (Heckman et al., 1997) with optimal bandwidth selection (Galdo et al., 2008; Huber et al., 2015; Uehleke et al., 2022).

In addition, our model selection is largely based on balance diagnostics (assessing balance analysis). We used a variety of dimensions to select between matching algorithms and assessing covariate balance, and overall to assess the comparability of the matched groups. Particularly, as suggested by Rubin (2001), we have estimated three assessing balance estimates (values): (1) the standardized difference in means of the propensity scores between participants and (matched) non-participants of the DP Program (B); (2) the ratio of the variances of the propensity scores for participants and non-participants of the DP Program (R); and (3) for each of the covariates, the ratio of the variance of the residuals orthogonal to the propensity scores for participants to the variance of these residuals for non-participants (Stuart, 2010). Furthermore, the t-test values were used to assess whether differences across treatment and control groups were statistically significant and removed after matching (Binci et al., 2018). All these measures indicate whether specific individual covariates are balanced across treatment and control groups (Binci et al., 2018).

Lastly, for the combination of these two approaches, it is important to note that matching needs to be implemented on the observations from the pre-treatment period. Similar to previous studies, we restrict the sample to farms with similar observable pre-treatment characteristics, i.e., we condition estimation on the pre-treatment outcomes (see Pufahl & Weiss, 2009; Arata & Sckokai, 2016). This way, the treatment effect is identified considering the different pre-treatment conditions between treated and untreated (Rosenbaum, 2002). As Salvioni and Sciulli (2011) noted, matching in the first stage requires to be estimated on pre-treatment control

[48] PSM (Matching) entails a three-stage process a) selection of matching covariates; b) estimation of ps scores, then c) selection of matching algorithms, and d) estimation of ATT.

[49] This model was selected based on balancing results estimates (see parts below providing a more detailed description of this model selection approach). In addition, generally, it is considered that matching approaches that approximate fully blocked randomization, such as Mahalanobis matching, are better since complete randomization is less efficient than fully blocked randomization. Theoretical results (e.g., Frölich, 2007) suggest that Mahalanobis matching generally tends to outperform PSM in terms of efficiency.

variables to remove systematic differences between treated and untreated observations. Moreover, the matched control group is similar to the treated group regarding observed pre-treatment characteristics, making the PTA more plausible (Uehleke et al., 2019).

Accordingly, as noted by (Angrist, 2003; Kopak, 2015; Bärnighausen et al., 2017), where experimental methods are not feasible, quasi-experimental methods are the second-best alternative. Therefore, to evaluate the effects of participating in the DP program (a program that supports farmers with coupled direct payments), we apply difference-in-differences with Mahalanobis Matching (DiD-PSM), as it is suitable for our research work (estimation) goals for a couple of key reasons. First, similar to Arata and Sckokai (2016), our research problem is a program evaluation problem where the treatment is the participation in the DP program. Second, as noted by Kirchweger and Kantelhardt (2015), the evaluation of agricultural programs is often challenged through voluntary participation and heterogeneous observation units. Besides voluntary participation, in our case, there are also minimum requirements for the farmers to join the program; thus, the policy by design has a self-selection mechanism in place, which turns alternative approaches as unreliable to assess the impact. Further, the non-experimental setting of the analyses likely leads to selection bias, as it is reasonable to think that the participating farms have different characteristics compared to the non-participating ones, and these characteristics may also affect the outcomes (Arata & Sckokai, 2016). Therefore, we employ this approach to mitigate biases stemming from differences in observed and unobserved (time-invariant) characteristics between beneficiaries and a control group (Bravo-Ureta et al., 2011; Uehleke et al., 2022). Third, using a nonparametric analysis allows us to consider individual-specific effects and avoid functional form misspecification. The main advantage of the PSM-DID estimator is that it can relax the unconfoundedness assumption (Baráth et al., 2015). Fourth, method selection is also motivated by the type of data employed. The availability of FADN data in our case - farm-level balanced panel data allows the application of the DiD estimator, which besides the advantages mentioned above, also allows the use of pretreatment outcomes in the matching procedure (Pufahl & Weiss, 2009; Chabé-Ferret & Subervie, 2013; Arata & Sckokai, 2016). Last, this is further motivated by previous studies utilizing this approach (Heckman et al., 1997; Smith & Todd, 2005), which show that DiD-matching estimators perform better than cross-sectional estimators.

4.2.3 FADN Data

The farm-level dataset utilized for the quantitative impact assessment comes from the FADN, which represents the most widely used farm-level database in the EU and the only source of microeconomic data harmonized at the EU level (Rizov et al., 2013; Arata & Sckokai, 2016). The primary purpose of FADN is to outline farm incomes, structure, production, and farm

expenditures, with data organization according to a structured system and methodology defined by the EU (MAFRD, 2020a). The FADN sample covers a population of farms above a minimum economic size (often labeled as commercial farms) which differs across member states (Arata & Sckokai, 2016). A general rule is that the FADN sample should represent farms that provide a level of income sufficient to support the farm households (Arata & Sckokai, 2016). The FADN sample is stratified according to three criteria: geographical region, economic size, and farm type (Salvioni & Sciulli, 2011; Arata & Sckokai, 2016). In Kosovo`s case, all seven regions and the standard eight FADN farm types are covered in the sample, and farms exceeding the threshold of €2,000 in terms of standard output were included in random sampling, representing 87% of the utilized agricultural area and 89% of livestock units (MAFRD, 2020a). Thus, FADN does not represent a random sample of Kosovo's agricultural sector, which could potentially constitute a limitation in generalizing our results.

The FADN data are collected through face-to-face interviews with professional farm recorders (Läpple & Thorne, 2018), covering data mainly on production, economic performance, and the policy support of selected farms. In our case, the Kosovo FADN consists of a panel dataset of 5 years (2015-19), containing more than 6,500 observations in Kosovo (1,250 random farms sampled repeatedly on an annual basis), representing a farming population of approximately 130 thousand farm households (MAFRD, 2020a). Our sample is a balanced panel[50] data set for three years (2015-17),[51] consisting of 1,199 independent farms, summing up to 3,597 observations over these three years.

We utilize the FADN dataset to empirically analyze the DP program's effects on a couple of outcomes (indicators). Therefore, subsequently, from the sample that we were able to retrieve, a panel of three years (2015-17), 1,743 observations (corresponding to 48% of total observations) received at least one DP measure over the observed period. It is important to note that subsidy data under FADN are aggregate data: no information is available on which DP measures the farm has applied or has received support for; therefore, the whole amount of subsidy in Euro has been used. Furthermore, data from the public administrative records of the DP program were utilized to recheck the support, whether the farmer received DP or not, and the amount of support each supported sampled farmer received. In addition, we do not differentiate (separate) the effects of DP on crops, livestock, or other farmers, as this distinction would result in much smaller treated groups.

Considering that our pre-treatment period is 2015 and the post-treatment period is 2016 and 2017, we further restrict our sample to the treated farms only in 2017 (supported once) and

[50] See Subchapter 4.2.2 for the advantages of using a balanced panel with this impact assessment approach.
[51] Considering that the sampling population list changed in 2017, we have restricted our sample until 2017, and the years 2018 and 2019 are not included in the empirical analysis.

farms treated twice - in 2016 and 2017 (supported twice), while farms which have not been treated (supported) over the whole 3-year period represent the control group (see Table 4.2 of sample selection below, which outlines the numbers of treated and control group/s).

Table 4.2: Sample size and selection criteria by DP program participation

Selection criteria	No. of observations	No. of farms
Farms with farm records for three consecutive years (2015, 2016 and 2017)	3,597	1,199
DP beneficiaries in 2015	576	576
Non-DP beneficiaries in 2015 (pre-treatment period)	624	624
DP beneficiaries in 2015, 2016 and 2017	1,308	436
DP beneficiaries in 2015 and 2017 (first & last year)	426	142
Observations left for empirical analysis		
Non-beneficiaries in 2015 and 2016, supported in 2017 - (potential treated group) – Group 1	207	69
Non-beneficiaries in 2015, supported in 2016 and 2017 - (potential treated group) – Group 2	219	73
Non-beneficiaries in 2015, and 2017, supported in 2016 - (potential treated group) – Group 3	66	22
Non-beneficiaries in 2015, 2016 and 2017 – (potential control group)	1,380	460

Source: Constructed by the author.

We use three types of observations that were left for empirical analysis: farms that were not supported with DP in three consecutive years consisting of 1,380 observations, farms that were supported with DP only in 2017 (later referred also as one-time receivers) with 207 observations and farms that were supported with DP in two consecutive years – 2016 and 2017 (later referred also as two-time receivers) with 219 observations, respectively. The last group (Group 3) – farms that were not supported in 2015 and 2017 but were supported in 2016 were not included in the empirical analysis due to a small number of observations.

4.2.4 Selection, construction and definition of outcome variables

To estimate the effects of the DP program on some of its key objectives (i.e., farm productivity, income, farm structure, and environment), we use a number of outcome variables (Y) depending specifically on the DP program objectives. Overall, outcomes are defined based on DP objectives, and several outcome variables are associated with each investigated DP

objective. In addition, the operationalization of the selected outcomes was driven by literature, as they were previously used in similar study contexts (see Table 4.3 below).

To capture the effects of the DP program on productivity, we use three standard productivity measures (outcomes): a) land productivity measured as gross output per hectare (*land_prod*), b) the total output per input outcome (*totaloutput_input*), and c) the total output per annual working units (*output_AWU*). While the three selected outcomes are used to cover the aspect of productivity, in particular the land productivity, which has been extensively used in the literature (see, for example, Läpple & Thorne, 2018; Vitunskiene & Makšeckas, 2018; Cisilino et al., 2019), they are also seen as a measure of efficiency (Läpple & Thorne, 2018). Regarding DP effects on farm income, we use net farm income (normalized on per ha basis) (*netincome_UAA*) and net farm income (normalized on per labor hours basis) (*netincome_laborh*). Considering the different farm structures, normalizing indicators per ha basis could reduce possible bias from estimating income effects. Further, to evaluate the effect of the DP program on increasing farm size, we use two outcome variables, one representing land usage and one representing the livestock sector. We use the utilized agricultural area (UAA) (*SE025*) and the number of livestock units (LU) (*SE085*) as outcomes to measure DP effects on farm size. Both of these outcomes have been extensively used as farm size outcomes (for UAA, see, for example, Kirchweger & Kantelhardt, 2015; Läpple & Thorne, 2018); while the LU, besides as a farm size outcome (e.g., Kirchweger & Kantelhardt, 2015) has been predominantly used as an environmental-related outcome (see Pufahl & Weiss, 2009; Arata & Sckokai, 2016). Lastly, besides the number of LU, other outcomes operationalizing the environmental objective are the amount of purchased fertilizers and soil improvers (*SE295*), the amount of purchased plant protection products (*SE300*), and the share of grassland area in total UAA (*shgrassland*), representing the four outcome variables used to estimate the effects of DP on the environment. Similar to the outcomes above, the operationalization of these selected outcomes is presented in the table below (Table 4.3).

Table 4.3: Operationalization of outcome variable to respective DP Program objectives

DP Program/ Policy objectives	**Operationalization of outcome variables (indicators)**	
	In the literature (*outcome: measurement – unit – references*)	**In this study** (*outcome – label*)
Increase productivity	<u>*Land productivity*</u>*: measured as gross farm output per hectare* (€/ ha) (e.g., Arata & Sckokai, 2016; Läpple & Thorne, 2018; Vitunskiene & Makšeckas, 2018; Cisilino et al., 2019); <u>*Land productivity:*</u> *measured as yield per hectare* (t/ ha) (e.g., Kotu & Admassie, 2016; Brady et al., 2017; FAO, 2017); <u>*Farm output*</u>*: measured as total farm output in euros* (€) (e.g., Baráth et al., 2018; Bojnec & Fertő, 2019); <u>*Farm productivity:*</u> *measured as farm sales per hectare* (€/ ha) (e.g., Pufahl & Weiss, 2009); <u>*Inputs:*</u> *measured as variable costs per hectare* (€/ha) (e.g., Arata & Sckokai, 2016; Cisilino et al., 2019); <u>*Labor productivity:*</u> *measured as farm gross value by total hours worked* (€/ hour) (e.g., Vitunskiene & Makšeckas, 2018); <u>*Labor input ratio:*</u> *measured as hours worked per total area* (hours/ ha) (e.g., Udagawa et al., 2014); <u>*Labor input*</u>: *measured as total annual hours worked in the farm* (hours) (e.g., Salvioni & Sciulli, 2011; Udagawa et al., 2014); <u>*Labor input:*</u> *measured as farm family labor – FAWU* (hours) (e.g., Salvioni & Sciulli, 2011); <u>*Labor profitability*</u>*: measured as net profit to family labor unit ratio* (€/ hour) (e.g., Salvioni & Sciulli, 2011);	○ *land productivity* - (land_prod) ○ *ratio of total outputs with total inputs* - (totaloutput_input) ○ *labor productivity per output* - (output_AWU)

Table 4.3: Operationalization of outcome variable to respective DP Program objectives (cont.)

Increase farm income	*Farm Income: measured as annual farm income in euros* (€) (e.g., NORC, 2012; Arata & Sckokai, 2016; Brady et al., 2017; Garbero & Chichaibelu, 2018); *Farm Income: measured as farm business net income by total farm output* (€) (e.g., Udagawa et al., 2014); *Farm Income: measured as income by annual working hours - AWU* (€/ AWU) (e.g., Cisilino et al., 2019);	○ *net income by utilized agricultural area* - (netincome_UAA) ○ *net income by labour hours* - (netincome_laborh)
Increase farm size	*Farm size: measured as total utilized agricultural area* (ha) (e.g., Pufahl & Weiss, 2009; Salvioni & Sciulli, 2011; Udagawa et al., 2014; Kirchweger & Kantelhardt, 2015; Arata & Sckokai, 2016; Läpple & Thorne, 2018); *Farm size: measured as land area for crop production* (ha) (e.g., Bajrami et al., 2019); *Farm size: measured as total livestock units* (LU) (e.g., Pufahl & Weiss, 2009; Kirchweger & Kantelhardt, 2015);	○ *total utilized agricultural area* - (SE025) ○ *total livestock units* - (SE085)
Reduce the negative effects to the environment	*Livestock: measured as total livestock units* (LU) (e.g., Pufahl & Weiss, 2009; Arata & Sckokai, 2016); *Livestock: measured as livestock units per utilized agricultural area* (LU/ UAA) (e.g., Pufahl & Weiss, 2009; Cisilino et al., 2019); *Fertilizer: measured as fertilizer expenditures per ha basis* (€/ ha) (e.g., Pufahl & Weiss, 2009; Arata & Sckokai, 2016; Uehleke et al., 2022); *Crop protection: measured as expenditures on chemicals, such as pesticides and others on per ha basis* (€/ ha) (e.g., Pufahl & Weiss, 2009; Arata & Sckokai, 2016; Cisilino et al., 2019; Uehleke et al., 2022); *Land use as grassland: measured as share of grassland area in the total utilized agricultural area* (%) (e.g., Pufahl & Weiss, 2009; Arata & Sckokai, 2016; Uehleke et al., 2022);	○ *total livestock units* - (SE085) ○ *fertilizer expenditures* - (SE295) ○ *crop protection expenditures* - (SE300) ○ *share of grassland* - (shgrassland)

Source: Constructed by the author.

It is important to note that the selection and construction of these outcomes mentioned above were also consulted with experts in Kosovo. This group of experts comprising of university professors, agricultural economists, agribusiness managers, and farmers. Meetings were held to discuss the potential outcomes, especially the previous experience of university professors with the FADN data, and the local context helped select the outcomes that represent the best measures of those outcomes.

Nevertheless, utilizing the FADN dataset is associated with a couple of drawbacks. Even though the harmonized data collection protocol across the EU constitutes one of the key strengths of FADN, followed by the yearly time frame and historical records (40+ years for some MS) (Matthews et al., 2021), being the only micro-economic database harmonized at EU level (Baldock et al., 2007) is associated with a couple of limitations which hinder researchers from performing more comprehensive empirical analysis, such as impact assessments. First, FADN does not represent the whole population of farmers, as it is based on a pre-selected random sample of farms above a certain economic size,[52] predominantly commercial farmers, while leaving out part-time and subsistence farms (Baldock et al., 2007; Mottershead et al., 2018). In addition, the FADN sample may also under-represent smaller farmers (Matthews et al., 2021). Second, FADN does not provide data on farm and farmer characteristics (such as diversification, education, and managerial experience) (Manevska-Tasevska et al., 2013) and or farming practices (Mottershead et al., 2018). As noted by (Kelly et al., 2018), the social and cultural dimensions of production systems and the motivations of land managers are listed as FADN data gaps. Third, non-farm income sources are not covered in the FADN (Allanson & Hubbard, 1999; Kelly et al., 2018; Spicka et al., 2019). In this line, Hill (1991) states that income indicators of FADN are unreliable as they do not represent the overall income situation of agricultural households. Generally, as Uehleke et al. (2019) note, using the FADN database limits the choice of outcome measures. Lastly, in addition to these drawbacks, another limitation in our case is that FADN Kosovo comprises many observations with missing data on specific indicators. Besides outcomes selection, this also hindered the selection of control covariates described below.

4.2.5 Selection, construction and definition of control variables for matching

Besides outcome variables, selecting appropriate matching covariates Z is of high relevance (Kirchweger & Kantelhardt, 2015). Matching covariates must cover all observable aspects that could influence farmers' decision to participate in the program being studied (in our case, the DP program) (Kirchweger & Kantelhardt, 2015). In our setting, following Caliendo and Kopeinig (2008), we include in the matching model covariates that influence the participation

[52] In Kosovo`s case, the minimum threshold on the economic size estimated as standard output was €2,000 (for more details on FADN for Kosovo, see MAFRD, 2020a).

decision and the outcome variable simultaneously as factors influencing the eligibility of a program, which can be a crucial aspect for matching (Udagawa et al., 2014).

Subsequently, to optimize covariate selection, based on the theoretical considerations, previous studies, previous knowledge, local context, data availability, and most importantly – the balance of the model, we use the following matching covariates: farm size as utilized agricultural area (SE025), the value of fixed assets, labor hours, crop protection expenditures - normalized on the per-ha basis and two dummies covering farm types. We included farm size in terms of UAA to ensure comparability among groups (treated and control), as this covariate determines if a farmer is eligible for one of the DP support measures. Pufahl and Weiss (2009) noted that farms that generate the largest benefits from the program are most likely to participate. Furthermore, this covariate has been extensively used in previous work with similar methodology (see, for example, Chabé-Ferret & Subervie, 2013; Udagawa et al., 2014; Baráth et al., 2018; Läpple & Thorne, 2018; Mennig & Sauer, 2019). Other covariates were used in similar studies starting from the value of fixed assets (see similar work by Baráth et al., 2018; Mennig & Sauer, 2019; Uehleke et al., 2022), labor hours (Chabé-Ferret & Subervie, 2013; Baráth et al., 2018; Mennig & Sauer, 2019), and covariates covering farm types (Salvioni & Sciulli, 2011; Arata & Sckokai, 2016; Uehleke et al., 2022). In this particular application, the dummy covariate "*dummy_LIV_FARM*" representing farms with a dominant livestock activity covers cereal farms as well, as cultivation of cereals in Kosovo is mainly associated with livestock farms as they produce their feed. The other dummy, "*dummy_PRM_CROP*," represents farms engaged in permanent crops, respectively (see Table A 10 in the Appendix for a more detailed description of covariates used in the estimation). Regarding crop protection expenditures, we did not find a study using a similar approach.

4.2.6 Selection, construction and definition of participation variables

Lastly, participating variables are constructed based on the treated group (once or twice supported). For the farmers that are only once supported with the DP program, participation is a binary variable denoted as "*DP17*", and it takes a value of one when the surveyed farmer has records of receiving coupled subsidies only in the last observing year – 2017 and no support over the previous years – 2015 and 2016. Subsequently, for the second group (two-time receivers) - for the farmers that are twice supported with the DP program, the participation variable is denoted as "*DP1617*", taking the value of one when the surveyed farmer has records of receiving coupled subsidies in the last two observed years – 2016 and 2017 and no support in the first year – 2015. The remaining farmers who have not been supported over the observation period are included in the control group (see the treated and control groups description and their sample sizes in Table 4.2).

To further ensure comparability between groups, we employ threshold support criteria of the DP program, i.e., we include in our estimation only those farms in the control group that meet the minimum threshold criteria of support for the DP program.[53] Consequently, we have excluded those farms with small agricultural activities, as they are excluded from the program.[54]

All the estimations were conducted in Stata 17, where matching procedures were implemented using the *psmatch2* package while balancing tests were carried out using the commands in the *pstest* package by Leuven and Sianesi (2003), which provides the results for all the statistics mentioned above.

4.3 Qualitative Elements of the Study

In addition to the quantitative approaches, this study includes qualitative elements, mainly to complement and better explain the quantitative results. The ethnographic fieldwork (mainly in the form of focus group interviews and individual in-depth interviews with farmers, policymakers, agricultural experts, university professors and researchers, and other stakeholders involved in policy making and implementation of extension policy in Kosovo) took place mostly as part of the experimental design phase. Rich insights have also been collected during and after the experiment, with the post-experiment survey, which included a couple of qualitative questions. In addition, field observations is another approach employed on this work. As Mohajan (2018) notes, qualitative work is essential to understand the issues of the studied topic. In addition, another segment of fieldwork occurred in the framework of the FAO Project (TCP/KOS/3602).

Besides experimental design, the qualitative elements (in-depth interviews and focus groups) were used to complement quantitative findings by providing context and explanations for the quantitative evidence, gaining a deeper understanding of extension services, and providing systematic explanations and overall more detailed information on issues concerning extension services and coupled direct payments. Particularly for the first two studies, this part delivers a deeper and more reliable assessment of the estimated preferences bringing rich insights that, besides explaining quantitative results, helps to inform policymakers to formulate better policies in the future. For the third study, besides explaining results, this part helps explore and understand farmers' perspectives on coupled direct payments, one of the main policy instruments in the country where the study occurred.

In-depth interviews were realized primarily with farmers, lead farmers, and experts. A total of 20 in-depth interviews were conducted (six interviews with experts and university professors,

[53] The minimum eligible farm size to be supported with DP in 2017 was 0.10 ha.
[54] A number of 21 observations were dropped from further analysis.

three interviews with agribusiness owners, one with an input seller, five with lead farmers, and five with other random farmers).[55] In addition, three focus groups were held (one with lead farmers, one with experts, and one with women small-scale farmers). Participants in the qualitative approach were purposively selected, including farmers, lead farmers, and experts. They were mainly selected considering their experience with extension services and or direct payments. In contrast to the rest of the interviews, lead farmers were randomly selected from a list, and they were interviewed to particularly explore their role within the public advisory service (Herzfeld et al., 2022).

The approach drew on a semi-structured protocol for both types of interviews (in-depth individual interviews and focus groups), the most widely used interviewing format in qualitative research (Herzfeld et al., 2022). The protocol had a pre-defined set of questions related to the topic; however, other questions emerged from the discussion. The beginning of the protocol consisted of a set of background questions, mainly related to the background of the person, his/ her farm activity or professional activity, and their experience with the studied topic. The primary purpose of these entry questions was to create the necessary climate of trust and communication (Herzfeld et al., 2022). The rest of the protocol comprises open-ended questions focusing on the previous experience with extension services, primary sources of extension, issues concerning this service, potential solutions for the future, and lastly, the final section comprised of questions related to direct payments, their experience with this type of support, generally aiming to explore their perspective on direct payments. Interviews lasted an average of two hours, ranging from 1.5 to 4 hours. Data were collected in the period between February to December 2018. Each interview was transcripted, and the main themes were identified by hand and with the support of *MAXQDA* software.

[55] Farmers constituted of different sub-sectors and farm sizes, aiming to get perspectives from different groups of farmers.

5 Less money for better extension service? Evidence from a Discrete Choice Experiment

This chapter provides answers to the first two research questions outlined in part (1.3). The first part describes the selected descriptive statistics, followed by a description of the estimated results, namely the main model results and the heterogeneity of these estimated preferences. The last sub-chapter provides estimates of the WTP for extension services. This is followed by the final subchapter, which outlines some critical reflections derived from this work (analysis).

5.1 Descriptive Statistics from the DCE

This section provides some descriptives on the socio-economic, farm production, and policy variables used in the analysis from the whole sample (N=362) and as differences between farmers with and without prior extension experience (see Table 5.1 below).[56] It turns out that two-thirds of the respondents (64%) have not used extension services before, neither private nor public. Public extension services were the primary extension source for those that have used extension services before (36%).

With respect to socio-economic variables, farmers with extension experience were slightly younger (49 years) compared to their counterparts - farmers with no extension experience (50 years). Almost all farmers are males since women-run farm operations are still uncommon in Kosovo. On average, farmers had 11 years of completed education, with over two-thirds of respondents having finished high school. Interestingly, farmers with more years of education tend to use extension services more. Farmers with more or equal to 12 years of education (high school and higher) constitute 75% of the extension users, with significant differences compared to 62% of farmers without extension experience. Regarding experience, farmers had, on average, 17 years of experience in agriculture, mainly as an inherited activity for which knowledge is transferred from one generation to the next, with no significant differences among the two groups. Respondents spent different amounts of time on farm work; an average of 67% was spent on farm-related activities. Nonetheless, one-third of surveyed farmers (32%) declared themselves full-time farmers, and 35% were full-time farmers among farmers with extension experience, compared to 31% of farmers without extension experience. A surprising finding was that 88% of farmers were using smartphones daily. This usage was mainly related to social media and weather updates, spending an average of 1.5 hours daily on their smartphones. Most farmers with extension experience (90%) used smartphones, compared to 86% of their counterparts. Further, farmers' risk aversion was estimated based on a scale question on the

[56] Another table with the complete descriptive statistics can be found in the Appendix, Table A 6: Summary Statistics: Farm and Household characteristics.

survey where 1 indicated a non-willingness to take risks at all up to 7 - absolutely willing to take risks. Descriptive results revealed that farmers with prior extension experience were significantly willing to take higher risks - on an average scale of 5.38 compared to 5 from farmers without extension experience. Over two-thirds (75%) of farm operations employed only household members; however, farmers with no extension experience were significantly employing much higher percentages of household members only (81%) compared to 63% of farmers with extension experience. Farm employment in Kosovo is still mostly happening on an informal basis, while household employment constitutes the main source of farm employment.

Significant differences were observed concerning household and farm incomes, shares of sold farm production and selling contracts. It turns out that farmers with extension experience have higher total household and farm net income per annum, have higher shares of income from their farming activities, sell higher percentages of their farm output, and have more selling contracts. For example, the farm income as a share of total income was estimated at an average of 60%, being almost equally important for both groups (above 55%), even though significant differences were observed. Farmers were generating an average of €8,987 annually as a net income from agricultural activity; however, extension users were generating €12,673 annually as a net income, almost twice higher than their counterparts - €6,940. Farmers were selling about 63% of their farm products; however, the vast majority were without contracts, and only 22% had selling contracts. A striking difference was found between the two groups: farmers with extension experience had double higher contracts (32%) than those without extension experience (16%).

Turning next to farm production variables, the average farm size in terms of utilized agricultural area (hereafter – UAA) was estimated at 9.8 ha, which is clearly above the national farm size average (1.7 ha per farm).[57] However, the median was significantly lower, at only 4 ha, due to a few outliers having more than 60 ha. Within our sample, 27% of UAA was cultivated by farms with less than 2 ha. Farms with 2 ha to less than 5 ha cultivate the most significant share of UAA (34.9 %) in Kosovo (Herzfeld et al., 2022), whereas this group cultivated about 28% of UAA in our sample. Hence, over half (54%) of the sample's UAA is cultivated by farms with less than 5 ha (see Table A 5: *Agricultural-related indicators at the sectoral level for Kosovo* in the Appendix for a number of similar agricultural-related indicators for Kosovo).

We note significant differences between the two groups regarding UAA, where extension users utilize more than twice UAA (15.1 ha) compared to an average of 7.08 ha UAA of non-extension users. Considering that public extension services work predominantly with larger and

[57] (MAFRD, 2017b).

more commercialized farmers, smallholders with 0.2 ha and less than 1 ha of UAA were more common among the group with no extension experience. However, no significant differences were observed between the two groups. Overall, smallholders constituted 16% of surveyed farms. Further descriptive results revealed land fragmentation: farmers continue cultivating crops on many plots, an average of 5.2 plots, with no significant differences among the two groups.

When it comes to direct payments, 35% of sampled farmers indicated that they had not received direct payments from the government in 2017. The farmers that have received direct payments (65%) received an average of €1,318 as coupled payments, while extension users have received significantly more (€1,909) compared to their counterparts (€1,016). This is explained by the fact that extension users are significantly larger farmers, making them receive more direct payments due to the nature of coupled payments. The table below presents the main descriptive statistics with differences between the two groups.

Table 5.1: Household, Farm and Policy characteristics of farmers with and without extension experience

	All farmers	Farmers with *extension experience*	Farmers with *no extension experience*	T-test for Equality of Means
	Mean	Mean	Mean	t/ p-value
Age of the household head (years)	49.77	49.25	50.11	0.5688/ 0.5699
Education of the household head (years)	10.63	11.20	10.31	-2.2245/ 0.0267
Household head has higher education (>=12 years of education) (%)	66.76	74.80	62.28	-2.4137/ 0.0163
Household head is male (%)	97.79	96.85	98.68	1.1903/ 0.2347
Farming experience of the household head (years)	16.60	16.51	16.66	0.1452/ 0.8847
Full-time farmer (%)	32.28	35.25	30.80	-0.8422/ 0.4003
Household head has a smart-phone (%)	87.64	90.48	86.10	-1.1941/ 0.2333
Risk aversion (1-not at all to 7-absolutely willing to take risks)	5.15	5.38	5.03	-2.0681/ 0.0394
Household employs household members only (%)	74.86	62.90	81.19	3.8009/ 0.0002
Annual household net income (euro)	13506.23	17348.41	11367.83	-4.0202/ 0.0001
Annual farm net income (euro)	8986.91	12672.64	6939.71	-4.3533/ 0.0000
Farm income as a share of total income (%)	59.77	66.83	55.80	-2.964/ 0.0032
Share of sold farm output (%)	63.30	73.76	57.46	-4.3135/ 0.0000
Farmer has a selling contract (%)	21.83	31.75	15.96	-3.449/ 0.0006
Total utilized agricultural area - UAA (ha)	9.81	15.10	7.08	-3.0189/ 0.0027
Number of plots	5.29	5.50	5.17	-0.5936/ 0.5532
Farmer is a smallholder (%)	16.48	13.60	17.54	0.9616/ 0.3369
Farmer received direct payments (%)	65	79.53	57.89	-4.2036/ 0.0000
Amount of direct payments received in 2017 (euro)	1317.64	1909.30	1016.93	-2.2015/ 0.0283

Note: The complete table can be found in the Appendix, Table A 7; Constructed by the author.

5.2 Estimation results: Farmers` preferences for Extension Services' characteristics

The estimation was conducted utilizing different formulations of GMNL models. As Lancsar et al. (2017) suggested, rather than choosing one preferred GMNL model, the estimates from a range of model specifications were reported and contrasted. Overall, estimates are reasonably stable across models.

First, the results from the GMNL models on the extension choice model are presented, followed by a discussion of the importance of attributes and the extension preferences by certain groups. Finally, results are presented by the heterogeneity in mean models, followed by WTP estimates. Overall, the different specifications resulted in similar results; however, in each part of the analysis, only the models that performed better were used for interpretation.

a) G-MNL model results

This part of the analysis highlights the importance of attributes on farmers` choices and examines how farmers value different attributes of agricultural extension service offers. In this part of the analysis, the G-MNL ($\tau = 1$) model performs slightly better;[58] therefore, the results from this model will be used for interpretation. The estimation results show that all the selected attributes of the extension package policy (farm visits, expertise, farm demonstrations, phone application, direct payments, and yearly rate) are significant determinants of the extension choices of farmers (see Table 5.2).[59]

Five attributes, "One farm visit," "Two farm visits," "Specialized expertise," "Included farm demonstrations," and "ICT extension platform" have significant positive coefficients, implying that farmers prefer extension services with one or two visits from extension agents in the farm, over zero visits, prefer more specialized expertise over general expertise, prefer more extension service packages with included farm demonstrations, and prefer much more extension services with ICT services included in the package, if all other conditions are held equal.[60] Another critical determinant of farmers` preferences towards extension services was direct payments. Since direct payments constitute the country's central agricultural policy and some farmers rely on direct payments, the attribute of direct payments was included to examine farmers` willingness to trade direct payments with more effective and better-organized extension services. However, contrary to other attributes, the attributes of direct payments - "DP Cut by 50%" and "DP Eliminated completely" revealed significant negative coefficients, indicating

[58] Better-performing models were selected based on the conventional criteria of log-likelihood, the Akaike Information Criterion (AIC), and the Bayesian Criterion (BIC) (Kadane & Lazar, 2004). The lowest values refer to the most preferred model.

[59] The results of the DCE can only be interpreted for the sample.

[60] Of the 3,258 choices our experiment recorded, 732 were made on the "opt-out" option. Most of these choices were made only at specific rounds; however, four farmers always chose the "opt-out" option, indicating that none of the extension schemes addressed their needs.

that farmers evaluated fewer packages with a fifty percent reduction in their current direct payments and evaluated less those packages when direct payments are eliminated, in order to implement the chosen package. Overall, farmers were not willing to accept any shortages in direct payments. In other words, their preferences revealed that they want direct payments to stay at similar levels. Regarding the "Yearly rate" coefficient, the negative estimate indicates that ceteris paribus farmers prefer extension packages with lower prices (lower cost).

Even though all the attributes affected the adoption of extension schemes, farm visits, and direct payments had the largest influence on the adoption of extension packages or were the main drivers of extension choices.[61] These results were expected considering that the public extension service is currently predominately oriented toward training with general agronomists, with limited presence in field visits and direct payment measures being implemented annually. The same highlights were observed from the ethnographic work, indicating that the current system is primarily oriented toward training, constituted by public extension agents with general knowledge and a lack of specialized expertise.

[61] After the experiment, farmers were asked to rank their most important attributes; specifically, they were asked to rank the three attributes that had the highest impact on their choices. This part of the analysis does not describe the actual behavior of farmers during the experiment as shown above; instead, it shows their opinion on what was important to them - in other words, how they think they behaved during the experiment. Direct payments, expertise, and farm visits were the highest-ranked attributes as first, second, and third most important attributes, respectively. See Appendix A 5: Self-ranking of choices by farmers", which describes in more detail the results from the ranking questions of the post-survey.

Table 5.2: G-MNL Estimation Results

Utility parameters	**Full G-MNL**		**G-MNL-I (γ=1)**		**G-MNL-II (γ=0)**		**G-MNL (τ=1)**	
	β.	St. err.	β.	St. err.	β.	St. err.	β.	St. err.
Farm visits (relative to Zero farm visits)								
One farm visit	1.639***	0.208	1.380***	0.143	1.312***	0.119	1.875***	-0.208
Two farm visits	2.309***	0.266	2.084***	0.172	1.842***	0.139	2.826***	-0.248
Expertise by extension agents (relative to general expertise)								
Specialized expertise	0.832***	0.155	0.666***	0.123	0.700***	0.112	0.782***	-0.155
Farm demonstrations (relative to non-included f. d.)								
Included farm demonstrations	0.940***	0.140	0.842***	0.103	0.793***	0.089	1.073***	-0.14
Extension service through ICT (relative to non-included ICT platform)								
ICT extension platform	1.311***	0.198	1.197***	0.128	0.971***	0.107	1.523***	-0.17
Direct Payments (relative to DP stay the same)								
DP Cut by 50%	-2.135***	0.253	-1.900***	0.150	-1.656***	0.135	-2.649***	-0.238
DP Eliminated completely	-4.168***	0.452	-3.767***	0.236	-3.325***	0.193	-5.065***	-0.377
Yearly rate	-0.013***	0.002	-0.011***	0.001	-0.010***	0.001	-0.015***	-0.002
Constant	1.233***	0.230	1.253***	0.195	1.035***	0.168	1.625***	-0.272
Heterogeneity in mean								
One farm visit	-0.312	0.276	0.640***	0.186	0.528**	0.176	0.491**	-0.227
Two farm visits	0.788**	0.223	0.904***	0.165	-0.878***	0.162	0.963***	-0.182
Specialized expertise	1.884***	0.191	1.429***	0.152	1.438***	0.134	-1.847***	-0.152
Included farm demonstrations	-0.665**	0.212	-0.696***	0.173	0.279	0.186	-0.858***	-0.222
ICT extension platform	1.224***	0.162	0.788***	0.171	0.915***	0.151	-1.055***	-0.181
DP Cut by 50%	1.487***	0.171	1.378***	0.160	1.303***	0.160	1.653***	-0.178
DP Eliminated completely	1.624***	0.197	1.382***	0.176	-1.743***	0.199	1.587***	-0.224
Yearly rate	-0.017***	0.002	0.015***	0.001	-0.016***	0.001	0.017***	-0.001

Table 5.2: G-MNL Estimation Results (cont.)

Tau	-0.706	0.128	0.662	0.080	-0.205	0.102	1	0
Gamma	0.472	0.100					0.669	0.068
N	9774		9774		9774		9774	
LL Function	-2424.5		-2429.2		-2445.03		-2421.98	
AIC	4887.0		4894.3		4926.054		4880.0	
BIC	5023.5		5023.7		5055.429		5009.3	
Significance levels: 'p<0.10, *p<0.05, **p<0.01, ***p<0.001;								

5.3 Heterogeneity in extension preferences

Considering that preferences may vary across our sampled farmers, this part of the analysis tries to reveal which other factors may affect farmers` choices and which factors tend to increase or decrease the probability of adopting extension packages offered in the DCE. Therefore, the preference heterogeneity model was estimated to account for heterogeneous preferences among farmers.

Estimates of preference heterogeneity are presented in Table 5.3. Several parameters revealed evident unobserved heterogeneity around the mean, including two farm visits, specialized expertise, farm demonstrations, ICT extension platform, direct payments, and yearly rate. Therefore, a number of observables were added to the model to identify possible factors responsible for the heterogeneity (Kassie et al., 2017), as Greene and Hensher (2003) note that introducing an interaction between the mean estimate of the random parameter and a variable is equivalent to revealing the presence or absence of preference heterogeneity around the mean parameter estimate. An insignificant result of the interaction term implies that there is an absence of preference heterogeneity around the mean on the basis of the observed covariates, or we have failed to reveal its presence (Greene & Hensher, 2003). The heterogeneity-in-mean variables were selected based on literature, background knowledge, significance, and the conventional criteria of the log-likelihood, AIC, and BIC (Kadane & Lazar, 2004). All the four GMNL specifications revealed similar results, however GMNL-I (γ=1), GMNL-II (γ=0) and GMNL ($\tau = 1$) came up with higher values of model selection criteria. Therefore, our further discussion will be based on the un-restricted model (Full GMNL).

Farmers` time spent in farm activities, previous usage of public extension service, farm size, and direct payments` receivers were found to be the factors that best explain the heterogeneous preferences among farmers. The preference for farm visits was different depending on the time a farmer spent in farming activities. Particularly, full-time farmers were found to have significantly more interest in two farm visits by extension agents compared to non-full-time farmers. A quarter of sampled farmers (32%) were full-time farmers, while the rest spent their time in other activities besides farming. In the majority of cases, full-time farmers are professional farmers, relying heavily on their agricultural activity as their main source of income and using private extension services from time to time. It could be that full-time farmers might have experienced farm visits on their farms; therefore, they know their value. Furthermore, qualitative interviews revealed that farmers consider farm visits as one of the most effective extension methods. In these interviews, several farmers revealed their interest in being visited. Notably, in one of the interviews with lead farmers, one of them stated:

Farmers need advice to connect theory with practice. For example, take the farmers and send them where plowing happens to see how the land is prepared for plowing, how the machinery is prepared, and how plowing is done. Farmers do not have an interest anymore in training.

This perspective mainly came from their previous experience with farm visits by private advisers, such as veterinarians, input sellers, and private experts who helped them solve specific farm issues. In line with this, interest in specialized expertise was positively related to the previous usage of public extension services. This preference of farmers towards specialized expertise was also expected, considering that expertise is another major drawback of the current system, where most of the extension agents are general agronomists - unable to address farmers' specific extension needs. About 36% of our sampled farmers had used extension services before, while 32% had an experience with the public extension service. These results were expected considering that the qualitative interviews revealed that private experts, input sellers, and veterinarians constitute the primary sources of advice for farmers in Kosovo.[62] Subsequently, as noted by Umali-Deininger (1997), farm operations' commercialization increases the demand for specialized client-and location-specific extension services. Therefore, it could also be that the majority of commercial farmers have utilized private extension services before and know the value of specialized expertise. As Kahan (2013b) noted, purely private services tend to be constituted by specialized experts with strong technical knowledge in specific fields. However, contrary to specialized expertise, farmers previously utilizing public extension services showed less interest in farm demonstrations. This result was unexpected; nonetheless, over the last years, farm demonstrations were carried out mainly by international donor organizations cooperating with the public extension service. These events were characterized by many participants, several topics covered in a short time, and a lack of practical demonstrations. Besides, in some cases, they were too general to cover farmers` specific needs. This might explain why farmers do not have a reliable experience with farm demonstrations or did not have a chance to participate in them. Further, smallholder farmers were more interested in the ICT extension platform. This was also expected, as smallholders have limited access to extension services since public extension agents work predominantly with larger and more commercialized farmers. Farmers with more extension contacts do not represent the typical farming population (Anderson & Feder, 2004). Moreover, in most cases, large farmers take most of the benefits, while the service is miss-targeted away from smallholder farmers (Gautam, 2000). Presented to farmers as an attribute that can deliver particular extension services through an ICT platform without the need to go to municipal offices to obtain information, it was highly

[62] Qualitative interviews also revealed that in some cases, other farmers, such as neighbor farmers and larger farmers, constitute another important source of information.

preferred by the sampled farmers, particularly smallholders, who may see this as a chance to get access to extension services.

These results are in the same line with the qualitative evidence. Smallholders in these interviews declared that they hadn`t received any advice. Farmers need to travel to municipal offices to approach the public advisors (extension agents). Particularly, one of the smallholders in the interviews declared:

For us - smallholders, the travel distance is long and costly; therefore, we do not even go to the municipal office. We usually consult bigger farmers for the issues we face in our farm operations or input sellers.

The issue of smallholders' access to extension services was also highlighted in the interviews with experts and some farmers. ICT usage was mentioned a couple of times, indicating the need to include ICT in delivering extension services, as this service cannot be efficient without using this technology, considering a large number of farms. Furthermore, one of the farmers declared that the majority of farmers would use an ICT-based extension service as most of them have smartphones.

Turning now to direct payments, represented with the dummy variable "*DP receiver*," equaling 1 for those that have received direct payments, revealed to be a significant determinant of preference heterogeneity. Farmers supported with direct payments were found to be less interested in cutting direct payments or eliminating them. In other words, supported farmers were more interested in direct payments to stay at similar levels. This was expected since direct payments in Kosovo constitute the main agricultural policy in the country in terms of budget allocation and number of supported farmers for at least a decade. Over half of our sampled farmers (65%) were supported by this policy, receiving an average of €1,317 annually. Similarly, the huge reliance of farmers on DP attributes has reflected the same story in the qualitative interviews. These interviews revealed that farmers were highly dependent on direct payments independently from their farm-size operation. On the one hand, a general impression was that DP policy was helping them to retain a small part of their profit since, without this policy, they would have to close their farm operations. On the other hand, they believe they should be subsidized to increase production capacity in the future to move from small to medium and larger farms. While for larger farmers, due to the nature of coupled subsidies (payments), the bigger the farm operation in terms of area planted or the number of heads, the higher the amount of DP they receive. Nonetheless, the heterogeneity in the mean model revealed some additional exciting results regarding direct payments. As one of the study's key research questions was to examine whether farmers would accept reductions or complete elimination of DP for an improved extension service, this part of the analysis revealed that full-

time farmers and smallholders showed interest in cutting or eliminating direct payments. The positive signs of the interaction terms "*DPCut*Full time farmer*" and "*DPEL*Full time farmer*" indicate that full-time farmers are more interested in cutting or even eliminating direct payments, or in other words, they are willing to trade direct payments with a restructured extension service. This might come first from their deeper understanding of the possible benefits that can come from an improved extension service. In the long run, an improved extension service could help more. Secondly, it could be that they "stand on their feet" with their agricultural activities, implying that direct payments are not a necessity for their farming operation. Similarly, smallholders showed interest in eliminating direct payments. This result was expected since most smallholder farmers in Kosovo are not eligible for direct payments and have not been eligible since the beginning of the program. Their exclusion might be why they were more interested in eliminating this policy.

Table 5.3: Heterogeneity in mean extension preference models

Utility parameters	**Full G-MNL**		**G-MNL-I (γ=1)**		**G-MNL-II (γ=0)**		**G-MNL (τ=1)**	
	β.	St. err.	β.	St. err.	β.	St. err.	β.	St. err.
One farm visit	1.839***	0.183	1.535***	0.124	1.770***	0.194	2.725***	-0.244
Two farm visits	2.547***	0.233	2.175***	0.160	2.588***	0.248	3.740***	-0.294
Specialized expertise	0.701***	0.167	0.666***	0.139	0.685***	0.157	1.347***	-0.204
Included farm demonstrations	1.140***	0.157	1.013***	0.129	1.145***	0.162	1.591***	-0.208
ICT extension platform	1.345***	0.174	1.083***	0.120	1.258***	0.161	1.771***	-0.182
DP Cut by 50%	-1.767***	0.295	-1.605***	0.234	-1.954***	0.287	-2.816***	-0.334
DP Eliminated completely	-3.628***	0.461	-3.006***	0.366	-3.187***	0.398	-4.220***	-0.491
Yearly rate	-0.009***	0.002	-0.007***	0.001	-0.009***	0.002	-0.009***	-0.002
Constant								
Observed heterogeneity								
Two farm visits*Full time farmer	0.614*	0.249	0.381'	0.221	0.436'	0.253	0.715*	-0.395
Two farm visits*Public extension user	0.125	0.228	0.161	0.215	-0.013	0.238	-0.221	-0.294
SP*Public extension user	0.747**	0.289	0.747**	0.246	0.621**	0.283	0.653*	-0.375
ICT extension platform*Smallholder	0.976**	0.331	0.732*	0.307	0.878***	0.324	0.919**	-0.406
Included farm demonstrations*Public extension user	-0.545*	0.224	-0.422*	0.196	-0.369'	0.215	-0.562**	-0.266
Included farm demonstrations*Full time farmer	0.365	0.246	0.136	0.200	0.216	0.225	0.086	-0.36
DPCut*DP receiver	-0.830**	0.301	-0.635**	0.240	-0.566*	0.250	-0.997***	-0.339
DPCut*Smallholder	0.456	0.386	0.485	0.319	0.674*	0.326	1.460***	-0.459
DPCut*Full time farmer	1.062***	0.289	0.919***	0.239	0.914***	0.262	1.499***	-0.365
DPEL*DP receiver	-1.431**	0.436	-1.092**	0.375	-1.589***	0.356	-2.386***	-0.527
DPEL*Smallholder	1.024*	0.521	0.042	0.514	0.267	0.492	-0.029	-0.597
DPEL*Full time farmer	0.862*	0.408	0.562	0.370	0.730*	0.370	0.882*	-0.463

Table 5.3: Heterogeneity in mean extension preference models (cont.)

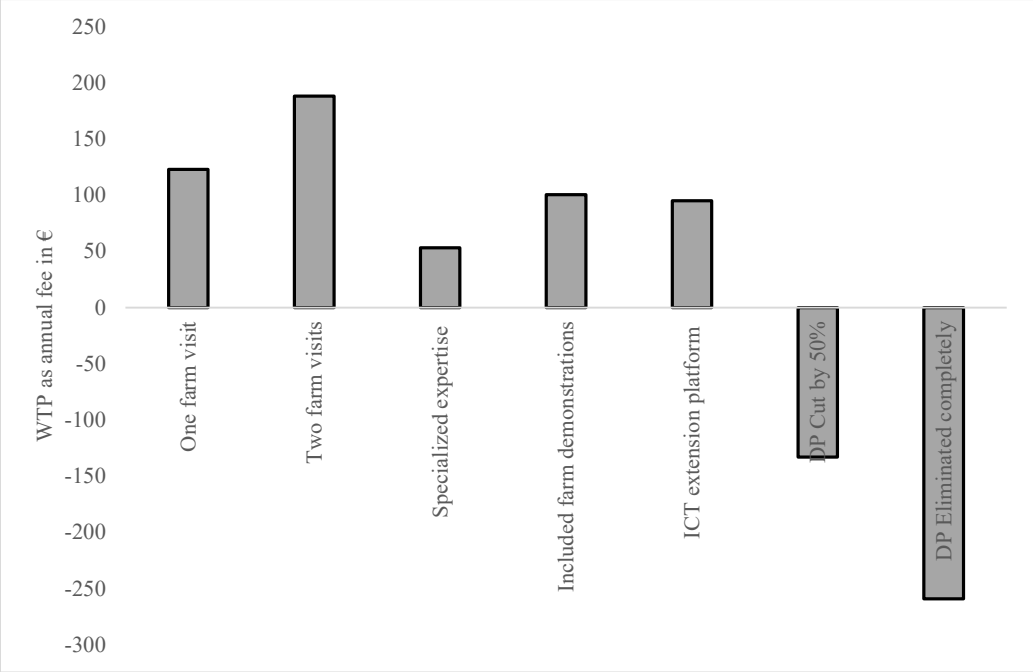
Heterogeneity in mean								
One farm visit	-0.349'	0.199	0.354	0.275	-0.566*	0.241	1.520***	-0.194
Two farm visits	-0.608**	0.183	0.732***	0.187	-0.736***	0.200	-0.833***	-0.153
Specialized expertise	1.736***	0.173	1.527***	0.143	2.044***	0.246	-2.295***	-0.281
Included farm demonstrations	-0.627***	0.173	0.570***	0.148	0.692***	0.148	0.922***	-0.199
ICT extension platform	-1.198***	0.171	-0.939***	0.152	0.941***	0.157	0.894***	-0.139
DP Cut by 50%	1.450***	0.210	-1.182***	0.141	1.283***	0.205	-1.784***	-0.222
DP Eliminated completely	2.172***	0.222	-1.957***	0.208	1.942***	0.272	2.934***	-0.314
Yearly rate	-0.017***	0.002	-0.014***	0.001	-0.016***	0.002	-0.026***	-0.003
Constant								
Tau	-0.554	0.088	-0.312	0.073	0.577	0.097	1	0
Gamma	0.091	0.118					-0.853	-0.113
N	9261		9288		9288		9288	
LL Function	-2273.8		-2289.0		-2310.4		-2297.1	
AIC	4607.5		4635.9		4678.8		4652.1	
BIC	4821.5		4842.9		4885.7		4859.1	
Significance levels: 'p<0.10, *p<0.05, **p<0.01, ***p<0.001;								

5.4 Willingness to pay for extension services' characteristics

This sub-chapter provides results on the willingness of sampled farmers to pay for an improved extension service. The WTP estimates across the four formulations of G-MNL estimated in WTP space are shown in Table A 8 in the Appendix;[63] however, for the sake of simplicity and slightly better model performance, the WTP estimates from GMNL-II (γ=0) will be used for interpretation.

The coefficients in the WTP space represent the marginal WTP for each attribute offered in the choice experiment. Given the improvements offered in the extension system choices, the current situation of the extension service in the country, and the range of prices that extension services are offered, predominantly from the private entities, WTP estimates resulted in coefficients in a realistic range. The first part of Table A 8 presents the mean of WTP coefficients. For the sake of simplicity, the figure below represents the mean WTP coefficients in a bar-chart format (see Figure 5.1 below).

Figure 5.1: WTP estimates as mean coefficients for specific extension service features



Source: Constructed by the author.

In general, farmers attached higher values of willingness to pay for two farm visits and direct payments compared to the rest of the attributes. The premiums as an average WTP ranged from

[63] In addition, the WTP estimates from WTP in space "mixlogitwtp" (a new package in Stata from Hole, 2016) are presented in Table A 9 in the Appendix.

a negative[64] of €258 for DP elimination to €188 for two farm visits.[65] On average, farmers are willing to pay €188 for two farm visits from extension services annually, about 1.5 times higher compared to one farm visit. Even though expertise and practical demonstrations remain critical aspects of the current extension system, the value the farmers put for receiving two farm visits on an annual basis is about 3.5 times higher than the value they put for specialized expertise and 1.9 times higher than the offer for farm demonstrations. A relatively similar difference in WTP relies on two farm visits and the ICT extension platform. Farmers are willing to pay €95 on average for ICT services from extension services, about two times lower compared to two farm visits; however, for this service, farmers attach similar WTP values to farm demonstrations and higher values compared to specialized expertise. When the farm visit attribute is reduced from two to one annual farm visit, farmers showed a 53% lower WTP - €123 on average.

Besides purely extension service attributes, farmers attached higher values to DP, specifically to their elimination. As one of the most important research questions of the study was to examine whether farmers would accept reductions or complete elimination of DP for an improved extension service, this part estimates how much money of DP farmers are willing to let for improved extension service. The results show that farmers attach higher values when it comes to DP. For example, farmers value DP elimination about five times higher than the value they attach to specialized expertise, 2.1 times over one farm visit, and similar values - 2.7 and 2.6 times higher compared to ICT and farm demonstrations, respectively. However, values attached to a 50% reduction of current levels of DP constitute lower negative WTP values compared to their elimination. The value farmers attached to the reduction of DP is 2.5 times higher than specialized expertise, and relatively lower differences (about one time higher) between DP reduction and one farm visit, ICT, and farm demonstrations. The most striking result that emerges from this part is that farmers would be willing to reduce DP as a tradeoff with two farm visits by extension agents annually. Farmers are willing to pay a premium for two farm visits which is 1.4 times higher than the value they attach to DP reduction. DP elimination is shown to have a higher negative WTP estimate, indicating that farmers are willing to keep receiving at least a reduced amount of DP as a tradeoff for improved extension service.

The results from the heterogeneity in mean willingness to pay (WTP) were evident concerning farm visits, DP, and ICT (see Table A 8). In line with the heterogeneity in mean results (part 5.3), full-time farmers seem to be willing to pay more for two farm visits on an annual basis from extension services compared to one farm visit and are less willing to pay for farm

[64] The negative WTP estimates account for negative preferences, mainly related to disutility (Kassie et al., 2017).
[65] An interesting insight from qualitative interviews was that €50 annual rate was considered a reasonable price by farmers. Particularly, one of the farmers stated that this particular value is not a big amount that can be paid by any farmer if the service is valuable.

demonstrations. Further, farmers previously using public extension services seem willing to pay more for specialized expertise. On the contrary, this group of farmers is not willing to pay for included farm demonstrations in the extension system. They are also willing to pay less for two farm visits. Smallholder farmers are willing to pay more for ICT services in the extension service compared to direct payments reduction. Similar to the results from the heterogeneity in mean models, full-time farmers seem willing to pay more for a reduction by half of the current direct payments compared to their complete elimination. Contrary to smallholders, who seem willing to pay more for DP elimination compared to their reduction by 50%. The group of farmers receiving direct payments before revealed negative WTP estimates for DP, indicating that they are not willing to pay for changes in DP.

These results document new evidence on extension services in this part of the world, considering that these services, with all their drawbacks, were offered previously free of charge to farmers. Overall, farmers are willing to pay for an improved extension service, particularly for some of the features that they think address their needs best. As Ozor et al. (2013) claimed, farmers may be dissatisfied with the current service delivery and may be willing to share its cost to improve the frequency of extension visits and coverage. In addition, Feder et al. (2001) note that extension services that charge fees to farmers have shown increased performance, have hired more professional staff, and have built a client-oriented relationship with farmers, which ultimately led to improving accountability and efficiency. In our work, we learned from in-depth interviews that advisers do not get any additional compensation for giving advice, impacting their incentives to improve this service or expand outreach. The willingness of farmers to share the cost of a restructured system is a critical finding since essential features of the extension are now known, and the WTP values might serve as a good benchmark point for policymakers if a possible cost-sharing system is initiated in the future.

Further, in line with the previous analysis, the WTP values for farm visits and DP are way higher than the rest of the attributes, which clearly indicates the importance of offering farm visits in the extension service and supporting farmers with DP. In our experiment, the attributes of DP were linked with access to a better extension service. For some farmers, this was not sufficient as they were constantly leaning towards DP and keeping them at the same levels. The considerable reliance of farmers on DP could be justified by the long period (more than a decade) that they have been receiving “free money” from the DP program. Consequently, the cash incentive from DP is distinctly strong, making farmers ignore the potential benefits of a suitable extension service. The tradeoff of reducing DP for a better extension service might have much larger benefits in the long run compared to keeping DP at the same levels. This benefit could have been seen by some farmers, who were willing to reduce or even eliminate DP for other features of the proposed extension service. The proposed extension service,

especially some of its features, is costly and additional contributions are needed to finance it. Therefore, a potential reallocation of some of the DP budget could finance some of these extension attributes that there is currently no budget for (such as farm visits, specialized expertise, and ICT). This reallocation of DP could be a reduction of current DP measures and not necessarily a removal; however, even if these potential DP changes are implemented, this will not affect most farmers in the country, as, e.g., smallholders are not eligible for DP.

Overall, key considerations for future restructuring should focus predominantly on these two features: farm visits and DP. Other important features include ICT and specialized expertise. Farm demonstrations appear to be not important as the rest of the extension features. Ozor et al. (2013) found that farmers were willing to pay for an improved extension service as long as it remained relevant to their needs. Similarly, farmers, in our case, were paying attention to attributes they thought were the most feasible to meet their needs. Lastly, qualitative interviews also clearly indicated the willingness of farmers to pay for extension services. In general, from these interviews, we have learned that farmers are willing to pay for extension services; however, they need to see and understand the value first. One of the farmers explained that farmers do not know the value of extension yet; therefore, they should get convinced first that the system works, and then they will pay for it. This insight was stated in a couple of other interviews. A general understanding is that farmers will pay when and or if they see a benefit from it. However, the system should be qualitative (offer advice of high quality), as farmers do not hesitate to pay when it offers quality.

5.5 Critical reflection on the DCE results

Implementing the discrete choice experiment, including the quantitative and qualitative part, constituted an advantage in getting insights from both approaches. However, the findings from the experimental part are also associated with a couple of limitations, mainly related to the hypothetical nature of the experiment, the selected attributes, and the experimental design.

First, even though DCEs are widely employed for preference elicitation, they remain controversial because of their hypothetical nature and the contested reliability and validity of their results (Rakotonarivo et al., 2016). Their hypothetical nature is at the heart of the controversy since respondents are asked to answer hypothetical questions (Rakotonarivo et al., 2016). Retrieved answers may be associated with hypothetical bias, which could arise from the behavior of respondents. In other words, we do not know how our respondents (farmers) would behave in a real-life scenario. Respondents may express preferences that may differ from their actual behavior under real economic circumstances (Hausman, 2012). Disparities between revealed and stated preference data are, in part, due to the hypothetical nature of the DCE. This hypothetical bias may originate when choice tasks do not fully reflect reality when respondents have incomplete preferences or perceive a vested interest in over- or under-stating the

importance of specific attributes (Quaife et al., 2018). In our case, we asked farmers to make choices between hypothetical extension service alternatives, where each choice set had six attributes reflecting the characteristics of the proposed hypothetical extension policy. We tried to address this potential limitation with warm-up questions, trying to familiarize our respondents with the nature of the experiment and its associated task (questions as choice cards). Additionally, considering the hypothetical nature of the experiment, we used a "cheap talk script" to "mitigate" hypothetical bias, in particular with monetary attributes.

Second, like other econometric approaches, DCEs are associated with several challenges (e.g., choice-task complexity and cognitive effort, experimental design, preference and scale heterogeneity, endogeneity, or model uncertainty) (Hoyos, 2010). However, one of the key challenges of DCEs is choice-task complexity, in particular, coming up with policy-relevant and reliable choice tasks (Norman et al., 2019) that best reflect the issue (program/ product/ policy scenario) being studied and understand the context in the target population (Hall et al., 2004; Mangham et al., 2009). Choice tasks should be realistic and implementable and can best inform decision-makers (Norman et al., 2019). We tried to address this challenge by a combination of approaches in the initial experimental design phase, starting with digging relatively deep into existing literature, reviewing extension services, the context in Kosovo, and previous empirical evidence concerning extension services and DCEs application, and conducting additional interviews. Although secondary literature can be used to identify an initial set of attributes (Mangham et al., 2009), we also relied on qualitative work to understand the context and design a relevant experiment for our purposes.

Third, our experiment has two monetary attributes: the yearly rate (price) attribute and the direct payments attribute. Even though there is no clear standard stated in the literature, this could have confounded respondents; therefore, we have tried to address this potential limitation with two approaches: 1) we included a level where DP stays the same at the direct payments attribute, and 2) we have designed a post-experiment survey, where we have asked respondents at the end of the experiment, to rank attributes by importance (the attributes which had the largest benefit in their choices). Furthermore, the methodological advances in DCEs sets allowed us to investigate and differentiate potential biases related to these two attributes.

Fourth, the socioeconomic data were collected via a relatively lengthy survey, which included detailed questions on the farm household, farming activity, and their perceptions of different segments (topics). However, long surveys are often associated with poor data quality (see Andreadis & Kartsounidou, 2020; Ambler et al., 2021; Jeong et al., 2023). In particular, long surveys are associated with growing fatigue[66] during the interview (Ambler et al., 2021), as

[66] The phenomenon in which response quality during the latter part of a lengthy survey may suffer is known as survey fatigue (Jeong et al., 2023).

some respondents disengage as the survey drags on because they are exhausted, bored, or because their attention wanders (Jeong et al., 2023), or some other respondents might not have the patience for long surveys as they are more likely to carelessly respond on long surveys (see Brower, 2018). This burden on respondents may lead to data losses and biases (Ambler et al., 2021), and generally, long surveys result in lower response rates.

Considering our experience during its implementation, its length with an average of two hours, farmers` fatigue, and potential issues concerning data quality having a shorter survey could potentially result in more accurate answers from the farmers. In terms of the experiment, we tried to address this potential limitation with data quality by conducting the experiment in the first phase, while the second phase included the socio-economic survey. Furthermore, we cross-checked the quantitative data with other sources, such as publicly available data, official reports, and other datasets from different donor organizations aiming to verify the completeness of our dataset and identify possible problems.

Lastly, the experiment design of the DCE is a crucial stage; recently, the tendency has been to opt out of increasingly complex designs. Even though different design strategies exist, orthogonal design, uniform design, and efficient designs, in particular, D-efficient[67] design, are considered state-of-the-art methods (see Mangham et al., 2009; Zhu et al., 2017; Lizin et al., 2022). Out of these methods, D-efficient designs have been used more often in the past years (see Rose & Bliemer, 2009; Zhu et al., 2017; Lizin et al., 2022), as D-efficient methods outperform the other two methods in terms of design efficiency (Zhu et al., 2017). However, the software and the package we have used (the "support.CEs" package in R) do not support the calculation of the D-efficiency estimate. Further, this package provides functions for generating orthogonal main-effect arrays but does not support optimal designs for discrete choice models (Traets et al., 2020). Nonetheless, in our case, we have used a fractional factorial design that incorporates three important design criteria of DCEs: 1) orthogonality, 2) minimum overlap, and 3) a level balanced design (see Experimental design subchapter for a more detailed description).

Considering these limitations, the experiment part of the study has been organized and implemented in the most feasible way, addressing a research gap that has not been investigated before globally. Furthermore, including qualitative evidence was vital and added value to the experimental design, explanation of the estimated preferences, and understanding of the reasons behind these stated preferences. As Lizin et al. (2022) note, a qualitative pre-phase ensures the relevance of what is being measured, helps target the right respondents and choice context, and feeds the experimental design with the design dimensions it needs to compute the statistical

[67] Statistical efficiency has been defined in terms of D-efficiency, which can be interpreted as minimizing the determinant of the covariance matrix (Bliemer et al., 2008; Rockers et al., 2012).

efficiency while considering respondent efficiency. Even though our findings represent important results, particularly for farmers and policymakers involved in extension services, in this type of experiment, its results need to be interpreted with caution.

6 Effects of Coupled Direct Payments on Productivity, Farm Size, Income, and Environment

This chapter provides the results which answer the third research question outlined in part (1.3). The results are organized in the following order: The descriptive statistics are the first sub-chapter, followed by the results from the quantitative approach to impact assessment. Results are separated into four key parts (policy outcomes), where each part describes the results for specific farm-level outcomes, starting from productivity results, farm income, followed by farm size, and lastly, the effects on environmental outcomes. The final part of this subchapter provides a summary of the estimated results. Like the chapter above, the final sub-chapter critically reflects on these estimated results and the approach employed.

6.1 Descriptive Statistics from the IE

The descriptive statistics of the key selected observables (covariates) used in the impact evaluation analysis for the whole sample are presented in Table A 11 in the Appendix. Here we present the results for the whole sample, while differences between the two groups (participants and non-participants of the DP program) are presented in the following sub-chapter (Matching & DiD Results).

Considering the topic of our research work, and the importance that direct payments have on the farming activities in Kosovo, half of the sample were direct payment recipients (supported with the DP program at least in one of the five years 2015-19). Among the recipients' group, farmers received an average of €1,935 as coupled direct payments support, ranging from €60 to €80 thousand.

Direct payments are conditional and coupled on farm size operation. In this regard, farmers utilized an average of 10.9 ha of agricultural area. Considering that the agricultural sector in Kosovo is strongly characterized by small farms, where half of the UAA is used by farms between less than one ha to less than five ha (Herzfeld et al., 2022), similarly in our case, more than half of the UAA was used by farms with five and less than five ha. Farms with this UAA predominantly cultivated cereals, occupying almost half of their UAA (47%), followed by vegetables at 7% and permanent crops at 5%, respectively. The yield of key cereals reached 3.8 quintals per ha for wheat and 3.5 quintals per ha for maize, respectively, which is similar to the previous empirical evidence (see, for example, Schils et al., 2018), and official records of MAFRD (see MAFRD, 2017b; MAFRD, 2018). Besides small-farm sizes, land plots are highly fragmented (Herzfeld et al., 2022) and dispersed in several locations – an average of seven plots (Miftari et al., 2014). Consequently, for farmers to reach their intended production levels and be eligible for direct payments, they must have a certain amount of land, often beyond what

they own. Thus, farmers need to rent a relatively large area of land. In our sample, almost half of the farmers rented land (46%), ranging from 1.5 ha to 210 ha. Regarding livestock, on average**,** farms had 4.12 LU, mainly cattle either mixed or destined for milk production. Milk yield reached an average of 2099 kg per cow, equivalent to about 8 kg per day of lactation. Similar values were also reported by Nushi and Selimi (2009) and MAFRD (2015).

Overall, farmers made an average of €20 thousand euros from this farming activity as net annual income. However, over half of the farmers (58%) were netting ten or less than ten thousand euros annually (about 800 euros monthly) from their farming activities. With regard to individual characteristics – demographics of farm managers, they were, on average, 50 years old, with the vast majority of them being males (98%).

6.2 Matching & DiD Results

This section presents the results following the step-by-step procedure of DID-matching implementation. First, results of the matching model (probit model) are presented, followed by matching quality results, and then finally; results are presented separately on the DP program objectives and its selected outcomes.

As Chabé-Ferret and Subervie (2013) note, the first step of the estimation procedure is an estimation of a probit participation model for the DP Program, where control variables are included as explanatory variables (parameter estimates are shown in Table A 12 and in Table A 13 the Appendix).[68] First, the pseudo-R2 is above 0.08, indicating a good model fit (Kabunga, 2014). Caliendo and Kopeinig (2008) argue that the pseudo-R2 indicates how well the regressors explain the participation probability, and its value should be fairly low. The low pseudo-R2 and the insignificant likelihood ratio test support the hypothesis that both groups have the same distribution of covariates after matching (Nikoloski & Ajwad, 2013). Second, as noted by Nikoloski and Ajwad (2013), Rosenbaum and Rubin (1983), Dehejia and Wahba (2002), and DiPrete and Gangl (2004) emphasize that the crucial issue is to ensure that the balancing condition is satisfied because it reduces the influence of confounding variables. In this regard, besides the visual comparison (the histogram before and after matching),[69] which can be found in the Appendix, (Figure A 3 and Figure A 4). Rubin (2001) suggests that the value of B should lie below 25 and that R should lie between 0.5 and 2 for the overall balance to be sufficient (Leuven & Sianesi, 2003). Our analysis shows Rubin`s B<25, Rubin`s R of 0.5-2, and a percentage of <10% for each covariate (see Table A 14 and Table A 15 in the

[68] The probit model has been estimated separately for both groups (DP17 & DP1617).
[69] Ideally, propensity scores should be distributed equally across treatment and control groups. Very skewed distributions could indicate that balance has not been achieved successfully (Binci et al., 2018).

Appendix). Third, most of the variables included in the model have the expected signs.[70] Results suggest a significant selection of observables, and they are coherent with previous empirical evidence on the determinants of participation in subsidy programs (see Pufahl & Weiss, 2009; Chabé-Ferret & Subervie, 2013; Arata & Sckokai, 2016; Bajrami et al., 2019; Uehleke et al., 2022). Subsequently, propensity scores are estimated through this probit model, then used for matching. Matching is considered successful when significant differences in covariates among participants and non-participants are removed (Pufahl & Weiss, 2009). After matching, there should be no statistical differences for the selected covariates between these two groups (Bajrami, 2016).

Before matching, participant farms in the DP program significantly differ from non-participants concerning a couple of characteristics (covariates). Farms enrolled in the DP program tend to have more utilized agricultural area, a higher number of livestock units, use more labor hours and spend more on chemical products (namely fertilizers and plant protection products) (see Table A *18* in the Appendix, which reports means of covariates among participants and non-participants of DP program on the pre-treatment year - 2015, before and after-matching). Furthermore, participant farms tend to have significantly more livestock activities. These descriptive results are important since the initial differences between these two groups are a potential source of bias in estimates of program impact (Bajrami, 2016). After matching, all the observable differences in means between participants (treated farmers) and non-participants (controls) have been removed.

Average treatment effects on the treated estimated by DID-Matching

Impact evaluations generally estimate the average impacts of a program (Gertler et al., 2016). Correspondingly, our parameter of interest is the ATT, estimated as an average difference in the outcomes between the treated and the matched control groups. The ATT is estimated following equation 16 on page 57, which compares the individual changes in outcomes between DP program participants ($\Delta y^1 = y^1 2017 - y^1 2015$) and their counterparts – non-participants of the DP ($\Delta y^0 = y^0 2017 - y^0 2015$). The impact of the treatment on the treated ("causal effect of participation in the DP") is estimated by computing mean differences across both groups between 2015 and 2017 (d-i-d analysis) (Pufahl & Weiss, 2009).

$$ATT = \frac{1}{N_1}\left(\sum_{i=1}^{N_1} \Delta y_i^1 - \sum_{i=1}^{N_1} \Delta y_i^0\right)$$

[70] The results of the probit model estimation indicate that larger farmers with higher values of UAA and livestock farmers are more likely to join the DP program. Similar results were obtained for the second group of farmers as well.

A positive or negative estimate of the ATT implies that participating farmers in the DP program have higher (lower) growth rates of outcome variable *y* than non-participants (Pufahl & Weiss, 2009). As Kirchweger and Kantelhardt (2015) note, the effect on particular outcomes is estimated as a development difference between the pre-treatment and treatment period (in our case, years of 2015 to 2017). The results are described below separately per each studied DP objective and its respective outcomes of interest.

Effects of DP on increasing productivity

One of the overall strategic objectives of Kosovo's agriculture and rural development program - ARDP 2014–20 is related to increased production and productivity, explicitly stating the development of a competitive and innovation-based agri-food sector characterized by an increased production and productivity and meet EU market standards (Bajramovic et al., 2016). In addition to ARDP objectives, two of the eight key objectives of the DP program aim to improve the competitiveness and efficiency of primary agricultural production and increase yields. As stated in the MAFRD (2014), the aim of direct payments is to increase the production of agricultural products. Furthermore, the specific objectives of most DP sub-measures aim to improve productivity. This comes as; generally, Kosovo farmers face productivity issues, struggling to be competitive and produce part of their production for self-consumption (MAFRD, 2014; Herzfeld et al., 2022). According to MAFRD (2014), agricultural productivity and yields are low as a result of small farm sizes and lack of access to technical expertise, resulting in outdated farming practices, inadequate use of inputs, a lack of credit, and inefficient farm management practices.

We employ three outcome variables to evaluate the effects of the DP program on improving the productivity of primary agricultural production: the land productivity per ha (*land_prod*), the ratio of total outputs with total inputs (*totaloutput_input*), and the output by annual working units (*output_AWU*). The operationalization of these outcome variables has been described in part (4.2.4), and moreover, they are considered standard measures of productivity[71] (see Table 4.3 on the operationalization of outcome covariates, page 63).[72] Overall, our results across three outcome variables indicate that we cannot reject the null hypothesis of no treatment effect, meaning that the DP program (coupled direct payments) might play no substantial role in improving the productivity of participant farmers in the DP program. These results[73] are also

[71] Productivity measures are also seen as important measures of competitiveness in agricultural production. For example, the European Commission considers productivity as the most reliable indicator for competitiveness over the long term (see EC, 2011b).

[72] Despite efficiency measures being often used in this analysis, FADN is not sufficiently detailed to estimate efficiency measures.

[73] This should not be interpreted as statistical significance in the sense of inferential statistics for the whole farms in Kosovo.

consistent across three other matching algorithms estimated to check the robustness of results (see Table A 19 in the Appendix).

Table 6.1: ATT estimates on productivity

NN Mahalanobis Matching	DP17 (t-2)				DP1617 (t-1)			
	ATT (S.E.)	t-value	Treated	Control	ATT (S.E.)	t-value	Treated	Control
land_prod	580.95 (1199.40)	-1.26	61	393	5943.68 (6415.70)	0.61	66	393
totaloutput_input	-0.24 (0.53)	-1.87	61	393	0.06 (0.60)	0.01	66	393
output_AWU	604.04 (2578.44)	0.52	61	393	687.65 (6928.20)	-0.37	66	393
N			69	457			73	457

Notes: Significance levels: *p < 0.1, **p < 0.05, ***p < 0.01;

DP17 refers to the treated (participant farmers) in the DP Program only in 2017 (one-time receivers);

DP1617 refers to the treated (participant farmers) in the DP Program in 2016 & 2017 (two-time receivers);

S.E. does not take into account that the propensity score is estimated;

Source: Own estimations based on FADN Data.

These results were expected considering the nature of coupled direct payments, and furthermore, the findings were in line with the literature.[74] Three explanations can be associated with these results. The first explanation as to why coupled direct payments did not improve productivity is that production levels do not affect the sum of payments, as this, in many cases, disincentivizes farmers to improve their productivity levels as they are aware that the payment levels are independently distributed from their production level – particularly quantity and quality. As Martinez Cillero et al. (2018) noted, coupled payments encourage a type of production that aims to qualify for a payment. In our case, this could be particularly true for payments linked to the area or number of livestock, which constitute over 90% of payments in the DP program. Disincentivizing efforts to improve productivity could be linked particularly to input use and level of specialization. When farmers receive a non-conditional additional income (Ciliberti & Frascarelli, 2019), farmers may decide to use fewer inputs and lesser intensity. This is also well argued in the literature, showing that coupled direct payments influence input choices (Rizov et al., 2013; O'Neill & Hanrahan, 2016; Brady et al., 2017; Pe'er et al., 2017; Trapp & Lakner, 2018; Garrone et al., 2019), and also influence input intensity (Trapp & Lakner, 2018). Consequently, this brings a situation where generally, farmers have fewer incentives to be cost-efficient, keep technologies up to date (OECD, 2011), or adopt more efficient production practices (see, for example, the work by Emvalomatis et al., 2008; Bojnec

[74] In the particular case of Kosovo, these findings are consistent with GAP (2016), who concluded that the MAFRD subsidies did not show any positive effect on increasing production.

& Latruffe, 2009). This is also in line with the findings from our qualitative interviews. A couple of farmers stated that direct payment compensation is low, which is not sufficient to invest in new technologies or increase the scale of production - farm size. In particular, one of the farmers stated:

Even in the cases when farmers receive up to 2,000 euros, no improvements can be made. What can a farmer do with 2,000 euros during the year - what can he/ she improve?

Subsequently, these farmers indicated no plans to expand their farming activity as much financing capacity is required. A similar study in Kosovo by Herzfeld et al. (2022) points out that direct payments are not attractive for small farms as they only receive small amounts of money that are not enough to develop the farm.

A second explanation is related to production decisions, as farmers tend to select their crop and or animal production towards those with eligible payments. Farmers also tend to express this in qualitative interviews, saying that their production decisions are influenced by subsidized crops, particularly cereal and dairy farmers. In Kosovo's case, the vast majority of agricultural land is occupied for cereal production (over 52% in 2020),[75] where cereals are highly subsidized. Nevertheless, despite high subsidization, cereal production remains uncompetitive compared to neighboring and EU countries, as the yields of these two key cereals are, on average, twice lower compared to EU levels (see, for example, Schils et al., 2018). Wheat yields in Kosovo and all the WB countries fall far behind EU levels. For example, in Kosovo, wheat yield in 2017-19 was 65% of the EU average (Martinovska Stojcheska et al., 2021). The low yields have characterized the farming community in Kosovo over a long period, especially during the last twenty years (post-war period after 1999). This issue is listed as one of the key weaknesses in the country's agricultural strategy (ARDP 2014-20), specifically stating the high share of non-market-oriented agricultural production. Several scholars have recognized that coupled payments tend to incentivize the cultivation of specific crops without taking into account the real needs of the demand (see Bečvářová, 2007; Trapp & Lakner, 2018; Ciliberti & Frascarelli, 2019; Scown et al., 2020), hampering a market-oriented approach.

The term "coupled" links payments to a specific stimulating production activity (Ciliberti & Frascarelli, 2019). Thus, farmers choose their crop or animal type based on the expected payment and not on expected market prices or farm production structure (Bečvářová, 2007; Trapp & Lakner, 2018; Scown et al., 2020). If farmers would concentrate on market signals and produce crops that are demanded in the market, this could stimulate them to reduce their

[75] Based on estimates from the MAFRD (2021) on utilized agricultural areas. See Table A 5 in the Appendix, which lists a couple of indicators regarding agricultural land usage in the country of study – Kosovo.

production costs and be more competitive (Bečvářová, 2007). This is in contrast with decoupled payments, where the initial idea with the decoupling of CAP under the 2003 reform was to separate income support from production decisions, letting farmers decide what and how much to produce based on market demand rather than based on the structure of payments (Brady et al., 2017). Compared to this, coupled payments pretty much bring the opposite effect. Their enormous influence on production decisions has negative consequences on both farm efficiency and total factor productivity (Hennessy, 1998; Zhu et al., 2012; Mary, 2013), and overall competitiveness, as farmers decide at least partly based on subsidies provided and not on market demand (Pe'er et al., 2017; Trapp & Lakner, 2018).

These results on improving productivity could also be attributed to the fact that coupled payments affect productivity and farm efficiency by keeping less competitive farmers in the market. These payments have kept inefficient farmers in the sector by incentivizing to produce the risk-averse farmers (Hennessy, 1998), those being not able to cover their fixed cost, and without the payment, they would exit the market in the long run (Chau & de Gorter, 2005). In particular, area-based payments influence production by preventing farmers from exiting the market (Bečvářová, 2007). In many cases, these payments represent a sort of soft-budget constraint and cover the losses from farming. Similarly, in our case, most supported farmers are not market-oriented but inefficient smaller farmers with concentrated production across the subsidized crops, eventually leading to low and or decreased productivity and overall lower farm profits. Qualitative evidence clearly indicates that most of the financial support from direct payments is being used to cover the production costs of their farming activities. Even more, some indicated that these payments help them to sustain the current production amounts, and without the payment, they would go into losses. In other words, it helps them to keep the agricultural activity alive, as otherwise, without the payments, they would not be able to keep producing. In this context, this evidence also revealed that smallholders are particularly highly dependent on direct payments. One in-depth interview with farmers stated that if direct payments are abolished, farmers will immediately cease their activities and consider migration opportunities.

Another interesting insight from qualitative interviews is the timing of direct payments distribution to farmers and their usage – the purpose of income support instrument usage. Most farmers indicated that payments are used to buy inputs to cultivate crops (seeds, fertilizers, plant protection products), diesel expenditures for agricultural machinery, spray manure, harvest, and other expenses on the field. However, their usage largely depends on when direct payments are being distributed. Farmers do not know when they will receive these payments, which substantially hinders their production planning process. For example, one of the farmers stated:

The usage of direct payments money depends on when they distribute them. It had happened before that they distributed payments around autumn, and I used to sow the wheat. They were very helpful.

Cases, when these payments are not used for agricultural activity are mainly cases when the farmers do not own the land. Direct payments often serve as rental payments for the rented land (see the part below on the effects of DP on farm income, which describes in more detail this leakage of support to land owners).

Effects of DP on farm income

One of the main objectives of the DP program is to increase farm incomes. Therefore, to measure this effect, we use two outcomes: the "*netincome_UAA*" outcome, which represents the net farm income covariate (SE420) normalized on per ha basis of UAA[76] and the "*netincome_laborh*", representing the net farm income covariate (SE420) normalized on per labor hour basis. The empirical results indicate that we cannot reject the null hypothesis of no effect, implying that the DP program does not lead to increasing farm incomes for both groups (one-time and two-time receivers). These results are consistent also across the other three matching algorithms[77] (see Table A *20* in the Appendix).

These results are expected considering the composition of coupled payments. Firstly, the most reliable explanation is that since its introduction, the DP program in Kosovo has been distributed to specific agricultural sub-sectors without any compliance requirements. As Matthews (2020) noted, with the intention to provide support to farm incomes, these programs often require farmers to engage in specific activities that are likely to be less profitable to be eligible for income support. In the same line, GAP (2016) claimed that the coupled subsidy scheme in Kosovo is increasing farmers' income in the short run; however, in the long run, it prevents development since it supports and keeps in the market also the farmers that are less productive.[78] Similarly, Ciliberti and Frascarelli (2019) argue that the impact on production decisions may explain the negative impact on farm income in the short run since coupled payments induce farmers to produce/ feed not profitable crops/ livestock. Consequently, as in our case, their income evidently lowers when farmers engage in less competitive farm activities (in many cases farming the subsidy by using lower inputs, outdated machinery, and technology). Even in cases where coupled payments may incentivize production (such as those coupled to output), their effects could be counterintuitive, as these payments may increase the

[76] See Table 4.3 in page 63 and 64 for a more detailed description of these covariates.
[77] We use three additional matching algorithms as a robustness check.
[78] In Kosovo`s case, similar results were obtained by Bajrami (2016) and Bajrami et al. (2019), who found that payments tied to cattle livestock numbers did not have any effect on improving the income of dairy farmers that were participants in the program in a single year.

intensity of production, which could improve productivity (increase yields), which in turn increases production costs. Consequently, farmers may be left with less income. This could particularly be true if many beneficiaries have a similar response to this incentive, which in turn, with increased production, farmers will face lower market prices for the products they produce. From the theoretical perspective, these payments may increase production, leading to lower output prices (Kirwan, 2009), thus generating policy gains for consumers (Ciliberti & Frascarelli, 2019). Additionally, these payments induce changes in input use. These changes are highly likely to result in changes in some input prices, particularly by increasing input prices (i.e., fertilizers, land, and capital), thus channeling policy benefit to input suppliers (Kirwan, 2009; Latruffe & Mouël, 2009; Rizov et al., 2013; Ciliberti & Frascarelli, 2019). This could be true for area-based coupled payments, where in particular, the literature argues that considering that the largest share of direct payments tends to be used to cover agricultural production (Goodwin & Mishra, 2005), this, in turn, increases the demand for inputs which drives an increase in their cost (prices), particularly land, fertilizers, and pesticides (Kirwan, 2009). Moreover, as Ciliberti and Frascarelli (2019) note, these payments may reduce the incentive for quality farm products, which has immediate negative effects on output prices, and in the long run, farms` ability to compete in domestic and international markets.

Secondly, the estimated results effects on farm income may also be explained by the fact that a considerable amount of direct payment support leaks to other beneficiaries, particularly landowners and often farmers do not constitute the final beneficiaries. Support leakage is a major drawback hindering efforts to support farm incomes effectively. The greater the share that goes to landowners, the less effective direct payments ultimately become in supporting farmers' incomes (Patton et al., 2008). This is well argued in the literature (see sub-chapter on the Effects of the coupled direct payments for a broader review on the leakage of direct payment support to landowners). This type of leakage support was indicated in our in-depth interviews as well. The qualitative evidence revealed that landowners often absorb coupled payments while actual farmers do not receive them. In one of the in-depth qualitative interviews, one of the farmers stated that he does not receive the payments regarding the grains he cultivated in an area of three ha, as his brothers own the land, and the payment is directly distributed to them. Two other farmers stated that they never see the direct payment money, as the money is directly disbursed to the landowner's bank account. Furthermore, in most cases, the direct payment amount serves as a rental payment. Consequently, this has continuously increased rent prices. Substantial empirical evidence exists showing that direct payments contribute to either increasing land rental rates (see, for example, Lence & Mishra, 2003; Roberts et al., 2003; Kirwan, 2009; Latruffe & Mouël, 2009) or are capitalized into land prices by raising the value of agricultural land (Phipps, 1984; Featherstone & Baker, 1988; Barnard et al., 1997; Shaik et

al., 2005; Ciaian et al., 2021). In the case of Kosovo, since the DP program has been implemented, direct payment rates have been constantly used as rental rates. Considering that direct payments have been continuously increasing, rental rates have been going up at the same rate, as in many cases, the subsidy payment per ha is used as rental payment for the landowner by the farmer. Insights from qualitative interviews confirmed this practice and noted that land rental amounts are high and often equal to the subsidy amount. When subsidy amounts are increased, the rental rate usually follows the increased subsidy amount. For example, in 2017, the subsidy amount for wheat amounted to 150 €/ ha, with landowners highly likely receiving this amount per ha of rented land.

These observations are in line with the literature stating that coupled payments increase the cost of resources in the agricultural sector (see, for example, Agrosynergie, 2011; Ciliberti & Frascarelli, 2019), such as pushing up rental values (Kirwan, 2009; Ciliberti & Frascarelli, 2019) or other resources that farmers use in production, such as inputs, notably when farmers do not own the resources they use in production (Latruffe & Mouël, 2009). Indeed, empirical evidence exists that part of the support provided by agricultural policies (including direct payments) contributes to increasing resource costs, input suppliers' income, and non-farming landowners' income (Ciliberti & Frascarelli, 2019). This could translate to less available farm income for the farm households. Besides leakage of support to landowners, there is considerable evidence stating that this type of support also leaks to other stakeholders in the value chain of agriculture (see, for example, the work by Breen et al., 2005; Russo et al., 2011; McDonald et al., 2014; O'Neill & Hanrahan, 2016; Ciliberti & Frascarelli, 2019). Considering that stakeholders along the value chain may be aware of the coupled payment system, particularly its coupling to specific crops and livestock, input suppliers could opportunistically take advantage of it (Ciliberti & Frascarelli, 2019). For example, input suppliers could increase the price of their inputs as they know which crops are subsidized and by which amount, followed by landowners, while processors could offer a lower price. In the same line, Ciliberti and Frascarelli (2019) highlight that in addition to this opportunistic behavior that such a payment generates on the supply side, inducing beneficiaries to “farm” the subsidies despite the crops, the presence of financial aid linked to specific production induces input suppliers and buyers of agricultural commodities to somehow intercept an amount of such a subsidy, by lowering the price of the commodities (Brooks, 1997; Alston & James, 2002; Hendricks et al., 2012; Rizov et al., 2013).

The third explanation could be attributed to farm size and its relation to farm income. Farm incomes are related to farm size. Considering that most farms in Kosovo are small and semi-subsistence farms (Bajrami et al., 2019; GAP, 2021; Herzfeld et al., 2022), in most cases, they generate less income from the agricultural activity due to the size of operation. Consequently,

income effects from the subsidy could be diminished due to the farm size operation. Bečvářová (2007) implies that larger-scale economies are associated with lower production costs, i.e., higher incomes. This also complies with the findings by Noack and Larsen (2019), which show that farmers earn higher and more stable incomes with increasing farm size. Another explanation for these empirical results on farm income could come from the consumption at the household level, particularly since smallholders tend to consume the vast majority of their production for household needs (Kahan, 2013a; Miller & Welch, 2013; Nandi et al., 2021). In these cases, when most of the agricultural production is consumed and not sold in the market, this does not create additional income for the households engaged in farm production. Similar observations were also stated by Ciliberti and Frascarelli (2019) in small Italian farms; where, as a result, that farm output is consumed and not sold, they observed significant decreases in farm income.

Table 6.2: ATT estimates on farm income

NN Mahalanobis Matching	DP17 (t-2)				DP1617 (t-1)			
	ATT (S.E.)	t-value	Treated	Control	ATT (S.E.)	t-value	Treated	Control
netincome_UAA	415.75 (1116.27)	-0.77	61	393	5804.27 (6517.07)	0.63	66	393
netincome_laborh	0.01 (1.33)	0.52	61	393	0.23 (3.99)	-0.28	66	393
N			69	457			73	457

Notes: Significance levels: *p < 0.1, **p < 0.05, ***p < 0.01;
DP17 refers to the treated (participant farmers) in the DP Program only in 2017 (one-time receivers);
DP1617 refers to the treated (participant farmers) in the DP Program in 2016 & 2017 (two-time receivers);
S.E. does not take into account that the propensity score is estimated;
Source: Own estimations based on FADN Data.

Overall, our findings are also in line with the literature on coupled payments` effects on farm income, stating that coupled payments have, on average, no significant impact on farmers' income (see Dewbre et al., 2001; Guyomard et al., 2004; Buckwell et al., 2017; EC, 2018; Biagini et al., 2020; DeBoe, 2020). From a broader perspective, it is generally argued that direct payments are a poor income support instrument (Brady et al., 2017). Even though decoupled payments are generally associated with positive effects on farm incomes (Agrosynergie, 2011; EC, 2011a; OECD, 2011; Severini et al., 2016; Soliwoda, 2016; Pe'er et al., 2017; EC, 2021a); when it comes to coupled payments, they are either associated with no effects (see EC, 2018; Biagini et al., 2020; DeBoe, 2020) or negative effects to farm incomes (see, for example, Smit et al., 2017; Ciliberti & Frascarelli, 2019).

Nevertheless, income measurements are a complex task, and estimating the effects of direct payments on income should be taken with caution. Sub-chapters "FADN Data" and "Critical reflection on the IE results" provide a more detailed overview of farm income limitations and potential biases; however, they are vastly related to the fact that support often leaks to non-target beneficiaries (e.g., landowners) (Buckwell et al., 2017), and income calculation often poorly reflects the actual income of the farm family (Buckwell et al., 2017; Finger & Benni, 2021). The FADN dataset does not cover non-farm income sources (Allanson & Hubbard, 1999; Kelly et al., 2018; Spicka et al., 2019). Along the same line, Hill (1999) states that income indicators of FADN are unreliable as they do not represent the overall income situation of agricultural households. Considering these limitations, in our case, we have used two outcomes that could better represent the income situation of observed farms. Another limitation relates to the fact that farms can be highly heterogeneous in terms of structure. The distribution of farm income across the farm population is often unequal, with large farmers absorbing bigger payments, i.e., higher income support (Scown et al., 2020; Finger & Benni, 2021; Ciliberti et al., 2022). In this regard, we sought to normalize variables on a per ha basis and labor hours basis. Lastly, as noted by Finger and Benni (2021), the effects of direct payments (either coupled or decoupled) on income are highly context-specific (see also Biagini et al., 2020). Thus, for this purpose, we added qualitative insights to understand the context better and provide an explanation for the qualitative results.

Effects of DP on farm size

The agricultural sector in Kosovo is characterized by small farms, where only in 2016, half of the UAA was used by farms between less than one to less than five ha (Herzfeld et al., 2022). Similarly, in the livestock sector, the average herd size in 2014 was four cows (MAFRD, 2015), with over 64% of cattle being used by farms from one to nine cows. The ARDP 2014-20 document lists small farm sizes as one of the key weaknesses of the agricultural sector in Kosovo. To address the small farm size, the MAFRD has listed the objective of increasing farm size as one of the key general objectives of the DP program. Moreover, increasing cultivated areas is a specific objective in the measures addressing fruits, vegetables, and livestock sub-sectors. Hence, we use two FADN outcome variables to estimate the effects of the DP program on farm size: the total UAA area in ha (*SE025*) and the total livestock units (LU) - (*SE085).*[79] As Kirchweger and Kantelhardt (2015) noted, this is a straightforward measure of farm growth, as farm size in agricultural production is mainly reflected in two outcomes: the area used for agricultural production and the number of animals/ livestock in the farm.

[79] For the outcome SE085, we have dropped those farms that have not had any livestock unit or production over the whole observation period (2015-17), and the whole model, including probit and ATT, has been estimated separately. See Table A 16 and Table A 17 in the Appendix for probit estimates on livestock outcomes for both groups.

The descriptive statistics reveal that the farm size since 2014 has been constantly increasing. Compared to 2014, where the average farm size in terms of UAA was estimated at 1.59 ha, this average increased to 1.71 ha in 2017. A similar pattern has also been observed in our analysis. Our results show that coupled payments (DP program) have had an effect on increasing the land area destined for agricultural activities (production) among the program participants. DP program participants have increased their UAA by an average of 0.82 ha for one-time receivers and 0.87 ha for two-time receivers, respectively, compared to non-participants (non-receivers).

Besides land use, results show that coupled payments might positively affect the number of livestock units program participants use (see Table 6.3 below). These results are consistent across both groups of program participants (one-time and two-time receivers) and the additional matching algorithms (Table A 21 in the Appendix). For example, coupled payments increased the LU (SE085) for two-time receivers by 0.52 LU on average compared to non-participants and 0.64 LU on average for one-time receivers. In other words, we can reject the null hypothesis of no effect on farm size.

Table 6.3: ATT estimates on farm size

NN Mahalanobis Matching	DP17 (t-2)				DP1617 (t-1)			
	ATT (S.E.)	t-value	Treated	Control	ATT (S.E.)	t-value	Treated	Control
SE025	0.82** (0.57)	2.16	61	393	0.87*** (0.61)	2.52	66	393
SE085	0.64*** (0.77)	2.65	53	336	0.52*** (0.74)	2.65	56	336
N			69	457			73	457

Notes: Significance levels: *p < 0.1, **p < 0.05, ***p < 0.01;
DP17 refers to the treated (participant farmers) in the DP Program only in 2017 (one-time receivers);
DP1617 refers to the treated (participant farmers) in the DP Program in 2016 & 2017 (two-time receivers);
S.E. does not take into account that the propensity score is estimated;
Source: Own estimations based on FADN Data.

Our empirical analysis shows that coupled direct payments have an effect on increasing farm size through the increment of land use destined for agricultural activities. Our results could be explained by the DP program eligibility requirements, which imply that as these payments are coupled with the size of the farm operation (either crop area or the number of heads), the larger the farm size, the larger the amount of support that the farmer receivers as direct payments. The level of crop payment does not depend on the production level but on the area cultivated with eligible crops (Ciliberti & Frascarelli, 2019). This evidently pushes farms to grow herd size and use more ha of agricultural land. This is in line with Pe'er et al. (2017), which note that as coupled payments are linked to farm production, they affect farm structure since farmers can

directly affect the payout levels. In our case, increases in farm size could also be driven by the DP program's minimum requirements (eligibility criteria). Considering that the DP program has minimum eligibility criteria,[80] farmers must increase farm size to receive support, particularly farms with smaller operations (small-holder farms). Similarly, Pufahl and Weiss (2009) noted that higher farmland growth rates of participants in the studied program (AE Program)[81] could be explained by the adjustment process of farms induced by program eligibility criteria. Generally, the literature points in the direction that direct payments keep more farmers in the sector and promote higher usage of agricultural land (see Bečvářová, 2007; Brady et al., 2017; Pe'er et al., 2017). Consequently, it is expected that direct payments influence land use, increasing land areas destined for agricultural production and affecting crop patterns by shifting production towards a particular crop, where farmers tend to select subsidized crops (see, for example, Agrosynergie, 2011; Smit et al., 2017; Trapp & Lakner, 2018; Haß, 2021). Even though for crop selection, our empirical analysis could not confirm or reject this hypothesis; however, we observed in the qualitative interviews that farm size increases were occurring predominantly among cereal and dairy farmers. On the contrary, due to direct payments, vegetable and arboriculture farmers have not stated any plans to expand areas. Furthermore, one of the farmers, a vegetable producer, stated that he does not even apply for direct payments, as the compensation for greenhouse and open field cultivation is quite low compared to the production costs that farmers face.

Hence, this could produce other additional effects, such as slowing structural change, environmental concerns, increasing land rental rates, and agricultural land value. Considering that farm size is a major driver of structural change (Kirchweger & Kantelhardt, 2015), previous empirical evidence highlights that direct payments are slowing structural change in the agricultural sector (e.g., Bečvářová, 2007; Brady et al., 2017). In addition to environmental concerns, which will be discussed below (*Effects of DP on reducing the negative effects on the environment*), another concern that comes as a side-effect of direct payments` policy application is that direct payments in general (either coupled or decoupled) have contributed to increasing land prices – rents and land capitalization (value of land for purchasing). This support leakage is described above in the "*Effects of DP on farm income*. "

Effects of DP on reducing the negative effects on the environment

Lastly, environmental concerns, namely climate change and the impact of agriculture on the climate, have attracted considerable attention in the literature over recent years. Recent estimates show that agriculture and land use change is responsible for a quarter of global GHG

[80] An interesting insight regarding the DP thresholds came from one of the in-depth interviews with experts, where one expert stated that current policy thresholds in Kosovo are set based on the "air" and are not evidence-based.
[81] Agri-environment.

emissions (Laborde et al., 2021). This emission from agriculture comes mainly in three dimensions, livestock, land use, and deforestation.

The vast majority of governments recognize the impact of agriculture on the environment (Gautam et al., 2022), and often this recognition is translated into policy measures. Similarly, the government of Kosovo has made efforts aiming to address the environmental challenges associated with agricultural activity in its agriculture and rural development strategy (ARDP), where one of the overall strategic objectives[82] of this document aims to protect natural resources and the environment in rural areas, addressing the challenges of climate change by achieving sustainable and efficient land use and forestry management and by introducing agricultural production methods which preserve the environment (see MAFRD, 2014). Promoting resource efficiency and supporting the shift towards a low-carbon and climate-resilient economy in the agriculture, food, and forestry sectors constitutes one of the six priorities of this strategy. Furthermore, besides the objectives of increasing productivity, income, and farm size in the DP program, one of the program's specific objectives is to reduce the negative effect of agriculture on the environment.

We attempt to estimate these effects with respect to livestock activities, fertilizer and plant protection usage, and grassland shares. The first outcome we use for this objective is related to livestock. Considering that livestock[83] is the largest emitter of GHGs among agricultural subsectors, we use the outcome of livestock units (LU) – SE085 to estimate the effect of the DP program on the environment, particularly its effect on reducing the negative effects on the environment. Our results show that coupled payments might have increased the number of livestock units – in our case, by 0.64 LU on average for one-time receivers and 0.52 LU on average for two-time receivers compared to non-participants (see Table 6.4 below).[84] This is expected in Kosovo`s case, considering that these payments are coupled with the number of LU on the farm. However, it is worth noting that increasing livestock numbers can have several direct and indirect effects on the environment. Direct effects could be the increased GHG emissions from more livestock inventory. The indirect effects of increasing livestock numbers per UAA unit can increase environmental degradation associated with livestock, including ruminant GHG emissions, soil erosion, the spread of invasive species in grazing lands, and nutrient emissions from manure and urine patches (DeBoe, 2020). While the EU has set up cross-compliance measures and environmental standards concerning livestock activity, Kosovo

[82] The overall objectives of ARDP 2014-20 are based on the Europe 2020 strategy and its long-term strategic objectives of contributing to the sustainable management of natural resources and climate actions (MAFRD, 2014a).
[83] Livestock alone contributes with estimations ranging from 14% to 18% of all agricultural-related GHG emissions (see FAO, 2006; Gerber et al., 2013; Sejian et al., 2016; Rojas-Downing et al., 2017). In the EU alone, agricultural GHG emissions constitute 20% of the EU`s total GHG emissions, while livestock is responsible for more than two-thirds of agricultural emissions (Weiss & Leip, 2012; Pe'er et al., 2017).
[84] Similar results were obtained across additional matching algorithms; see Table A 22 in the Appendix.

lags behind these efforts. Furthermore, in Kosovo`s context, taking into account that no compliance requirements in regard to the environment are required, the negative effects can even be more prominent, particularly in emissions originating from manure. Lastly, although we find that the DP program contributes to increasing the farm size of livestock farms, it has conflicting objectives as it confronts the objective of reducing the negative environmental impact. On one side, it aims to increase farm size by incentivizing farmers with coupled payments to increase their LU, while on the other side, it has an objective under the same program, which aims to reduce the negative impact of the livestock sector on the environment.

Table 6.4: ATT estimates on the environmental outcomes

NN Mahalanobis Matching	DP17 (t-2)				DP1617 (t-1)			
	ATT (S.E.)	t-value	Treated	Control	ATT (S.E.)	t-value	Treated	Control
SE085	0.64*** (0.77)	2.65	53	336	0.52*** (0.74)	2.65	56	336
SE295	296.08** (143.06)	2.28	61	393	129.86* (110.17)	1.64	66	393
SE300	-1.16 (32.86)	1.38	61	393	8.06 (18.91)	0.44	66	393
shgrassland	-7.65*** (5.20)	-2.46	61	393	6.51 (5.52)	-0.42	66	393
N			69	457			73	457

Notes: Significance levels: *p < 0.1, **p < 0.05, ***p < 0.01;
DP17 refers to the treated (participant farmers) in the DP Program only in 2017 (one-time receivers);
DP1617 refers to the treated (participant farmers) in the DP Program in 2016 & 2017 (two-time receivers);
S.E. does not take into account that the propensity score is estimated;
Source: Own estimations based on FADN Data.

Correspondingly, we use these two outcomes, namely fertilizer usage (SE295) and crop protection (SE300), to assess whether coupled payments contribute to the usage amounts of chemical products. These outcomes which have been previously used in other studies (see, for example, Pufahl & Weiss, 2009; Arata & Sckokai, 2016; Uehleke et al., 2022) do not measure the amount of usage, but the purchased amount, as the FADN data on fertilizers and crop protection products, indicates only the farm expenditures, not the quantity applied (Arata, 2014). However, as Uehleke et al. (2019) note, most studies utilizing the FADN database refer to input intensity of fertilizer and plant protection on a cost basis as they implicitly represent environmental indicators, simply because less input per land unit would do less harm to the environment. In addition, when farmers purchase inputs, including chemical products (such as fertilizers), they will likely use that amount of purchased fertilizer during the same cultivation season as the purchased amount is directly linked to the applied amount.

Results revealed that coupled payments may have affected fertilizer expenditures by both groups (one-time and two-time receivers). The outcome of interest - ATT, estimated as a d-i-d estimator, equals €296.08 for one-time receivers, indicating that one-time receivers had, on average, spent €296 more on fertilizer expenditures compared to non-participants. In contrast, for two-time receivers, the estimated value was lower, €129.86 expenditures more on average on fertilizer than non-participants. This is expected, as the majority of farmers use fertilizers. Increases in fertilizer expenditures could also be attributed to increases in farm size – larger farm sizes. A larger farm operation requires higher input use and higher mechanization use. As farmers increase farm size due to the program, this inevitably increases expenditures for inputs, i.e., fuel and fertilizers. Increasing farm size alone is associated with negative effects on the environment. Ren et al. (2019) noted that farm size plays a critical role in agricultural sustainability, notably in the excessive use of mineral fertilizers. Consequently, since 2012, there has been an increase in N fertilizer use in the EU, contributing as well to the recent increase in GHG emissions (Pe'er et al., 2017). Using chemical products such as fertilizers and crop protection products is associated with negative environmental effects of agriculture (see Arata & Sckokai, 2016), and generally is known as non-environmentally or non-sustainable farming practice. For the other outcome - crop protection (SE300), there are no observable effects for both groups. This could be due to the nature of coupled payments and from the experience of farmers with this type of support. As OECD (2011) notes, when farmers know that the payment levels are independently distributed from their production level, namely their production quantity and quality, they generally have less incentive to be cost-efficient and keep technologies up to date. Besides this, crop protection products are primarily used in cases of disease appearances at crops (in the field) and depending on the level of activity (intensity of production).

Lastly, we turn to the effects of DP participation on the change in the share of grassland. Similar to Arata and Sckokai (2016) and Pufahl and Weiss (2009), to estimate this effect, we use the outcome of grassland share, a percentage ratio from the total UAA of the farm. In other words, we use the outcome of grassland share to see whether coupled payments (DP program) had any effect on decreasing or increasing its share. We find that one-time receivers have reduced the share of grassland in their land use amount (area), possibly indicating that coupled payments may have reduced the grassland share for one-time receivers by 7.65 percent on average compared to non-participants of the DP program. Nevertheless, similar to livestock units and fertilizer expenditures, we can reject the null hypothesis of no effect on reducing grassland areas for one-time receivers.

The reduction in grassland is likely due to the increase in farm size. As shown above, coupled payments may have encouraged participant farmers to use larger areas for agricultural activities.

Subsequently, coupled payments incentivize farmers to convert grassland to arable land. Considering the small-scale farm operation and limited farmland areas in the village and neighboring sites in Kosovo, increasing farm size seems to have been associated even with converting grassland or other types of land (such as forests) into arable land. This could also be explained by the fact that Kosovo's farmers favor easier accessible land, which is close by, either in their possession or has clear property rights. One of the qualitative interviews stated that grassland is often converted into arable land, as there is no available land to be cultivated. Many owners prefer to leave the land fallow rather than leasing it to their neighbors. Similarly, Pe'er et al. (2017) note that farmers usually tend to focus more on fertile and readily accessible land, leading to the abandonment of marginal areas. Also, other authors have provided evidence of coupled payments in reducing grassland areas in a similar context as Kosovo (see, for example, the case in Bulgaria: Dobrev et al., 2014; Trapp & Lakner, 2018). Interestingly for two-time receivers, this effect was not observed. Similar to crop protection outcome, longer history of support could also be the most reliable explanation for this particular result.

Summary of IE Results

Overall, with our results, we can reject the null hypothesis of no effect of the DP program on increasing farm size; however, in terms of productivity and farm income, we cannot reject the hypothesis of no effect on improving productivity and increasing income. We observed that participant farmers – both groups (one and two-time receivers) increased farm size, while no differences were observed in outcomes that indicate certain aspects of productivity and income. However, this program seems to have considerable effects on the environment. In this regard, it likely influences some land use decisions, incentivizing farmers to convert grassland into arable land and increasing the number of livestock units and chemical product usage. In our results, we observed that participant farmers (both groups) increased the number of LU and purchased more fertilizers than non-participants. Further, one-time receivers reduced their grassland shares in the total UAA compared to non-participants.

Results on productivity and income were expected considering the drawbacks largely associated with the coupled direct payments, starting from the non-compliance requirements, support to non-competitive farmers, and support leakages (land capitalization and leakages to other actors). Moreover, results on some-related outcomes may follow the same pattern, as they could be closely related to the results of the other outcomes. For example, the estimated results on income could also be linked to the estimated results on production. As these payments do not contribute to increasing productivity, farmers can sell more or less, or smallholders could sell a part left outside of their household consumption; consequently, this does not translate to additional income. As Ciliberti and Frascarelli (2019) note, those results could be attributed to the fact that this type of support mainly aimed to subsidize specific products, causing a similar

impact on farm income. These reasons are hampering the potential positive effects of coupled direct payments. In our case, some of these drawbacks were confirmed in our qualitative interviews and during field observations. Apart from the explanations mentioned above, Ciliberti and Frascarelli (2019) argue that other causes of these results could be that coupled payments have subsidized low-quality production for a long time and, in general, have not represented an incentive to improve competitiveness (Latruffe & Mouël, 2009; Zhu & Lansink, 2010).

Lastly, as several studies show that a significant part of the coupled payments leaks away to other actors, this vastly diminishes the potential benefits that farmers can have from these payments; nevertheless, this could also have positive effects as these leakages might have an impact on the incomes of these other actors in the agricultural sector such as landowners, input suppliers, consultancy services, consumers and others (Ciliberti & Frascarelli, 2019). For farm size, farmers tend to increase their areas and the number of livestock to increase the amount they receive as payments. It looks like farmers are concentrated on expanding areas rather than improving productivity. Furthermore, this could have large negative effects on the environment, predominantly from conventional practices in field production and GHG emissions from the livestock subsectors.

To sum up, to what extent governments can influence farm productivity and how governments can influence farm competitiveness developments are not new questions. However, coupled payments as a policy instrument remain a non-efficient instrument to address issues of productivity and income and are associated with adverse effects on the environment. Besides the effects discussed above, there is evidence that coupled payments linked to an area requiring the planting of specific crops are, however, less efficient and more trade-distorting than payments made irrespective of the use to which the land is put (Dewbre et al., 2001; Ciliberti & Frascarelli, 2019). Ultimately, whether agricultural support benefits farmers closely depends on whether farmers own the resources they use in production (Latruffe & Mouël, 2009). When farmers do not own resources, particularly land, these payments may benefit owners and not the primary intended beneficiaries of the policy - farmers using these resources (Ciliberti & Frascarelli, 2019).

6.3 Critical reflection on the IE results

The combination of quantitative and qualitative approaches employed in this study resulted to be beneficial in explaining the effects of the coupled direct payments. Furthermore, combining two research methods in the quantitative approach alone was helpful in eliminating potential biases, mainly related to the counterfactual and selection bias. Nevertheless, our findings are also associated with several limitations, mainly related to the available data.

First, our outcome selection was limited and largely dependent on available data. As Uehleke et al. (2019) note, using the FADN database limits the choice of outcome measures. In particular, data availability prevented the inclusion of additional outcomes. Second, our impact assessment evaluates a policy instrument which is also an income-support instrument. Besides support leakages, income calculation often poorly reflects the income situations of farm households, failing to reflect the actual farm income and the income from other sources (Buckwell et al., 2017; Finger & Benni, 2021). Current measures of farm income are predominantly concentrated on average farm income from farm activity, which might not be sufficient to reflect the well-being of farms (de Mey et al., 2016; Finger & Benni, 2021). Moreover, since farms are increasingly characterized by multiple income sources (Finger & Benni, 2021), farm income estimates often fail to account for other household income sources (Buckwell et al., 2017). Buckwell et al. (2017) highlight that income calculations currently poorly reflect the overall income of farm families and households, including non-farm incomes; hence, essential aspects of income diversification should be considered, mainly when farm support policies are investigated. Similarly, in our case, one of the major drawbacks of FADN is that it most likely does not offer a realistic income measure, as non-farm income sources are not covered, constituting another limitation. Considering that farm income might not be a reliable outcome to measure the effect of direct payments on farm income, measures such as disposable income could be better estimates for this type of assessment (see Finger & Benni, 2021). Third, FADN does not collect information on potential environmental indicators such as input use or agricultural practices such as soil conservation. In this study, similar to Uehleke et al. (2019) and Arata and Sckokai (2016), we have used expenditures in fertilizers and crop protection instead of the amount used. This could represent another limitation, as the usage amount used was not covered in the FADN (see Uehleke et al., 2019, for a longer brief on this issue). Fourth, regarding direct payment support, FADN does not differentiate between DP measures, as is the case with AES measures (see Arata & Sckokai, 2016; Uehleke et al., 2019). Accordingly, similar to other studies that have utilized FADN in impact assessment, we use the support amount in euros as a whole (total), as there is no information from which measures total support comes. As Uehleke et al. (2019) highlight, having data on each DP measure would be helpful to analyze the impact of each measure and compare their efficacy to understand single DP measures better. Lastly, a major issue in direct payments is farmers' utilization of these payments. In other words, what farmers do with those payments remains an open question. Therefore, having data on the usage of payments would be very beneficial, particularly in estimating the long-term effects of this policy. Similarly, having data on land ownership would be beneficial to investigate the support leakages. Further, FADN is organized across a restricted sample, which tends to over-represent large and commercial farmers. At the same time, part-time and smallholders are largely excluded. Besides, no information is provided as to what

extent FADN is random and how the data are collected. Furthermore, in the case of Kosovo, there were many observations with missing data (not complete observations). Consequently, we ended up with relatively small sample sizes of treated and control groups. For example, we tried to estimate the effects of coupled payments on yield; however, we ended with low numbers of treated farmers - 29 for one-time receivers and 36 for two-time receivers. This could be another limitation, causing potential biases in the estimation, particularly on the estimated results and their significance, even though they largely correspond to the findings of previous studies looking at the effects of coupled payments. Nevertheless, a longer panel would have been desirable.

Lastly, given the available FADN data for Kosovo, we could not assess all the objectives listed in the policy document. Therefore, considering the abovementioned limitations, we would not wish to over-emphasize the policy significance of our empirical findings, given the limitations of FADN data listed above. Moreover, as we do have only individual data, which are most likely not representative of the sector, we do not tend to generalize our findings at the sector level. Even though we do not assume to transfer these results to the whole population, having a larger sample would have been advantageous. Nevertheless, to address these limitations, we tried to estimate the effects using various outcomes per each DP program objective that could have been evaluated, given the available data. From a policy perspective, similar to Uehleke et al. (2022), estimating the average effect across all DP measures on the outcomes of interest is still a meaningful measure/ indicator for the evaluated policy. In addition, as a second approach, we include qualitative evidence to explain our results and get a more comprehensive view of these results.

In the end, data quality remains a concern, particularly across developing countries. Similarly, in Kosovo, we did not have access to another data set to cross-evaluate the data quality of the FADN. In our particular case, we spent much time cleaning the retrieved data, particularly cases that were unrealistic, such as extremely high yields, exceptionally high incomes from agricultural activity, and other outlier cases. With a higher-quality dataset, we could answer more questions better, retrieve more accurate estimates, and generally answer research questions more thoroughly.

7 CONCLUSIONS and POLICY IMPLICATIONS

This chapter summarizes the main findings of the three studies, emphasizing the importance of these findings and their contribution to the literature. The main findings are described separately in the three sub-chapters below. The contribution of this research work, policy implications, and final remarks, including key limitations and ideas for further research, follow this. Some main study limitations are translated into policy recommendations and ideas for future research.

7.1 Farmers` preferences for extension services

Extension services worldwide are being examined critically for their relevance more than ever before in the face of global economic, political, and technological developments. Ineffectiveness and lack of sustainability have constituted the main criticism, primarily attributed to not being demand driven. The minimal farmer involvement in selecting extension methods probably explains the poor performance of most extension methods (Mwololo et al., 2019). Even though a number of extension methods and models have been applied so far, to date, there has not been any study examining farmers` preferences for this service. The vast majority of studies have been concentrated on the supply side. Therefore, this study addresses this gap in the literature from the demand side by studying farmers' preferences for certain service elements offered by extension services in an experimental setting through a DCE.

Our analysis revealed that farmers prefer extension services with more direct visits to the farm, specialized expertise, farm demonstrations, and extension services using ICT. However, farm visits and avoiding cuts in direct payments were the main drivers of choices. In addition, we shed light on the heterogeneity of extension preferences across some groups of farmers, including their WTP.

Overall, *three lessons can be learned from this work*. *First*, the stated preferences constitute an extension system that is 180 degrees different compared to the current one, considering that the current extension service is characterized by shortages in staff members, distracted public extension agents with a limited presence in field visits, a service-oriented predominately into mass training with the majority of agents being general agronomists. These findings reveal again the well-known need to restructure the current system. In a possible restructuring process in the future, special considerations should be given to farm visits and direct payments. Further, extension services are costly, and developing countries' governments are often short of public finance; therefore, we investigated, in addition to an extension fee, whether farmers would accept reductions in direct payments as a trade-off to receive an improved extension service. Results suggest that choices that involved a reduction of current direct payments were less often selected, indicating that farmers tend to stick to direct payments, especially if they have

received them already in the past. However, two groups of farmers – full-time farmers (majority constitute receivers of DP) and smallholders (majority constitute non-receivers) showed interest in cutting or eliminating DP.

Second, the current system has been recognized as a homogenous approach without recognizing the diversity and heterogeneity of needs and conditions across many different groups of farmers. Therefore, this study sheds light on the role of socioeconomic characteristics on farmers` preferences, which extension features are important, and for which groups. It looks like the minority of farmers who use advisory services are more educated, spend more time on farming activities, have larger farms, are more market-oriented, and are beneficiaries of the direct payments program. Smallholders and non-commercial farmers tend to be more excluded or not seeking service from extension services. Their strong preference towards ICT extension is expected, as they have experienced difficulties in accessing advisory services from extension agents and see this as an opportunity for easier access. Further, farmers previously utilizing public extension services were more interested in specialized expertise. Their preference towards specialized expertise signals a significant insight into farmers` understanding of the importance of specialized expertise. This study's results align with the findings by Kahan (2013b), which noted that in public sector extension services, there is often a considerable variation in the academic qualifications of extension workers and subject matter specialists, leading to gaps in competencies and skills. Subsequently, this has constituted one of the critical bottlenecks that have hindered the effectiveness of extension services.

7.2 Farmers` WTP for extension services

From the *second* study, the WTP estimations have shown that farmers are willing to pay for a restructured extension service, particularly willing to share the cost of extension services to have more farm visits in their farms by extension agents with specialized expertise and have the opportunity to utilize ICT for their information needs. Like the other two analyses (main model and heterogeneity in mean models), farmers put more weight on farm visits and DP in terms of WTP. In particular, farm visits are valued higher compared to other features of the extension. Farmers` estimated WTP for two farm visits is €188 (as an annual fee), which is about three and a half times higher than the value they put for specialized expertise, 1.9 times higher than the offer for farm demonstrations, and two times higher than ICT. The WTP for DP elimination was estimated at €258, which constitutes a value about five times higher than the value they attach to specialized expertise, and 2.1 times over one farm visit. However, farmers are willing to pay a premium for two farm visits which is 1.4 times higher than the value they attach to DP reduction, highlighting a vital result indicating that farmers would be willing to reduce DP as a tradeoff with two annual farm visits by extension agents. Farmers see farm visits

as a valuable tool to address their needs, and their willingness to share their costs indicates that regular visits in a restructured system could be a successful approach. Correspondingly, farmers attach higher values than specialized expertise for the ICT extension platform, resulting in an average WTP of €95. The preference of farmers towards technology, specifically towards extension services with ICT services included in the package, reveals an important insight, considering that typically the number of clients who need to be covered by extension services is large, and the cost of reaching them is high.

To sum up, the first two studies have highlighted key attributes of what a restructured extension service should contain, particularly what features are important and for which groups, for which groups a potential reallocation of DP could be feasible, and to what extent farmers would be willing to pay for the service. This evidence can be used to design specific extension models for specific farmers as more specific-targeted and relevant policies based on preferences could result in higher uptakes and successful implementation.

7.3 Effects of coupled direct payments on productivity, income, farm size and environment

We employ a mixed-method approach - a matching and difference-in-differences in combination with qualitative work to estimate the causal effects of coupled direct payments on farm productivity, income, farm size, and their effects on the environment. To our knowledge, this is the first application of this approach to coupled payments evaluation. This approach was applied to the FADN 2015-17 dataset from Kosovo, where similar to the other six Western Balkan countries, coupled direct payments constitute the main policy instrument. Even though millions are distributed annually as coupled payments, there is no empirical evidence of the effects of these payments. Overall, this region is widely under-researched. Therefore, we have used the case of Kosovo to address this gap and contribute to the empirical evidence on the policy assessment of coupled direct payments. We contribute to the literature in three directions.

First, from our quantitative empirical results, it has not been possible to reject the null hypothesis of no effect on improving productivity and increasing farm incomes. This does not differ whether farmers have been supported once or twice in a row with coupled payments through the DP program. Possible channels of influence could be the non-compliance requirements, leakages of support, and generally substantial support going towards non-competitive farm operations. Some of these arguments were well explained through qualitative insights, which helped us better understand this impact assessment's retrieved results. Furthermore, considering that from our results, it is unlikely to find a significant effect on productivity, this could easily translate to the same result on farm income as chain effects,

where results follow the same pattern of effects as these outcomes (productivity and farm income) are closely linked.

However, a *second* important finding is that we observed positive effects on farm size. Our findings reveal empirical evidence that participating farms in the DP program have increased the land used for agricultural activities and the number of livestock units in their farms. These same effects were observed for both groups – one-time and two-time receivers. It looks like the program is achieving its objective of increasing farm size in terms of land used for agricultural production and the number of livestock. We could also assume a causal relationship due to the choice of method. However, qualitative interviews revealed that expansion mainly occurs among cereal and dairy farmers. For example, this does not happen for vegetable farmers due to higher production costs and lower compensation from coupled payments.

Third, the DP program seems to have substantial negative effects on the environment. This comes mainly through production-linked incentives (i.e., coupled payment measures), which influence farmers to convert grassland areas to arable land, increase the amount of LU, and generally purchase more fertilizers and plant protection products. We find that DP program participants (either one- or two-time receivers) have increased their usage of chemical products, namely fertilizers. At the same time, farmers that have been supported only once have increased the usage of chemical products as plant protection products. The same group has reduced the share of grassland area in the total utilized agricultural areas. As previous empirical evidence notes, this is done mainly with the intention of converting grassland to arable land. Lastly, with livestock being the largest emitter of GHGs among the agricultural sub-sectors, we also find that coupled payments have contributed to an increase in the LU for both groups (one- and two-time receivers). These findings are aligned with previous empirical evidence showing that coupled direct payments, i.e., production-linked incentives have a generally negative effect on the environment.

To sum up, this study shed light on the effects of coupled direct payments on farm productivity, income, farm size, and related environmental effects. These payments seem to have no effects on improving productivity and increasing farm income; however, they contribute to increasing farm sizes and are associated with negative environmental effects. This evidence can be used for the future formulation of direct payment policies, not just in Kosovo but overall in the Western Balkan region.

7.4 Contribution of the research work

Our research contributes three aspects to the recent literature on direct payments and extension services. First, throughout the world, extension services face the challenge of establishing a well-managed, effective, and accountable system that meets the needs of farmers engaged in

diverse and complex farming systems (Birner & Anderson, 2007). However, the vast majority of research on extension services has been concentrated on the supply side. Therefore, this study addresses this gap in the literature by studying preferences from the demand side, representing the first attempt of this kind globally. Insights from this analysis could be necessary for the future formulation of these services, especially for the institutional arrangement of extension services, budget allocation, and involvement of the private sector in extension services. Second, unlike previous studies, this DCE employs a mixed-method approach. Including qualitative work as an additional approach to explaining quantitative results constitutes a rare case in the extension services literature. Furthermore, to date and the best of our knowledge, this work constitutes the first attempt that utilizes a mixed-method approach to examining farmers` preferences for learning and extension services. Third, the study applies a state-of-the-art econometric approach, utilizing farm-level panel data from a developing country to study the effects of coupled direct payments in a highly subsidized, under-researched region, with aspirations to become full members of the EU in the near future. To the best of our knowledge, this represents the first attempt utilizing panel data with this approach to evaluating coupled direct payments in this region and beyond. Another significant contribution of this quantitative analysis is the inclusion of two different groups of direct payment receivers - one and two-time receivers. In other words, we estimate the effects of these payments on farmers who have been supported once (only in one year) and those who have been supported twice (two years in a row).

Overall, our empirical findings contribute to closing empirical gaps in research by estimating farmers' preferences for extension preferences and evaluating the effects of coupled direct payments in a developing country. Similarities that extension services and coupled direct payments share worldwide make these findings apply to many countries across the globe.

7.5 Policy Implications

This work comprised three studies: 1) investigating farmers` preferences for extension services, 2) estimating farmers` WTP for extension services, and 3) evaluating the effects of coupled direct payments. Considering the main findings from this work, several policy implications in terms of agricultural policy are drawn. These policy implications aim to improve the service of extension and reorganization of coupled direct payments.

The first study highlighted the immediate need to restructure the current extension system, focusing on some extension elements that farmers preferred. Besides their importance in closing a critical empirical gap, these stated preferences have several policy implications. Since extension services face common global challenges, some implications have broader relevance. These findings are particularly important in cases where governments relying on public

extension services make efforts to reorganize this system. Furthermore, farmers are different; subsequently, they have heterogeneous information needs. In this particular study context, considering that large farms are different, these findings are specifically relevant for agricultural sectors with small farms, as most do not have the means to hire their own experts. A potential restructuring and reorganization of the public extension system, in particular, should consider farmers' preferences in the first place, especially how farmers want their needs to be addressed. Therefore, first, farm visits were the most preferred extension delivery method in our experimental setting. Farm visits are not common, particularly in public extension services, which are predominantly oriented towards a training approach. Our results revealed a strong preference for farm visits by farmers as a suitable approach to learning in practice. Thus, policymakers should consider farm visits as one of the core elements of future extension systems (services). Increasing the presence of extension agents in the field is a challenge, considering that the current service is characterized by shortages in staff members and limited presence in field visits. However, a farm visit delivery approach could be organized across an in-demand system, where in other words, farm visits occur when farmers demand them. In addition, policymakers should consider sub-contracting a part of the public extension service to private entities, such as private specialized experts (private extension agents), input dealers, consulting companies, and NGOs. Along the same line, Anderson and Crowder (2000) claim that contracting in a public-private coalition approach, in contrast to a purely public-sector extension approach, may help to achieve extension services and make them demand-led. Particular emphasis should be given to private experts, which could join the system based on the need. In this way, the system could establish a pool of specialized experts tackling the specific needs of farmers for advisory. This could also solve the long-stated issue of staff shortages, which has characterized current public extension services in many countries, not solely the country of study - Kosovo.

Second, the educational background of extension agents is a major challenge, as their capacities remain inadequate to address the rapidly changing demands for extension services (Babu & Joshi, 2019). Although several extension models have been tested so far, its personnel constitute one of the weakest and most critical resources. As Kahan (2013b) notes, in public sector extension services, there is often a considerable variation in the academic qualifications of extension workers and subject matter specialists, leading to gaps in competencies and skills. Subsequently, this has constituted a critical bottleneck that has hindered the effectiveness of extension services in developing countries. This study showed a strong preference of farmers towards specialized expertise, signaling that farmers understand the importance of specialized expertise. In particular, farmers previously utilizing public extension services were more interested in specialized expertise, and furthermore seem to be willing to pay more for

specialized expertise. Hence, specialized expertise is another core element after farm visits, which policymakers must consider when developing extension services policies. Besides staff shortages, a more prominent challenge is the expertise of current extension agents, with the majority being general agronomists, as in the case of Kosovo. With most current extension agents being either nonspecialized or general agronomists, farmers worldwide have struggled to find solutions for specific problems. Even more, some of the emerging challenges require prepared capacities that suit the needs of farmers, particularly in building resilience to cope with climate change and other associated challenges in agricultural production (Babu & Joshi, 2019). Establishing a demand-driven system with a pool of specialized experts, besides solving the staff shortages issue, could offer farmers an opportunity to spot and diagnose problems by experts, offer solutions to their complex situations, and generally be advised on more efficient use of resources (see Anderson & Feder, 2003). Further, as Lindner (1993) notes, the effect of extension advice is likely to be higher under an approach where the farmer can determine what kind of information is essential to them. Nevertheless, policymakers should consider competitive compensation for this pool of specialized experts. Competitive agriculture requires competitive information. Furthermore, based on our field observations and in-depth interviews with experts, private experts are largely in demand, and their inclusion in the public extension system with a permanent position could not be attractive from their side. Therefore, utilizing them in a demand-based system could benefit both sides.

Additionally, as the public extension service alone cannot expand the coverage and meet the changing demands of consumers and industries (Babu & Joshi, 2019), utilizing ICT could be a more sound option to enhance the extension's reach and effectiveness. Typically, the number of farmers who need to be covered by extension services is large, followed by a high cost of reaching them (Anderson & Feder, 2004). The ratio of farmers-to-extension agents is high – estimated at one agent for every 2000 to 3000 farmers (McNamara et al., 2014). Similarly, in Kosovo in 2014, on average, a public extension agent had to cover 3,168 farmers. Consequently, the vast majority of extension services fail to reach many farmers, predominantly smallholders and non-market-oriented farmers. In this regard, ICT offers a real and low-cost possibility to overcome these issues. Our study showed preferences highlighting the need to include ICT in future extension services. The farmers' positive attitude and willingness to pay for ICT in extension service gives important insights into the future sustainability of these systems. Therefore, policymakers should consider investments in ICT. These investments offer an opportunity for different groups of farmers, particularly smallholders, to have access to these services. Investments could include mobile phones, tablets, laptops, video-recording equipment, e-extension phone applications, websites, radio, and TV channels. Offering several options makes it easier for farmers to select their most appropriate channel. Furthermore,

including ICT in extension services constitutes one of the first major steps toward a demand-driven extension service. Lastly, technology has been facing rapid development over the last few years. Like other fields, extension services face new technologies such as Blockchain, machine learning, and artificial intelligence (AI). Mainly driven by the private sector, some companies utilizing these technologies have already started including demand-driven extension services for farmers as part of their platforms. Soon, when mass adoption of these technologies is expected, extension services will have to face these trends and adapt as fast as they can. Considering that these technologies are expensive, it is unlikely that public extension services will be able to catch up with these trends independently. Therefore, public-private partnerships should be considered to offer farmers a qualitative, updated, and efficient service. On the other side, even though ICT extension models are known for being efficient and for their ability to deliver customized and new information to farmers (Bhavnani et al., 2008; Mittal & Tripathi, 2009), these models need up-front investments, even if users pay a small fee later. However, the policy could generally improve general welfare by reallocating money from direct payments to support ICT-based extension development.

Further, another important finding of our first study is that farmers are willing to share the cost of extension services; notably, they showed a willingness to pay for extension services with more farm visits in their farms and to utilize ICT for their information needs. Considering that extension services are costly, these results could serve as an excellent basis to initiate the development of a fee-based extension service, which constitutes a much more sustainable policy option. In addition, also from qualitative interviews, it was revealed that farmers are willing to pay for extension; however, some of the farmers and experts expressed that the first year of a fee-based extension service could be better if entirely covered by the government as it can serve as a testing phase and farmers have a chance to understand the value of the extension. If not entirely, a co-financing system between the Ministry of Agriculture and farmers could work, particularly in the beginning. Nevertheless, the WTP of farmers towards extension is a clear indication that a possible restructuring with a cost-sharing extension system is possible in the future. The idea of paying for extension is advocated to sustain the service's provision and increase its quality and frequency of contacts (Ozor et al., 2013). Therefore, farmers' participation is seen as necessary for a sustainable implementation of this or a similar policy in the future. In the particular case of Kosovo, we also looked at whether farmers were willing to trade DP with an improved extension service. Results indicated that farmers tend to stick to direct payments, especially if they have received them in the past. However, this was not the case for two groups of farmers. In other words, as the demand for public goods such as direct payments is much stronger from farmers – as opposed to services such as extension, full-time farmers and smallholders are willing to trade DP with an extension service that matches

their needs. As current policies (DP measures) aim to support mainly the first group - full-time farmers, this is a strong argument for policymakers in Kosovo on shifting money towards extension. However, this restructuring should carefully consider the DP re-allocation, possibly by gradually reducing their amount. These budget shifts could be allocated to ICT and the inclusion of better-trained staff that spends more time on field visits, as these two features are seen as the most realistic steps in the current state. Last but not least, the re-organization of extension services should recognize the diversity and heterogeneity of needs across farmers. As Janvry et al. (2016) suggest, that extension services need to be organized across a demand-driven service that should recognize the diversity and heterogeneity of conditions and needs across farmers. However, for a sustainable cost-sharing extension system, besides extension features, the social and local context considerations are crucially important to be considered.

Analyzing and understanding farmers` preferences before a policy-led restructuring elicits important insights. This study has made evident the importance of preferences for restructuring and building effective and sustainable extension services. These findings are particularly noteworthy for future policymakers aiming to restructure and design a more efficient and organized extension service. Most importantly, this work provides recommendations for policymakers on where to allocate their investments to improve the efficiency of extension services. Future extension services should be organized and developed based on farmers` preferences, which ultimately could lead to improved accountability and efficiency.

Besides extension services, and trading possibilities of direct payments, the third study aimed to evaluate the effects of coupled direct payments in Kosovo, one of the countries in the Western Balkans, a region where coupled direct payments constitute the main policy instrument. In 2017, these countries spent more than €537million[85] in coupled payments. However, even though millions have been spent, these policy programs are characterized by weak and or no monitoring and a lack of scientific evaluation. The lack of an evidence-based policy which has characterized the WBs has made it challenging to identify policy needs, design policy measures, identify relevant policy targets and assess the efficiency and impacts of the policy measures implemented, namely if they have achieved the objectives set (Martinovska Stojcheska et al., 2021). Therefore, this study tries to close this empirical gap, and in general, our findings have important policy implications for Kosovo, the whole WB region, and other countries applying coupled direct payments.

First, this study has shown that applying coupled direct payments in Kosovo most likely did not improve productivity and increase farm incomes. There is clear evidence in the literature that these payments affect productivity negatively, mainly through incentivizing extensive

[85] Value estimated from the report by Volk et al. (2019).

production, dictating production decisions, and keeping less competitive farmers in the market, with most of the benefit being absorbed by large farmers and landowners. Further, they distort production and markets and concentrate on a few commodities. *Second*, similar to productivity, no positive effects were found on increasing farm income from applying coupled payments. Even though income is considered a centerpiece of many direct payment programs, coupled direct payments, also in our analysis context, seem to have mostly failed to deliver the objectives related to improving or increasing farm incomes. Overall, it was not possible to establish evidence of these payments affecting incomes positively. Lastly, there is evidence indicating that these payments may negatively affect the environment, mainly through reallocating grasslands to arable land and increasing the number of animals in the livestock sector. Similarly, in the case of Kosovo, the non-compliance type of support, support leakages, and support towards non-competitive farm operations and support schemes massively excluding smallholders seem to diminish the potential effects of coupled direct payments to achieve its objectives.

To improve the current situation, policymakers in Kosovo should consider re-orienting public support towards investments in public goods as the first and most suitable option. These types of support measures could include budget allocations supporting efforts on agricultural education, innovation, and information dissemination such as extension services, agricultural schools, and investments in research and development of new technologies, infrastructure-related projects (such as irrigation, roads, energy production, machinery, land reform efforts, and information systems), and efforts to improve data collection and monitoring of the agricultural sector.

The second most suitable option could incorporate decoupling direct payments, linking payments to environmental benefits (compliance requirements), the concentration of support to investment support, and linking measures to improvements in quality. For example, decoupling direct payments implies de-linking current support payments with particular crops and livestock. One of the main critiques of coupled direct payments is that farmers can directly affect payout levels. Moreover, in many cases, they cover the losses from farming and create a dependency. This direct payment discriminates against other crops and products, which may be more profitable (Kastner International, 2012). Therefore, offering support payments independently of production may incentivize farmers to concentrate their production decisions on the market, improving their productivity, quality, and overall competitiveness. Likewise, (Bečvářová, 2007) notes that offering decoupled payments makes it possible to choose the best structure of farm activities and offers farmers a chance to decide about competitiveness and production prosperity in longer time horizons. Next, policymakers must consider including compliance requirements, particularly concerning the environment.

Similar to what Gautam et al. (2022) note, even though the Kosovo government seems to recognize agriculture's impact on the environment, its policy incentives, particularly production-linked support to farmers, involve production processes and products that generate substantial GHG emissions. Our results suggest that current support measures harm the environment. Therefore, as coupled payments may considerably harm the environment by driving environmentally damaging and unfriendly production practices, assigning compliance requirements such as environmental-friendly production practices could constitute the first steps towards reducing the negative impact of agriculture on the environment. Furthermore, the introduction of similar environmental schemes like AES in the EU is further recommended, as besides positive effects on the environment, it is a step further towards policy alignment with the EU's CAP.

Further, we observed some positive results in increasing farm size from the coupled payments. Even though, at first sight, this might look like a positive development; however, further work is needed to investigate the potential effects of this change. Firstly, farm size increases might also be associated with substantial environmental effects. Secondly, particularly in the case of Kosovo, land fragmentation remains a considerable issue, with farms cultivating their land on an average of seven plots (Miftari et al., 2014; Herzfeld et al., 2022). Thirdly, larger farms do not necessarily mean more competitive. Therefore, this further investigation needs to evaluate this development in more detail, with particular emphasis on who are these farmers that have expanded (which sub-sector they belong to, level of commercialization, production system, whether they are existing farmers or new entrants), and what are the main drivers of this expansion, besides direct payments.

To sum up, whether agricultural support benefits farmers closely depends on whether farmers own the resources they use in production (Latruffe & Mouël, 2009). Therefore, governments must ensure who is their target in the policy and who ends up receiving the benefits. Subsequently, the government of Kosovo should revise the current DP program to bring the desired benefits. Besides, as the long-term political goal of the WBs is to join the EU, in principle, the CAP represents the benchmark that their agricultural policies must meet upon their accession (Martinovska Stojcheska et al., 2021). Therefore, these countries must align their direct payments policy to the EU's CAP, where payments have been reorganized to decoupled form since 2003.

Another critical policy implication that needs to be highlighted is the lack of data at the country level, particularly representative and higher-quality data that can be utilized for impact assessment studies. In all the WBs, there is still a requirement for more robust management and control systems, as the existing systems lack data quality and relevance owing to insufficient resources to maintain them (Martinovska Stojcheska et al., 2021). For example, in the case of

this impact assessment for Kosovo, we could not evaluate all the objectives listed in the DP program, given the available FADN data and its limitations. In particular, variables that cover farm income, agricultural practices, competitiveness, and environment are only covered to a limited extent by the FADN. Nevertheless, still, our study constitutes an example of how data could be used, demonstrating the good usefulness of data, but similar analysis requires continuous support with high-quality data. This should motivate policymakers, particularly governments, to increase their efforts in data collection and, above all, to increase the quality of data that is being collected. Data quality is even more important than just data availability. Governments need precise and timely data to implement better policies for well-being and sustainable development. More data with higher quality is the main driver to promote informed policymaking. Therefore, policymakers must advocate for increased investment in national statistical offices and other stakeholders involved in data-gathering.

In the particular case of Kosovo, the government must coordinate with other relevant stakeholders, such as the Agency of Statistics, to increase and reorganize capacities for FADN data collection. Further, policymakers must coordinate and increase efforts to integrate the agricultural data into one dataset, ensuring higher quality and availability to carry out research on essential topics associated with agriculture and rural development. Lastly, linking payments (support measures) to measurable outputs is necessary to measure policy objectives. In general, efforts to improve data availability, and quality are critical, as they should accurately represent the actual situation of the agricultural sector in Kosovo and other WB countries. Some of these efforts could include utilizing administrative data and combining it with other data sources such as public surveys, utilizing technologies such as Big Data technologies, including ICT in data collection, and using machine learning and AI to detect errors and patterns. Employing these elements in future agricultural datasets could strongly support these efforts in improving agricultural data availability and, most importantly, reliability.

From a broader perspective, FADN alone, as noted by previous authors, needs to be expanded to cover additional indicators, especially tapping on environmental and social dimensions (Uthes et al., 2020; Finger & Benni, 2021). Reflecting the importance of the environment, FADN needs to cover additional indicators, such as fertilizer and plant protection products usage, irrigation usage, energy sources and their use, tillage practices, manure storage, soil covers, organic farming, and areas under these different production practices. For the latter, having data on the disposable incomes of farmers addresses some of the limitations listed above and might reflect much better the well-being of farmers. In terms of policy support, FADN does not distinguish between DP measures. The distinction of support between measures is also necessary to evaluate the individual effects of each support measure. Aligning FADN with public support databases could be a valuable step toward this goal. Lastly, the usage of

payments remains unknown as the lack of data on the usage of direct payments constitutes another limitation that could bring important insights. Utilization of this income support may differ significantly across farm size, as, for example, some direct payments may support small farmers with operating costs; for large farmers, this might support their efforts to adopt more advanced certain practices or technologies. Furthermore, qualitative interviews revealed that farmers are unaware of when they will receive this money, significantly hindering further farm activity planning.

7.6 Implications for further research

Overall, the quantitative and qualitative findings of this work contribute to closing empirical gaps in research by firstly, investigating farmers' preferences for extension preferences in a developing country and, secondly, an impact assessment study that evaluates the effects of coupled direct payments, a well-known policy instrument, particularly across developing countries. Similarities that extension services share worldwide make these findings applicable to most parts of the world. Similarly, these findings have broader relevance for the impact assessment on direct payments, particularly in the WB countries where this policy instrument is dominant.

The sub-chapter above has listed several critical policy implications deriving from the three studies: extension service preferences, willingness to pay, and impact assessment. We have tried translating the main findings into concrete policy implications, which should serve policymakers as defining policy paths to move forward. Apparently, this research could not cover all the aspects of extension service and direct payments policy. For the first two studies, further research is advised on factors determining farmers` participation in fee-based extension services and further investigating farmers` preferences for even more specific extension delivery approaches. Similarly, further work is suggested on studying extension preferences in real-world examples, particularly with ICT applications which could elicit important insights for policymakers.

Concerning impact assessment, research with a larger sample covering all the WB countries would have been more comprehensive. Integrating a more extended panel with additional measurements could produce a more precise picture of the causal effects of coupled direct payments. Additionally, it offers an opportunity to assess the longer-term impact of these payments. Subsequently, to gain a better understanding of these payments, there is abundant room for further research in a couple of directions. First, further research based on the disposable income of farmers is needed, and research focusing on what farmers do with the direct payments financial support. Second, there is a need for further research on determining factors behind farm expansion and intensity of treatment and its associated effects. Lastly,

employing RCTs as a sound impact assessment approach to evaluating coupled direct payments is highly advised to determine the causal effects of this policy instrument, with the ultimate goal of guiding future policy interventions and priorities.

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9 APPENDICES

A 1: Additional Tables for the Literature Review

Table A 1: Summary of literature review on farmers` preferences on information sources and learning

Preferences on information sources and learning			
Main findings	**Main preference elicitation method (approach)**	**Country**	**Author(s)**
• Farm magazines, the county extension agents, and other farmers were the most frequently used sources of information for farm decision-making; • Most used source of information on existing production methods was experience, while the most used source on new technology was the observed experience of others.	/	U.S.	Mawby and Haver (1961)
• Farm magazines are a widely used information source, but also large farmers prefer personal, service-oriented information as opposed to written information; • Family and friends are the primary sources of information for cropping decisions. Independent consultants are important sources of information to larger farmers, but not to small farmers.	Ranking questions in the survey	U.S.	Ford and Babb (1989)
• Farmers preferred written information, mainly from printed sources. Cooperative extension service ranked highly as information source; • Private & cooperative firms, and salespeople to be important information sources for production decisions; • Dairy farms in particular relied more heavily on specialists than did other farm types.	Ranking questions in the survey (*asking farmers to rank first, second and third most useful sources*)	U.S.	Schnitkey et al. (1992)
• Farmers gave less importance to salesmen and other farmers as sources of information, but gave greater importance to consultants. Use of consultants tended to be greater on larger, more diversified farms with more complex financial structure; • Livestock farmers spent more on consultants than did crop farms.	Likert-type scales	U.S.	Ortmann et al. (1993)

Table A 1: Summary of literature review on farmers` preferences on information sources and learning (cont.)

Main findings	Main preference elicitation method (approach)	Country	Author(s)
• Internal information sources such as records, employees, tenants, or borrowers were highly rated; • Farmers and farm managers both rated soil fertility consultants significantly higher than agricultural bankers.	Likert-type scales	U.S.	Patrick and Ullerich (1996)
• Growers rated independent consultants most reliable and were most satisfied with industry consultants; • Growers rated their own records as the most valuable sources of information for making production, marketing and financial decisions; • Consultants were most widely used in production decisions.	Ranking questions in the survey (*Scale 1–3 & 1-4*)	U.S.	Guenthner et al. (1996)
• Farm operators contacted by the Soil Conservation Service (SCS) and extension personnel, who also participate in government commodity programs have an increased likelihood of considering SCS information useful.	Ranking questions in the survey (*Scale 1-10*)	U.S.	Pompelli et al. (1997)
• Informal learning from people and print and electronic media (unstructured learning activities), combined with learning on the job, featured as the main source of learning for many farmers; • Farming is best learnt on the job; • Preference for non-organized and non-institutional learning (one-on-one interaction with experts, peers, observation) rather than formal organized training.	/	Australia	Bamberry et al. (1997)

Table A1: Summary of literature review on farmers` preferences on information sources and learning (cont.)

Main findings	Main preference elicitation method (approach)	Country	Author(s)
• Preference for informal learning setting, networks of 'known contacts', interactive training, short sessions, group training, convenient times and locations; • Farmers might choose information seeking over training as they prefer independence, can lack confidence in a formal training setting and can experience fear and apprehension when exposed to new knowledge; • Farmers are used to having control over their learning, and compared to information seeking, they have much less control over the content and quality of the training; • Private consultants, who provide information tailored to a particular far business, are a popular information source.	A review & summary of other studies	Australia	Kilpatrick and Rosenblatt (1998)
• Most used informal sources, mainly experts, supplemented by observation and experience, other farmers, and print and electronic media. Training was very rarely the only source used; • Field days were favored because they provided a variety of information; • The importance of the social interaction which can occur around a group learning activity was highlighted in the study. It seems that farmers learnt as much from interaction with others during breaks or in discussion than from the 'official' part of the meeting; • One-on-one learning is valued because it permits contextualisation to a particular farm business, allows customization to a particular learner's needs.	Qualitative approach	Australia	Kilpatrick (1999)

Table A1: Summary of literature review on farmers` preferences on information sources and learning (cont.)

Main findings	Main preference elicitation method (approach)	Country	Author(s)
• Crop/livestock-specific magazines and general farm magazines are the most useful information sources; • Among the personal sources, local dealer sales and technical people were the third highest-rated information source, with 57% of the respondents indicating they often or always provided useful information; • The number of commodities that a farm produced significantly increased the probability that producers often or always received useful information from 6 out of the 8 information sources; • The Internet may be a complement rather than a substitute for traditional information sources or an indicator of producers who find traditional information sources useful.	Likert-type scales	U.S.	Gloy et al. (2000)
• Informal learning sources in the form of experts, observation and experience, and other farmers were the most frequently used learning sources for change; • Formal training activities were a learning source for just over one third of the changes described. In particular, training was rarely used as the only source for learning for change; • Consulting experts were frequently used sources of learning for all types of change. Experts include government consultants, private consultants, researchers and other experts, buyers of products, suppliers of goods and services, and financial advisors.	Qualitative approach & Quantitative comparisons	Australia	Kilpatrick and Johns (2003)

Table A1: Summary of literature review on farmers` preferences on information sources and learning (cont.)

Main findings	Main preference elicitation method (approach)	Country	Author(s)
• Learning methods, particularly experiential, continuous and relevant that permit farmers to learn at their own pace and where individual learning styles are considered will lead to increased satisfaction and motivation; • Learning experiences based in natural settings, e.g., the farm, using authentic activities have the potential to develop the cognitive capabilities (i.e., the thinking, believing and ideas component of attitude) of transferability and adaptability of knowledge; • Formal sessions of short duration, convenient timing to fit with farm activities, hands-on and practical sessions with high-quality presenters, personal contact and plenty of opportunity for discussion, methods allowing farmers to learn at their own pace; • Most farmers need personal contact and discussion when training, as it helps to help reach an understanding of how others think.	Likert-type scales & Qualitative approach	Australia	Bone (2005)
• Printed materials (periodic newsletters, fact sheets and other practical material) & face-to-face advise by other farmers were rated as the most useful information sources; • Communication with peers seems to be among farmers' best source of information; • The information should also be presented to farmers based on their age and education level; • Sources such as computerized systems and marketing clubs are the less preferred information sources.	Likert-type scales	U.S.	Ngathou et al. (2005)
• Learning tailored to farmer age, experience and situations; • Balance of field activities, presentations and discussions, and working together on different tasks. Opportunity to collaboratively design workshop structure and content (between presenters and farmer participants); • Held at suitable time and place. Assistance with computers. Take account of local conditions and scenarios.	Qualitative approach (in-depth interviews) & Cluster Analysis	New Zealand	Brown and Bewsell (2010)

Table A1: Summary of literature review on farmers` preferences on information sources and learning (cont.)

Main findings	Main preference elicitation method (approach)	Country	Author(s)
• Farmers articulated a learning process that relies mostly on first-hand experiences motivated by saving time and money, learning about cutting edge-research, and engaging in the social aspects of education; • Farmers prefer learning from peers and experts who have experience with their situation. They want trusted educators who are well-connected to the local area and who respect farmer values and goals; • Farmers want educators to embrace the changing nature of agriculture; • Differences exist in agricultural education needs among types of farmer groups; • Farmers most often prefer hands-on methods & learning that consider their level of experience with farming, their education, the scale of their operation, and their location.	Focus group interviews & surveys	U.S.	Nancy Franz et al. (2010)
• Farmers prefer combining hands-on learning, demonstration, farm visits, discussion, and opportunities for one-on-one with experts; • Games, comics, role-playing, and radio are methods that farmers do not prefer to learn from; • Farmers from extension want cutting-edge and relevant information and help to understand how to apply information; • The extension needs to focus education on the local context; • Information disseminated to farmers should be understandable regardless of education and experience levels and tailored to their context.	Focus groups	U.S.	Nancy Franz et al. (2010)
• Group learning, revisiting learning from earlier sessions, opportunity to learn from other farmers, supporting different learning styles; • One-on-one support with computers.	Focus group approach (*gathering and documenting the experiences of farmers within these groups*)	New Zealand	White and Sheath (2011)

Table A1: Summary of literature review on farmers` preferences on information sources and learning (cont.)

Main findings	Main preference elicitation method (approach)	Country	Author(s)
• Educational programs that provide networking opportunities, relevant content and a positive, interactive environment (i.e., small group learning that is hands-on); • Farmers enjoy talking to older producers, leaders in agriculture and peer producers; • Social media was highly utilized by participants as a way to stay updated on educational events and information.	Focus groups	U.S.	Bailey et al. (2014)
• Farmers use multiple information sources, most complementary or substitutes to each other, and any single source does not satisfy all information needs; • Only 9.5% of the farmers are using single source of information and mainly they depend on other farmers for their information needs; • All the farmers who are using traditional media or modern ICT sources are also accessing information from other sources.	Field Survey & Grouping different information sources	India	Mittal and Mehar (2015)
• For livestock farmers, the perceived usefulness of information providers was greatest for veterinarians followed by other farmers, accountants and agricultural retailers; • The delivery of information to farmers needs to be conducted in a targeted way using several different information sources and methods; • The demographics of the target audience must be known in order for the delivery of information to be tailored to meet their preferences; • Providing information in a way that combines several information sources and delivery methods is likely to have the greatest impact.	Rating questions in the survey (*Scale 1-4*)	New Zealand	Corner-Thomas et al. (2017)
• Farmers showed a higher preference for on-farm advice and training in small groups than for lectures, offered to a larger audience; • Compared to lectures, farmers also preferred to choose from a list of options such as field excursions, lectures and consultation in small groups; • Farmers preferred a more individualized approach to training.	Choice experiment approach (DCE)	Slovenia	Šumrada et al. (2022)

Note: "/" implies that no information was found or provided in the literature. Constructed by the author.

Table A 2: Summary of literature review on the effects of direct payments

Impact of DPs on:	Main finding/ s	Author(s)	Country/ Region (Study Period)	Data & Methods
Production & efficiency	Subsidies drive productivity through efficiency and input productivities and the magnitudes of these effects differ across regions. In contrast to existing studies, we find that subsidies have a positive impact on technical efficiency.	McCloud and Kumbhakar (2007)	Denmark, Finland & Sweden (1997-2003)	FADN on dairy farms; A Bayesian hierarchical model
	The system of agricultural subsidies after accession to the EU has kept small farms profitable, despite that these payments are negatively related to farms' technical efficiency but positively related to their profitability. Also, a decline in mid-size farms is observed, which were also economically inefficient, but did not become profitable as a result of DP.	Bojnec and Latruffe (2013)	Slovenia (2004-2006)	FADN; Standard approach of a lin-lin second-stage regression & non-parametric method DEA
	Negative correlation between subsidies and farm productivity was found in the period before decoupling. Results suggest that the decoupled payments are less distortive and enhance productivity.	Rizov et al. (2013)	EU-15 (1990–2008)	FADN; A structural semi-parametric estimation algorithm
	Decoupling has contributed to farm productivity growth and behavioral changes related to farm specialization. Farmers have specialized in more productive activities after decoupling, but they did not find that decoupling caused farmers to switch to producing new products.	Kazukauskas et al. (2014)	Ireland, Denmark, & Netherlands (2001-2007)	National Farm Surveys; Semi-parametric approach modified from previous authors
	Decoupled subsides have larger negative effects on total factor productivity (TFP) compared to coupled subsides. Also decoupled payments lead to larger welfare losses.	Gibson and Luckstead (2017)	USA	Static competitive general equilibrium model

Table A 2: Summary of literature review on the effects of direct payments (cont.)

Impact of DPs on:	**Main finding/ s**	**Author(s)**	**Country/ Region (Study Period)**	**Data & Methods**
Production & efficiency	DP distort markets and production and reduce the efficiency of farmers, and, the distortive effect of coupled payments is even stronger compared to decoupled payments. DP incentivize farmers to convert grassland to arable land.	Trapp and Lakner (2018)	Bulgaria	(FADN, Eurostat & other databases) & Qualitative Data Use of scientific literature, political documents & Secondary Data Descriptive Analysis & Qualitative Approach
Farm Income	Results demonstrate that those support measures causing the greatest distortion to production and trade are also the least efficient in providing income benefits to farm households. Compared to area payments, market price support and DP based on output or on variable input use are inefficient and trade distorting way of supporting farm incomes.	Dewbre et al. (2001)	OECD countries (1987 & 1998)	Using data from two base years 1987 & 1998 and parameter estimates derived mainly from reviews of published studies; Policy evaluation matrix (PEM)
	Decoupled income transfer without mandatory production is an efficient way of supporting farmer´s income with the least distortion of trade.	Guyomard et al. (2004)	/	Analysis of four agricultural income support programs to their ability to achieve domestic policy goals; Using a static and riskless single-output partial equilibrium
	Negative effect of participation in Entry Level Stewardship (ELS) on total farm business income but not on purely agricultural income.	Udagawa et al. (2014)	England (2004-2009)	Farm Business Survey (FBS); Propensity score matching with Difference-in-difference

Table A 2: Summary of literature review on the effects of direct payments (cont.)

Impact of DPs on:	Main finding/ s	Author(s)	Country/ Region (Study Period)	Data & Methods
Farm Income	Liberalizing the agricultural sector has clear negative impacts on farm income. The simulations predict that an abolishment of direct payments would cause a 20 to 25 % reduction in farm income.	Deppermann et al. (2013)	Western Germany (2006-2008)	A partial equilibrium (the European Simulation Model (ESIM) & a programming model (Farm Modelling Information System (FARMIS)
	The most transfer-efficient policy instrument seems to be the rural development program (RDP), followed by the single payment scheme (SPS), whereas the least effective are coupled direct payments.	Ciaian et al. (2015)	EU (1999-2007)	FADN on two-step generalized method of moment (GMM) estimator
	Variability of farm income over time is high and most of it is coming from the revenue component. The DP stabilize farm income and this is mainly because DP are less variable than the remaining part of income. DP are found to play a very limited countercyclical role against fluctuations of the remaining part of farm income. DP are not targeted to those farms facing the highest level of income variability.	Severini et al. (2016)	Italy (2003-2012)	FADN; Mean of variance decomposition by income components
	Decoupled direct payments provide the highest contribution to agricultural incomes, followed by agri-environmental payments and farm investment subsidies. In contrast, coupled payments have no significant impacts on farmers' income.	Biagini et al. (2020)	Italy (2008-2014)	FADN - Micro-data panel of Italian farms; Dynamic modelling

Table A 2: Summary of literature review on the effects of direct payments (cont.)

Impact of DPs on:	Main finding/ s	Author(s)	Country/ Region (Study Period)	Data & Methods
Farm structure	Increasing commodity payments led to higher farm exit rates in the U.S. agriculture, specifically for small farms. Even more, supported farmers with DP bought those that were not supported.	Ahearn et al. (2005)	US (1982-1996)	Panel data from 48 states; Three-stage least squares model
	Policy measures significantly affected farm size inequality, with most of the measures considered decreasing it.	Piet et al. (2011)	France (1970-2007)	Agricultural censuses and farm structure surveys at the NUTS3 level; Robust instrumental variables generalized method of moments (IV-GMM)
	CAP abolishment strongly reduces the intention to increase the amount of farmed area. Age, farmer skills, location, and current land size are positive determinants of farm size expansion. In contrast, the option to reduce land use is affected by aging, low education levels, and other farm characteristics.	Bartolini and Viaggi (2013)	9 different European Countries. (2009)	Survey data; Multinomial logit model
	Direct payments significantly slow structural change, by hindering farms to expand their land area and exploiting economies of scale, hampering productivity growth and income development. Direct payments are keeping more farms in the sector and more land in agricultural use than would otherwise be the case, thus avoiding land abandonment, primarily in marginal areas.	Brady et al. (2017)	EU	Data from/ within the models; CAPRI model and AgriPoliS model

Table A 2: Summary of literature review on the effects of direct payments (cont.)

Impact of DPs on:	Main finding/ s	Author(s)	Country/ Region (Study Period)	Data & Methods
Land use, rents & land capitalization	Cash rental rates increased by almost one dollar per acre for each additional dollar per acre paid for market loss assistance and production flexibility contracts. In contrast, conservation reserve program payments appear to exert no effect on cash rental rates.	Lence and Mishra (2003)	U.S. (1996-2000)	County-level annual panel data from various sources for the state of Iowa; A theoretical model approach & regression framework
	The impact of DP on rental values depends on the type of payment and the nature of the production characteristics of the associated agricultural commodity. Decoupled direct payments linked to land fully capitalize on land rents (and ultimately into land prices). Coupled direct payments to the sheep sector are fully capitalized into rental values, while those to the beef sector are not. This is attributed to the fact that sheep enterprises use relatively few inputs other than land.	Patton et al. (2008)	Northern Ireland (1994 – 2002)	Farm business survey (FBS); Instrumental variable techniques based on GMM estimation
	Farmers who rent the land they cultivate capture 75 percent of the subsidy, leaving just 25 percent for landowners. Landlords capture about one-fifth of the marginal subsidy dollar through higher rental rates. Taking into account that 94 percent of landlords are not farmers, a back-of-the-envelope calculation suggests that only about 9 percent of farmland subsidies leave the agricultural sector.	Kirwan (2009)	U.S. (1992 & 1997)	U.S. Census of Agriculture; An instrumental variable (IV) approach

Table A 2: Summary of literature review on the effects of direct payments (cont.)

Impact of DPs on:	Main finding/ s	Author(s)	Country/ Region (Study Period)	Data & Methods
Land use, rents & land capitalization	Results indicate that a 10% decrease in agricultural support would decrease land prices by 3.3% to 5%. Therefore, a considerable part of farm subsidies is distributed and taken by initial landowners instead of operating farmers.	Feichtinger and Salhofer (2013)	/	242 observations from 26 articles; Net present value method and hedonic pricing approach and a Meta-regression analysis
	Before decoupling, direct support payments (Pillar I) are heavily capitalized into land rents, reducing the transfer efficiency of these payments. Post-decoupling, these payments remain capitalized into land rents, albeit in most cases slightly less so than in the pre-decoupling period. Long-run capitalization of agricultural subsidies into agricultural rents is highest among tillage farms.	O'Neill and Hanrahan (2016)	Ireland (2000-2009)	Teagasc National Farm Survey (NFS) of around 1200 Irish Farmers; Two-step robust system GMM
Environment	Participation in AE programs significantly reduced the purchase of farm chemicals (fertilizer, pesticide). A positive effect was also found on the area of agricultural use and a reduction in stocking densities and chemical use per hectare.	Pufahl and Weiss (2009)	Germany (2000-2005)	Balanced panel data set (LAND-Data); Propensity score matching with Difference-in-difference (DiD)
	Cross-compliance rules lead to a significant reduction in farm expenditure on fertilizer and pesticides. This outcome also holds for farmers who participated in other voluntary agro-environmental schemes. However, the results do not support our expectations that farmers who relied on larger shares of public payments had a stronger motivation to improve their environmental performance.	Jaraitė and Kažukauskas (2012)	EU-15 (2001-2007)	FADN; Quasi-experimental methods (difference-in-differences - DiD)

Table A 2: Summary of literature review on the effects of direct payments (cont.)

Impact of DPs on:	Main finding/ s	Author(s)	Country/ Region (Study Period)	Data & Methods
Environment	The AES aiming to subsidize conversion to organic farming has large additional effects and almost nonexistent windfall effects. On the contrary, the AES, which only requires farmers to add one crop to the rotation, has generated minimal additional effects. The AES aiming to subsidize conversion to organic farming is a case in point. Because it was directed at conventional farmers only, the extent of windfall effects is tiny, and cost-effectiveness is high.	Chabé-Ferret and Subervie (2013)	France (2003 – 2005)	"STRU" database of the French Ministry of Agriculture; Propensity score matching with Difference-in-difference (DiD)
	Simulation results indicate that a reduction in direct support brings a general decrease in farmed area, an increase in forested land, less fluctuation in natural vegetation coverage, an increase in abandoned arable land area, and negligible changes in the built-up area despite regionally diverging land use trends.	Sieber et al. (2013)	EU (2015-2025 prediction)	Sustainability Impact Assessment Tool (SIAT), a meta-model
	The economic and environmental impacts of CAP greening are relatively small. The CAP greening leads to a slight price increase and a small decrease in production. The environmental impacts (GHG emissions, N surplus, ammonia emissions, soil erosion, and biodiversity-friendly farming practices) of CAP greening are small. However, some regions may see more significant effects than others. The environmental effects are positive per hectare, but the increase in UAA can reverse the sign for total impacts.	Gocht et al. (2017)	EU (2007-2009)	Farm Structure Survey (FSS) and (FADN); CAPRI model

Table A2: Summary of literature review on the effects of direct payments (cont.)

Impact of DPs on:	Main finding/ s	Author(s)	Country/ Region (Study Period)	Data & Methods
Environment	The environmental efficiency of CAP is very low, particularly in greening measures (EFA, permanent grassland, crop diversification). The largest investments are made into the least effective measures from a biodiversity perspective. CAP climate measures are insufficient, hardly targeting livestock production and nitrogen fertilizer as the primary sources of GHG emissions. Effects on soil and water are partly positive, partly negative. Precise and targeted measures that effectively tackle climate change based on known reduction potentials are widely missing under the CAP.	Pe'er et al. (2017)	EU (2000-2016) & earlier periods for some indicators.	Different data sources; A combination of methods and tools including: a) scoping, b) evidence gathering, c) analysis, d) reporting and quality control, e) database expansion, gap filling and report checking.
	The potential removal of voluntary coupled support for ruminants reduces greenhouse gas emissions in the EU, leading to an emissions reduction of −0.5% of total agricultural GHG emissions in the EU annually. However, emissions leakage significantly diminishes the global mitigation effect since about 3/4 of the reduction in the EU is offset by increased emissions in the rest of the world. This indicates that production subsidies for some products may cause more harm to climate efforts than subsidies to others depending on trade relations and relative emission intensities. However, further research on specific products is required to form a solid base for policy decisions.	Jansson et al. (2021)	EU (1990–2009) & (2010-2018)	CAPRI database & FAOSTAT; CAPRI

Note: "/" implies that no information was found or provided in the literature. Constructed by the author.

A 2: The Agriculture and Rural Development Plan (ARDP)

The Ministry of Agriculture, Forestry and Rural Development (MAFRD) is the managing and execution body of the agricultural policy at the national level. The MAFRD bases its work on the following main policy documents: the national development strategy, the Agriculture and Rural Development Plan (ARDP) drafted by MAFRD, the medium-term expenditure framework drafted by the Ministry of Finance and the economic reform program (ERP) drafted also by the Ministry of Finance (Kerolli-Mustafa & Gjokaj, 2016; Martinovska Stojcheska et al., 2021). However, the support from the government of Kosovo for agriculture and rural development is predominantly based on the ARDP,[86] a complementary policy framework based on the national development strategy and its priorities (Martinovska Stojcheska et al., 2021). Since the first initial draft, the ARDP[87] has been structured around two main pillars – direct support measures and rural development measures, corresponding strongly to the CAP of the EU (MAFRD, 2014). The first pillar (Pillar I) addresses direct payments to farmers, such as direct payments for dairy cows, heifers, sheep, goats, winter wheat, maize, table grapes and other crops, while the second pillar (Pillar II) comprises rural development measures, including vocational training, investments in physical assets, irrigation infrastructure, natural resource management and farm diversification through alternative activities in rural areas.

Since its first draft (document version), the ARDP has not changed by much. The ARDP 2014-20 was based on previous ARDP 2007-13 but addresses the long-term goals and priorities in compliance with the EU CAP and links programming process with multiannual rural development programs (Kerolli-Mustafa & Gjokaj, 2016). Some of the key objectives outlined in this document[88] are as follows:

- To develop a competitive and innovation-based agri-food sector with increased production and productivity capable of producing high-quality products and meeting the requirements of the EU market, contributing to the security and safety of the food supply, pursuing economic, social and environmental goals by fostering employment and developing human and physical capital;

[86] ARDP constitutes one of the key documents that MAFRD bases its work, which is revised every four years.
[87] The first ARDP 2007-2013 was prepared and approved by the government of Kosovo in April 2007, and it was updated in September 2010 (Bajrami, 2016).
[88] The ARDP 2014-2020 takes into account the EU's strategic objectives for rural development focusing on the following six priorities in the upcoming programming period: 1) Fostering knowledge transfer in innovation in agriculture, forestry and rural areas; 2) Enhancing competitiveness in all types of agriculture and enhancing farm viability; 3) Promoting food chain organization and risk management in agriculture; 4) Restoring, preserving and enhancing ecosystems dependent on agriculture and forestry; 5) Promoting resource efficiency and supporting the shift towards a low carbon and climate resilient economy in the agriculture, food and forestry sectors, and 6) Promoting social inclusion, poverty reduction and economic development in rural areas (MAFRD, 2014).

- To protect natural resources and the environment in rural areas, addressing the challenges of climate changes by achieving sustainable and efficient land use and forestry management and by introducing agricultural production methods which preserve the environment, and
- To improve the quality of life and diversify job opportunities in rural areas by fostering employment, social inclusion and balanced territorial development of those areas (MAFRD, 2014).

To achieve these objectives, MAFRD has developed eight rural development measures which include the following: 1) vocational training (improving farmers' professional skills); 2) restructuring physical potential in the agri-rural sector; 3) managing water resources for agriculture; 4) improving the processing and marketing of agricultural products; 5) improving natural resources management; 6) farm diversification and alternative activities in rural areas; 7) improvement of rural infrastructure and maintenance of rural heritage, and 8) support for local community development strategies (see MAFRD, 2014). These measures which were also outlined in the previous ARDP 2007-13, were directly aligned to the former four axis of EU`s rural development strategy (see Table A 3 below) (Bajrami, 2016).

Table A 3: ARDP alignment to the four main axis of EU`s CAP

Axis no.	**EU CAP (Axis)**	**MAFRD Measures**
Axis 1	Competitiveness	• Development of vocational training to meet rural needs (Measure 1) • Restructuring physical potential in the agri-rural sector (Measure 2) • Managing water resources for agriculture (Measure 3) • Improving the processing and marketing of agricultural products (Measure 4)
Axis 2	Environment and improved land use	• Improving natural resource management (Measure 5)
Axis 3	Rural diversification and quality of rural life	• Farm diversification and alternative activities in rural areas (Measure 6) • Improvement of rural infrastructure and maintenance of rural heritage (Measure 7)
Axis 4	Community-based local development strategies	• Support for local community development strategies (Measure 8)

Source: (Bajrami, 2016)

The ARDP 2014-20 addressed three key EU rural development policy axes (priorities), namely agricultural sector competitiveness, sustainable management of natural resources and climate actions, and balanced territorial development of rural areas (see Table A 4 below) (Martinovska Stojcheska et al., 2021).

It also mentions objectives related to the food safety in line with EU veterinary and phytosanitary standards, and also environmental standards, namely restructuring and modernization of the sector and how this would contribute to the development of sustainable land management practices by supporting organic farming and other agri-environmental practices, sustainable forest management and forestation (Martinovska Stojcheska et al., 2021). Instruments related to the environment are included in both pillars, with the difference, that under the second pillar measures, conditions are mandatory for farmers to receive support, while under the first pillar, environmental measures such as organic cultivation of crops are fully voluntary. For annual implementation of the ARDP, both pillars are managed and implemented with separate programs. The program that manages the first pillar is called the Direct Payments Program (hereafter the DP Program), while the program that manages the second pillar is called the Rural Development Program.

Table A 4: Kosovo`s ARDP 2014-2020 priorities and selected rural development measures

Priorities	**Measures**
Improve farm sustainability and competitiveness of all agricultural and agro-industrial products, along with continued approximation to EU standards	M 101- Investment in physical assets of agriculture households M 103 – investment in physical assets in processing and marketing of agricultural products
Recovery, protection and enhancement of ecosystem pertinent to agriculture and forestry	M 201- Agro-environment measures and organic Farming M 202- Planting and protection of forests
Promote socio-economic inclusion, poverty reduction and territorially balanced rural development	M 302 – Farm diversification and business development M 303 – Preparation and implementation of Local Development Strategies – LEADER
Transfer of innovations and knowledge in agriculture, forestry and rural development and strengthen the capacity of public administration in implementing rural development programs	M 401- Enhanced training M 402- Advisory services M 501- Technical assistance
Others	Irrigation projects

Source: Kerolli-Mustafa and Gjokaj (2016) & MAFRD (2013)

To implement the DP program, since 2014 (over the period 2014-20) MAFRD has been spending around €25 million annually. About half of this budget was allocated for direct payments, and the other half for the rural development measures. For example, in 2017, 64 percent of the budget was allocated for the DP program (a total of €27 million), and the rest for the RD Program, even though the projected amount for RD was much higher.

Table A 5: Agricultural-related indicators at the sectoral level for Kosovo

No.	***Indicators***	**2017**	**2019**
I	*Economic Contribution & Employment*		
	Agriculture, hunting, forestry, and fishing, value added (% of GDP)	7.4	7.2
	Agriculture as the main source of household income (% of other sources)	3	/
	Employment in agriculture (%)	24.3	22.8
II	*Trade*		
	Share of agri-food exports in total goods' exports (%)	16.2	17.1
	Share of agri-food imports in total goods' imports (%)	22.8	21.7
	Agri-food trade balance (million Euro)	-633.1	-694.4
III	*Agricultural Land*		
	Total UAA (ha)	416,072	420,141
	Total UAA (% of land area)	81	82
	Arable land (% of land area)	37	37
	Agricultural irrigated land (% of total UAA)	4.8	4.2
	Meadows and pastures, including common land (% of total UAA)	52	52
	Vegetables area (% of total UAA)	2	2
	Fruits area (% of total UAA)	1.5	2.2
	Vineyard area (% of total UAA)	0.8	0.8
	Land under cereal production (% of total UAA)	29	30
	Wheat area (% of land under cereal production)	67	65
	Maize area (% of land under cereal production)	30	32
	Organic production area (ha)	170	480
IV	*Farm Structure*		
	Number of farms (agricultural holdings) with arable land	108,108	105,289
	No. of farms (less than 2 ha)	80,117	73,397
	Share of farms with less than 2 ha (% of total arable land)	26.2	25.7
	No. of farms (2 ha & less than 5 ha)	20,460	24,231
	Share of farms with 2 ha & less than 5 ha (% of total arable land)	32.3	34.9
V	*Herd Size*		
	No. of cattle inventory	259,729	257,733
	Dairy cows (% of total cattle fond)	51	51
	No. of sheep and goats' inventory	210,688	216,299
	No. of poultry inventory (1000)	2,811	2,665
VI	*Yields*		
	Wheat yield (t/ha)	3.98	3.55
	Maize yield (t/ha)	4.09	4.16
	Average milk yield (kg per year/cow)	2,090	2,100
VII	*Budgetary support to agriculture*		
	Percentage of government expenditures on agriculture (% of total budget)	3.04	2.39
	Percentage of spending on agriculture (% of GDP)*	0.87	0.80
	Total budgetary support per hectare of UAA (EUR/ha)	102.09	111.16

Table constructed by the author with the data retrieved from (MoF, 2017; ASK, 2018; MAFRD, 2018; BDMS, 2019; MAFRD, 2020b; ASK, 2022);

Note* - MAFRD budget in relation to GDP according to economic activities at current prices.

A 3: Warm up questions (example) and Cheap Talk text

Figure A 1: An example of a choice set round used for warm up questions

Attributes	Option 1	Option 2	Option 3
Milk yield per day	15 liters	10 liters	None of these
Breed (race)	Holstein Friesian	Mixed	
Age	2	2.5	
Country of origin	Germany	Kosovo	
Price (€)	1,700	1,000	

Source: Constructed by the author.

A 3: Cheap talk text

"We will now start with the experiment. Just like before, I will show you choice cards and you have to decide on one option on each round. As I just explained, this time the choice cards come with an offer of an improved extension system. Just like the options for dairy cows, you need to check the different attributes of each option and decide which one you would take. When you chose your preferred extension system, this is associated with a price that you will need to pay in order to access that service. Before and now, of course, you will not have to pay. But this is very important, you should carefully think about your choice and make it as realistic as possible. Only choose an option if you would be willing to pay the price for the product offered. The experience shows that sometimes people tend to overestimate (overvalue) the amount that they are willing to pay. It is therefore very important that you carefully pay attention that you only choose options that you would be willing to pay for. For this you have to consider how this annual cost of extension service will affect your budget, considering also the amount of direct payments that might be received, reduced or eliminated. Considering these, in the end, you should be completely sure that you are actually willing to pay that annual rate which is associated with the choice that you choose. Generally, your truthful answers are extremely important because they will, together with the answers of other farmers, directly be used to inform the Ministry of Agriculture and other policy makers in Kosovo about the needs of farmers for improved extension services and their specific preferences. Therefore, please think thoroughly when choosing your choice cards."

A 4: Additional Tables from the DCE Part of Analysis

Table A 6: Summary Statistics: Farm and Household characteristics

	N	Mean	S.D.	Min	Max
Socio-economic variables					
Age of the household head (years)	359	49.77	13.41	23	87
Education of the household head (years)	355	10.63	3.64	0	19
Household head is male (%)	362	97.79	0.15		
Farming experience of the household head (years)	334	16.60	9.21	1	50
Full-time farmer (%)	347	32.28	46.76		
Household head has a smart phone (%)	356	87.64	32.91		
Risk aversion (1-not at all to 7-absolutely willing to take risks)	352	5.15	1.56	1	7
Household employs household members only (%)	346	74.86	43.39		
Farm has a designated successor (%)	338	26.04	43.89		
Annual household net income (euro)	344	13506.23	13513.14	1500	100000
Annual farm net income (euro)	352	8986.91	12071.89	0	72000
Farm income as a share of total income (%)	353	59.77	33.93	0	100
Share of sold farm output (%)	352	63.30	34.82	0	100
Farmer has a selling contract (%)	339	21.83	41.31		
Farm production variables					
Total utilized agricultural area - UAA (ha)	358	9.81	23.99	0	230
Land area left abandoned (ha)	348	0.02	0.15		
Number of land (UAA) plots	343	5.29	4.95	0	50
Farmer is a smallholder (%)	358	16.48	37		
Farmer is engaged in livestock activities (%)	342	78.36	41.18		
Farmer is engaged in meat production activities (%)	186	24.73	43.15		
Farmer is engaged in cereal production activities (%)	362	72.10	44.85		
Farmer is engaged in vegetable production activities (%)	362	18.51	38.84		

Table A 6: Summary Statistics: Farm and Household characteristics (cont.)

	N	Mean	S.D.	Min	Max
Policy & extension services					
Farmer received direct payments (%)	360	65	47.70		
Amount of direct payments received in 2017 (euro)	358	1317.64	3645.88	0	46400
Farmer has previously applied for a bank loan (%)	349	16.91	37.53		
Use of extension services (%)	355	35.77	47.94		
Use of public extension services (%)	355	31.55	46.54		
Farm location					
Distance to shop for agricultural inputs (km)	344	6.08	4.74	0	35
Distance to farmers` market (km)	218	9.03	6.31	0.5	75
Distance to municipal center (km)	359	8.93	4.68	0.3	27

N - number of observations
S.D. - Standard Deviation
Note: N slightly differs between variables due to missing data.
Source: Constructed by the author.

Table A 7: Household, Farm and Policy characteristics of farmers with and without extension experience for the whole sample

	All farmers	Farmers with extension experience	Farmers with no extension experience	T-test for Equality of Means
	Mean	Mean	Mean	t/ p-value
Socio-economic variables				
Age of the household head (years)	49.77	49.25	50.11	0.5688/ 0.5699
Education of the household head (years)	10.63	11.20	10.31	-2.2245/ 0.0267
Household head has higher education (>=12 years of education) (%)	66.76	74.80	62.28	-2.4137/ 0.0163
Household head is male (%)	97.79	96.85	98.68	1.1903/ 0.2347
Farming experience of the household head (years)	16.60	16.51	16.66	0.1452/ 0.8847
Full-time farmer (%)	32.28	35.25	30.80	-0.8422/ 0.4003
Household head has a smart phone (%)	87.64	90.48	86.10	-1.1941/ 0.2333
Risk aversion (1-not at all to 7-absolutely willing to take risks)	5.15	5.38	5.03	-2.0681/ 0.0394
Household employs household members only (%)	74.86	62.90	81.19	3.8009/ 0.0002
Farm has a designated successor (%)	26.04	21.95	28.37	1.2936/ 0.1967
Annual household net income (euro)	13506.23	17348.41	11367.83	-4.0202/ 0.0001
Annual farm net income (euro)	8986.91	12672.64	6939.71	-4.3533/ 0.0000
Farm income as a share of total income (%)	59.77	66.83	55.80	-2.964/ 0.0032
Share of sold farm output (%)	63.30	73.76	57.46	-4.3135/ 0.0000
Farmer has a selling contract (%)	21.83	31.75	15.96	-3.449/ 0.0006
Farm production variables				
Total utilized agricultural area - UAA (ha)	9.81	15.10	7.08	-3.0189/ 0.0027
Land area left abandoned (ha)	0.02	0.02	0.03	0.5117/ 0.6092
Number of plots	5.29	5.50	5.17	-0.5936/ 0.5532
Farmer is a smallholder (%)	16.48	13.60	17.54	0.9616/ 0.3369
Farmer is engaged in livestock activities (%)	78.36	78.40	78.87	0.1023/ 0.9186
Farmer is engaged in meat production activities (%)	24.73	26.74	23	-0.5875/ 0.5576
Farmer is engaged in cereal production activities (%)	72.10	74.02	72	-0.3341/ 0.7385
Farmer is engaged in vegetable production activities (%)	18.51	18.90	18.86	-0.0087/ 0.9930

Table A 7: Household, Farm and Policy characteristics of farmers with and without extension experience for the whole sample (cont.)

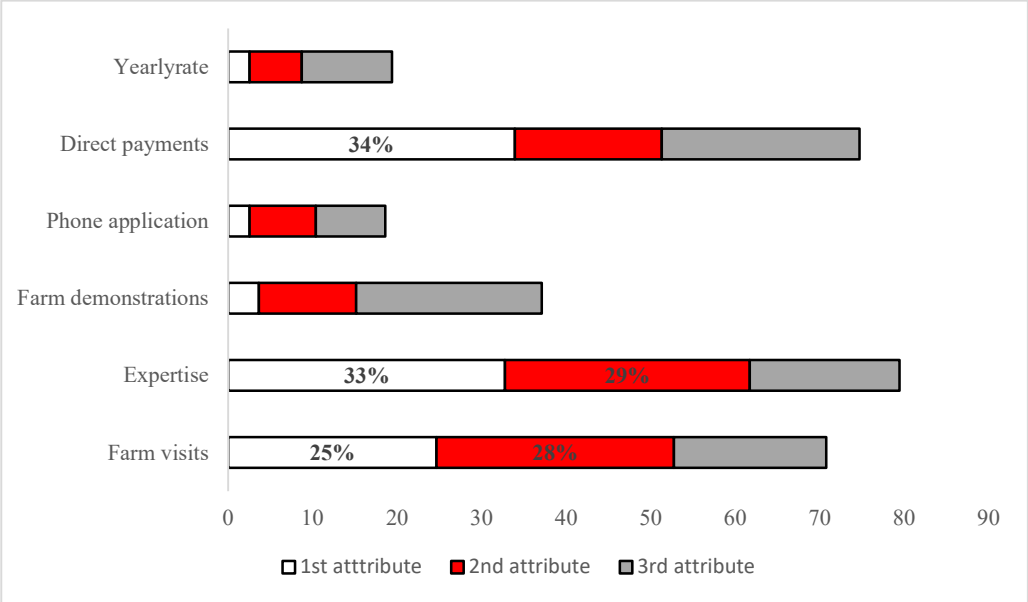
	All farmers	Farmers with extension experience	Farmers with no extension experience	T-test for Equality of Means
	Mean	Mean	Mean	t/ p-value
Policy				
Farmer received direct payments (%)	65	79.53	57.89	-4.2036/ 0.0000
Amount of direct payments received in 2017 (euro)	1317.64	1909.30	1016.93	-2.2015/ 0.0283
Farmer has previously applied for a bank loan (%)	16.91	24.00	12.95	-2.6608/ 0.0082
Farm location				
Farm location (>=10 km from nearest city center) (%)	42.06	37.80	44.05	1.1438/ 0.2535
Distance to shop for agricultural inputs (km)	6.08	6.22	6.00	-0.4057/ 0.6852
Distance to farmers` market (km)	9.03	8.20	9.60	1.6145/ 0.1079
Distance to municipal center (km)	8.93	8.66	8.95	0.5706/ 0.5686

Source: Constructed by the author.

A 5: Self-ranking of choices by farmers

After the experiment, farmers were asked to rank their most important attributes, or in other words, they were asked to rank which were the three attributes that had the highest impact on their choices. This part of the analysis does not describe the actual behavior of farmers during the experiment as shown above; instead, it shows their opinion on what was important to them - in other words, how they think they behaved during the experiment. Figure A 2 below presents the highlights of this analysis.

Figure A 2: Importance of attributes-self-ranking by respondents in percentage (%)



Note: First (1st) attribute implies (denotes) the first-ranked attribute by farmers in the post-experiment survey, followed by the second (2nd) and third (3rd) attribute.
Source: Constructed by the author.

As shown in Figure A 2, direct payments and expertise were ranked by farmers as the first most important attribute. Farm visits came out as third. Expertise and farm visits were ranked second most important, followed by direct payments. As the third most important attribute, farmers mentioned direct payments and farm demonstrations more often than the rest.

Further, we looked at differences in first attribute ranking across some particular groups-similar groups to part b) of the analysis. For example, DP receivers ranked as expected the DP attribute as the most important, compared to non-DP receivers, who ranked expertise. Farmers with prior experience with public extension services ranked expertise as the most important attribute, compared to non-users who ranked DP. Younger farmers (35 years old or younger) ranked expertise as the first attribute, with a large difference (over 20%) to the second attribute. Farmers older than 35 years ranked DP as the first most important attribute. For farmers having 12 and more years of education (high school or higher), expertise was the first highest-ranked

attribute, compared to those with less than 12 years of education, where DP came out as the most important attribute. Similar results were obtained for farmers with a selling contract, smallholders, and farmers living 10 km or longer from the municipality, who ranked expertise as the first attribute, compared to their counter groups (no contract, non-smallholders, <10 km distance) who ranked DP as first. Lastly, the first ranking attribute was examined across different crops and agricultural subsectors where farmers were engaged. Overall, no major differences were found across these groups. Nevertheless, vegetable producers, cereals producers, and farmers engaged in livestock activities as expected ranked DP as the first most important attribute in their choices, compared to their counterparts (non-vegetable producers, non-cereal producers, and non-livestock farmers) who ranked expertise as their most important attribute. Interestingly, farmers engaged only in meat production valued expertise first, compared to their counterparts, who valued DP as the first and most important attribute.

The last examined groups were related to their marketing situation, specifically to their opinions regarding the market in general and their marketing sources – the major sources where the sampled farmers were selling their products. Farmers that considered the market situation difficult ranked DP as the first most important attribute, compared to their counterparts, who valued expertise as the most important attribute. No major differences were found in their market sources (where they sell their agricultural products). Farmers selling to private commercial buyers valued expertise first and DP second. Contrary, farmers that were selling through a marketing or other cooperative valued expertise first and farm visits second. Interestingly, DP was not on their "radar." Direct sales (either to market or to customers) were another common source of marketing agricultural products. Farmers that used this market value by far DP as the first most important attribute, followed by expertise. An explanation could be that farmers in this type of market feel less secure in income generation; therefore, they rely much higher on DP as an important part of their annual incomes. Last of all, farmers that use all three primary sources of the market (private commercial buyers and direct sales) value expertise first and farm visits second. In sum, this part of analysis shows some key opinion differences regarding extension preferences across the examined groups. Overall, farmers that are doing better in the market are larger, have not received DP, have an experience with extension services, are younger, have at least a high school education value more expertise as their key feature in choosing extension services, compared to their counterparts who put more weight on DP.

Table A 8: Willingness to pay for a restructured extension service system in willingness to pay space

Utility parameters	**Full G-MNL (1)**		**Full G-MNL (2)**		**G-MNL-I (y=1) (3)**		**G-MNL-II (y=0) (4)**		**G-MNL (t=1) (5)**	
	β.	St. err.	β.	St. err.	β.	St. err.	β.	St. err.	β.	St. err.
One farm visit	115.433***	15.242	136.815***	-22.509	122.123***	-17.865	123.052***	-18.169	123.484***	-18.472
Two farm visits	179.324***	23.494	215.870***	-36.111	190.365***	-29.054	188.237***	-28.031	187.081***	-29.858
Specialized expertise	75.253***	13.853	59.585***	-16.689	49.599***	-13.632	53.302***	-13.558	54.090***	-14.679
Included farm demonstrations	91.546***	12.477	103.434***	-20.879	93.364***	-16.747	100.574***	-17.058	93.548***	-16.693
ICT extension platform	97.403***	15.093	110.752***	-21.842	95.718***	-17.38	95.146***	-16.8	98.820***	-18.729
DP Cut by 50%	-173.988***	19.888	-141.366***	-33.425	-132.073***	-28.976	-132.923***	-30.34	-155.212***	-31.136
DP Eliminated completely	-338.199***	40.234	-264.506***	-60.567	-247.123***	-50.02	-258.965***	-50.525	-299.348***	-53.598
Yearly rate	1	Fixed	1	Fixed	1	Fixed	1	Fixed	1	Fixed
Constant	153.0.15***	21.886								
Observed heterogeneity										
Two farm visits*Full time farmer			42.496	-26.37	45.122**	-22.665	40.608*	-21.512	49.182**	-24.89
Two farm visits*Public extension user			8.1	-22.021	1.138	-19.834	11.467	-20.538	16.698	-19.161
SP*Public extension user			51.543*	-26.753	54.869**	-23.914	48.316**	-22.784	42.300*	-23.233
ICT extension platform*Smallholder			60.515*	-35.005	71.064**	-32.877	63.829**	-27.357	43.49	-33.025
Included farm demonstrations*Public extension user			-40.594*	-21.346	-34.182*	-18.743	-40.829**	-19.646	-36.651*	-20.842

Table A 8: Willingness to pay for a restructured extension service system in willingness to pay space (cont.)

Included farm demonstrations*Full time farmer	-1.428	-23.837	-6.755	-19.1	-10.82	-18.682	-14.211	-22.243
DPCut*DP receiver	-61.013**	-26.508	-50.886**	-22.05	-58.034**	-24.032	-43.046*	-22.487
DPCut*Smallholder	61.016*	-34.131	44.467	-30.66	36.811	-31.451	74.616**	-30.964
DPCut*Full time farmer	53.702*	-28.373	48.654**	-24.618	60.926**	-23.956	55.327**	-24.789
DPEL*DP receiver	-130.338***	-39.795	-103.652***	-34.157	-112.929***	-32.964	-80.235**	-35.417
DPEL*Smallholder	-11.211	-49.164	15.514	-47.172	67.806	-42.18	58.767	-45.548
DPEL*Full time farmer	17.757	-38.785	1.401	-39.079	56.511*	-30.244	13.221	-44.099
Yearly rate*Full time farmer	1.276***	-0.238	1.172***	-0.208	1.027***	-0.179	1.201***	-0.215
Yearly rate*Public extension user	0.258	-0.172	0.294*	-0.16	0.105	-0.155	0.310*	-0.182
Yearly rate*Smallholder	0.221	-0.211	0.224	-0.185	0.135	-0.186	0.268	-0.176
Yearly rate*DP receiver	-0.045	-0.181	0.061	-0.15	0.12	-0.139	0.011	-0.165

Table A 8: Willingness to pay for a restructured extension service system in willingness to pay space (cont.)

Heterogeneity in mean										
One farm visit	-15.528'	8.347	-16.164	-27.169	-0.806***	-0.168	-76.612***	-17.001	33.123***	-9.835
Two farm visits	10.174	7.976	15.5	-26.764	-0.748***	-0.223	88.538***	-18.75	-34.586***	-10.525
Specialized expertise	33.578*	16.890	-28.706	-47.948	-1.592***	-0.138	144.247***	-23.209	60.077***	-15.276
Included farm demonstrations	-10.084	9.083	14.389	-24.341	-0.563***	-0.192	75.888***	-14.734	-31.139***	-7.75
ICT extension platform	20.267'	11.240	-18.342	-30.286	-1.064***	-0.128	-109.169***	-20.229	43.329***	-11.843
DP Cut by 50%	23.583'	12.333	-24.289	-41.146	-1.428***	-0.163	-116.336***	-22.203	48.390***	-13.07
DP Eliminated completely	35.466'	18.298	-32.26	-54.184	-1.713***	-0.204	165.012***	-28.926	54.028***	-14.933
Yearly rate	0	Fixed	0	Fixed	0	Fixed	0	Fixed	0	Fixed
Constant	-68.173*	32.808								
Tau	-0.590***	0.095	-0.518***	-0.100	-0.525***	-0.119	-0.469***	-0.096	1.000	0.000
Gamma	0.0297918	0.019	-0.064	-0.092					0.016***	-0.006
N	9774		9288		9288		9288		9288	
LL Function	-2327.3		-2308.0		-2314.3		-2303.2		-2313.5	
AIC	4692.6		4682.0		4692.6		4670.3		4691.0	
BIC	4829.1		4917.5		4920.9		4898.7		4919.4	

Significance levels: 'p<0.10, *p<0.05, **p<0.01, ***p<0.001;

Table A 9: WTP estimates from the "mixlogitwtp" package in Stata

Attribute	Attribute level	**WTP in SPACE**	
		Coeff.	95% CI
Farm visits	Offer of an annual farm visit in the farm by the extension service	134.3	(84.1 - 184.4)
	Offer of two annual farm visits in the farm by the extension service	260.6	(169.1 - 352.1)
Specialized expertise	Extension agents with specialized expertise	99.5	(60.2 - 138.8)
Included farm demonstrations	Farm demonstrations are included under this package	111.2	(72.9 - 149.5)
ICT extension platform	ICT Extension platform for mobile phone is included	140.3	(91.6 - 189)
DP	Direct payments are cut by 50%	-213.1	(-277.7 - -148.5)
	Direct payments are eliminated completely	-444.1	(-584.3 - -303.9)
Constant		143.3	(104.2 - 182.3)
Data presented as estimates (95% confidence interval); C.I. - Confidence Interval;			

A 6: Additional Tables and Figures from the IE Part of Analysis

Table A 10: Definition of all used variables in the analysis

Variable	Label	Unit	Description
SE025	Total Utilised Agricultural Area (UAA)	ha	Total utilised agricultural area of holding. It consists of land in owner occupation, rented land, land in share-cropping.
SE085	Dairy cows (incl. Buffaloes)	LU	Female bovine animals (incl. Female buffaloes) which are held principally for milk production for human consumption.
SE011	Labour input	Hrs	Time worked in hours by total labour input on holding.
SE016	Unpaid labour input	Hrs	Time worked in hours by unpaid labour input (generally family) on holding.
SE021	Paid labour input	Hrs	Time worked in hours by paid labour input on holding.
SE030	Rented U.A.A.	ha	Utilised agricultural areas rented by the holder under a tenancy agreement for a period of at least one year.
SE035	Cereals	ha	Common wheat and spelt, durum wheat, rye, barley, oats, grain maize, rice, other cereals.
SE110	Yield of wheat	q/ha	Production of common wheat and spelt in quintals (100 kilogrammes) per hectare.
SE115	Yield of maize	q/ha	Production of grain maize in quintals per hectare.
SE125	Milk yields (incl. Buffaloes)	Kg/cow	Average production of milk and milk products in kg per dairy cow.
SE131	Total output	€	Total value of output of crops and crop products, livestock and livestock products and of other output.
SE420	Family Farm Income	€	Renumeration to fixed factors of production of the family (work, land and capital) and renumeration to the entrepreneur´s risks (loss/profit) in the accounting year.
SE441	Total fixed assets	€	Agricultural land and farm buildings and forest capital + Buildings + Machinery and equipment + Breeding livestock, Intangible assets and other non-current assets.
SE295	Fertilisers	€	Purchased fertilisers and soil improvers.
SE300	Crop protection	€	Plant protection products, traps and baits, bird scarers, anti-hail sells, frost protection, etc.

Table A 10**:** Definition of all used variables in the analysis (cont.)

Variable	Label	Unit	Description
netincome_UAA	-	€/ha	Net income per UAA (Calculation: SE420/SE025).
netincome_laborh	-	€/hrs	Net income per labor hour (Calculation: SE420/SE011).
output_AWU	-	€/AWU	Output in the farm per total work unit (Calculation: SE131/SE010).
totaloutput_input	-	€	Ratio of Total Output by Total Input (Calculation: SE131/SE270).
net_profit_margin	-	%	The net profit margin of the farm (Calculation: SE420/SE131).
land_prod	-	€/ha	Land productivity by hectare (Calculation: SE131/SE025).
shgrassland	-	%	Share of grassland area in total UAA (Calculation: Tgrassland/SE025).
v_fixed_assets	-	€/hrs	Value of fixed assets per farm working units (Calculation: SE441/SE010).
Crprot_ha	-	€/ha	Crop protection expenditure per hectare (Calculation: SE300/SE025).
Farmer_age	-	Years	Farmer_age is calculated by the observed year minus year of birth of the farmer.
SE605	-	€	Total subsidies on current operations linked to production (excluding investments).
dummy_LIV_FARM	-	0-1	Value = 1 if a farm has a more intense livestock activity (more than 4 cows, SE085 > 4).
dummy_PRM_CROP	-	0-1	Value = 1 if a farm has a more intense permanent crop activity (equal or more than 50% of UAA allocated for permanent crops, shpermanentcr>=0.5).
dummy_DP_17	-	0-1	Value = 1 if the farm has been supported with direct payments only in 2017.
dummy_DP_1617	-	0-1	Value = 1 if the farm has been supported with direct payments in 2016 and in 2017.
Region_No	-	0-7	There are seven regions (1 = Prishtine, 2 = Mitrovice, 3 = Peje, 4 = Prizren, 5 = Ferizaj, 6 = Gjilan, 7 = Gjakove).

Source: Constructed by the author.

Table A 11: Summary Statistics: Key selected covariates

Variable	Description	Obs.	Mean	SD	Min.	Max.
SE010	Total labor input in AWU	4261	2.1	7.52	0	352.75
SE011	Labor input in hrs	4261	3777.64	13568.75	0	634950
SE015	Unpaid labor input in AWU	4261	1.48	1.09	0	13.11
SE020	Paid labor input in AWU	4261	0.62	7.43	0	7.43
SE025	Total Utilised Agricultural Area (UAA) in ha	4261	10.94	30.88	0	711
SE030	Rented UAA in ha	4261	4.14	14.11	0	14.11
SE035	Cereals in ha	4261	5.45	15.74	0	230
SE046	Vegetables and flowers in ha	4261	0.51	2.59	0	2.59
SE054	Permanent crops in ha	4261	0.42	5.29	0	5.29
SE085	Dairy cows (incl. Buffaloes) in LU	4261	4.12	7.74	0	103.5
SE110	Yield of wheat in q/ha	3815	2.87	1.9	0	10
SE115	Yield of maize in q/ha	3498	2.75	2.32	0	25
SE125	Milk yield (incl. Buffaloes) in kg/cow	4261	2099.28	1741.2	0	12142.86
SE131	Total output in €	4130	32501.07	263754.7	-252635	12700000
SE270	Total input in €	4130	22142.51	265048.6	0	13900000
SE295	Fertilisers in €	4211	1514.59	4580.37	0	125696
SE300	Crop protection in €	4187	465.92	5755.01	0	250000
SE420	Family farm income in €	4261	20909.25	75483.61	-408555	2586100
SE441	Total fixed assets in €	4119	325850.3	1164560	0	30200000
SE605	Total subsidies – excluding on investments in €	4261	1935.28	19351.58	0	800000

Source: Constructed by the author.

Table A 12: Probit regression estimates *(DP17)*

Dependent variable is DP Participation 1/0	Coefficient	S.E.
SE025	0.05**	0.02
v_fixed_assets	-0.00	0.00
labour_hours	0.00	0.00
crprot_ha	0.00	0.00
dummy_LIV_FARM	0.49***	0.17
dummy_PRM_CROP	0.28	0.35
Constant	-1.55	0.14
N	459	
LR $\chi 2$ ($p>\chi 2$)	31.57	
Pseudo - R^2	0.08	
Log likelihood	-173.22	
S.E. - Standard Error		
Significance level: * at 10% level, ** at 5% level, *** at 1% level;		

Table A 13: Probit regression estimates *(DP1617)*

Dependent variable is DP Participation 1/0	Coefficient	S.E.
SE025	0.06***	0.02
v_fixed_assets	-0.00	0.00
labour_hours	0.00	0.00
crprot_ha	-0.00	0.00
dummy_LIV_FARM	1.07***	0.17
dummy_PRM_CROP	0.89**	0.36
Constant	-1.82	0.18
N	464	
LR $\chi 2$ ($p>\chi 2$)	78.59	
Pseudo - R^2	0.20	
Log likelihood	-159.25	
S.E. - Standard Error		
Significance level: * at 10% level, ** at 5% level, *** at 1% level;		

Figure A 3: Visual inspection of matching (overlap condition) (*DP17*)

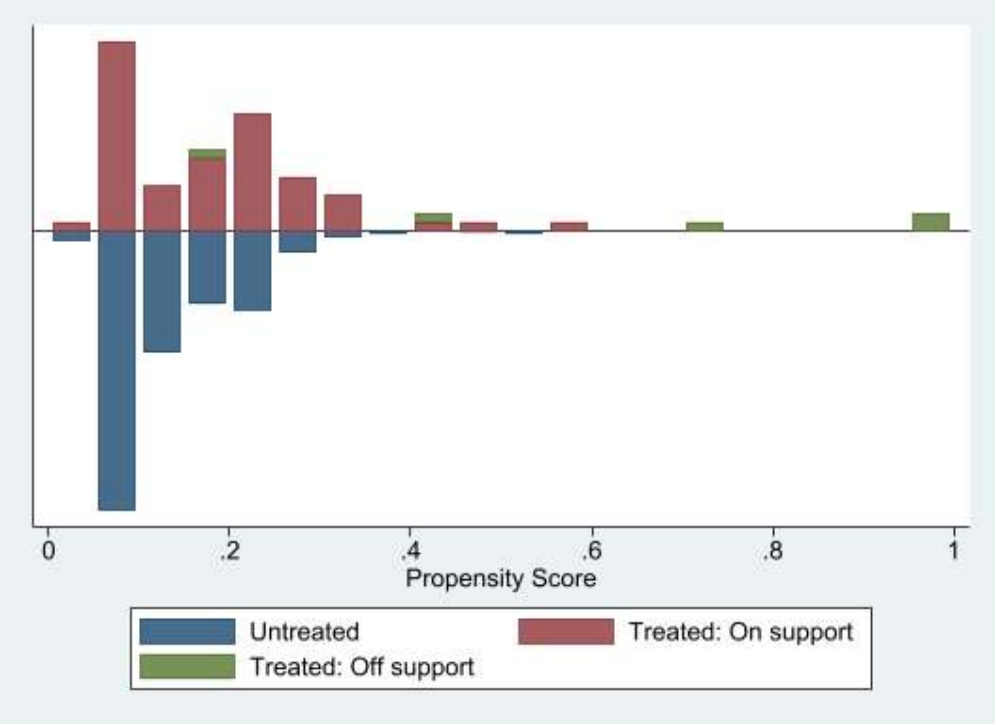


Figure A 4: Visual inspection of matching (overlap condition) (*DP1617*)

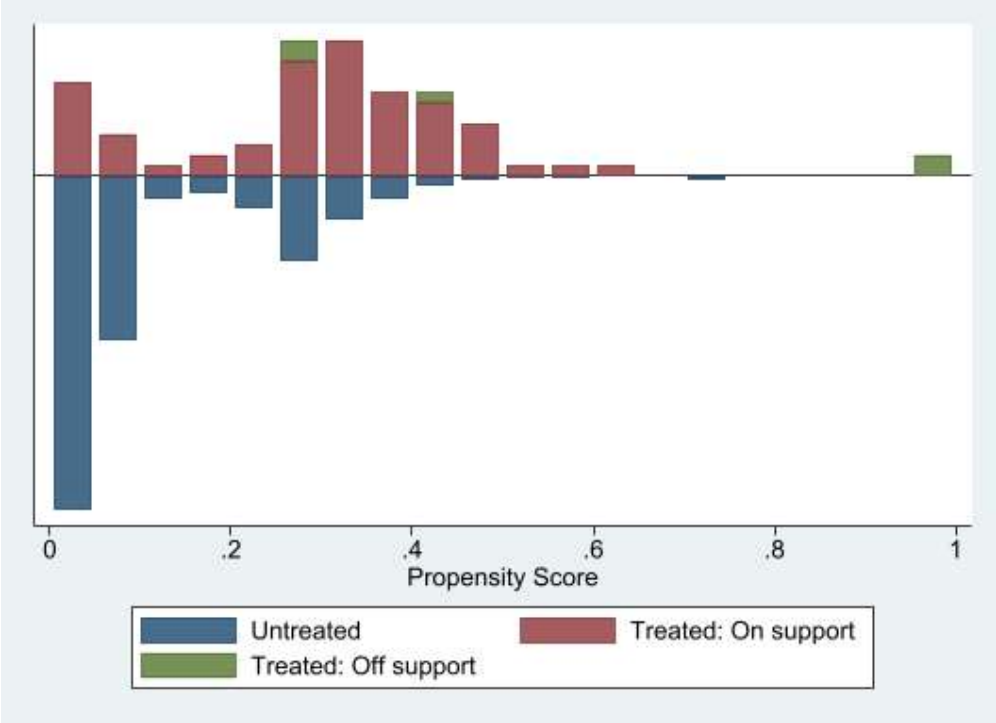


Table A 14: Estimated values for the matching quality *(DP17)*

Sample	Ps R2	LR chi2	p>chi2	MeanBias	MedBias	B	R	%Var
Unmatched	0.084	31.57	0	20.1	19.6	50.7*	10.94*	100
Matched	0.002	0.34	0.999	0.8	0.1	10.5	1.24	0
if B>25%, R outside [0.5; 2]								

Table A 15: Estimated values for the matching quality *(DP1617)*

Sample	Ps R2	LR chi2	p>chi2	MeanBias	MedBias	B	R	%Var
Unmatched	0.198	78.59	0	33.1	24.5	77.8*	5.75*	100
Matched	0.005	0.93	0.988	0.8	0.5	16.7	1.23	0
if B>25%, R outside [0.5; 2]								

Table A 16: Probit regression estimates for livestock outcomes *(DP17)*

Dependent variable is DP Participation 1/0	Coefficient	S.E.
SE025	0.06**	0.02
v_fixed_assets	0.00	0.00
labour_hours	0.00	0.00
crprot_ha	0.00	0.00
dummy_LIV_FARM	0.45**	0.18
dummy_PRM_CROP	0.54	0.64
Constant	-1.63	0.18
N	393	
LR $\chi 2$ ($p>\chi 2$)	28.31	
Pseudo- R^2	0.08	
Log likelihood	-148.55	
S.E. - Standard Error		
Significance level: * at 10% level, ** at 5% level, *** at 1% level;		

Table A 17: Probit regression estimates for livestock outcomes *(DP1617)*

Dependent variable is DP Participation 1/0	Coefficient	S.E.
SE025	0.06**	0.03
v_fixed_assets	-0.00	0.00
labour_hours	-0.00	0.00
crprot_ha	-0.00	0.00
dummy_LIV_FARM	1.18***	0.20
dummy_PRM_CROP	1.01	0.66
Constant	-1.89	0.20
N	397	
LR $\chi 2$ ($p>\chi 2$)	65.32	
Pseudo- R^2	0.19	
Log likelihood	-137.65	
S.E. - Standard Error		
Significance level: * at 10% level, ** at 5% level, *** at 1% level;		

Table A 18: Balance of covariates: Difference in mean for the matching and outcome variables for potential and selected participants and non-participants (controls)

Variable	Potential participants	Potential controls	Selected participants	Selected controls
netincome_UAA	2534.10	4468.00	2540.70	2303.20
SE025	9.41	4.28**	5.25	5.09
SE085	3.04	2.08**	3.14	3.10
SE110	2.89	3.03	2.92	3.30
SE115	2.64	2.89	2.71	3.49
SE125	2211.20	1967.50	2270.70	2279.70
land_prod	2993.00	5311.80	2994.10	2602.30
totaloutput_input	2.59	2.74	2.66	1.92
output_AWU	13692.00	14119.00	11973.00	10310.00
netincome_laborh	6.83	6.73	5.86	4.93
net_profit_margin	0.81	0.80	0.80	0.87
SE295	988.76	569.06*	664.79	664.63
SE300	161.53	95.90**	128.76	114.16
shgrassland	32.29	32.99	33.40	24.53
v_fixed_assets	440000	920000	340000.00	330000.00
labour_hours	2872.30	2248.8*	2685.30	2655.00
crprot_ha	35.15	29.95	30.93	28.99
dummy_LIV_FARM	0.52	0.27***	0.53	0.53
dummy_PRM_CROP	0.03	0.03	0.02	0.02

Significance level: * at 10% level, ** at 5% level, *** at 1% level;

Source: Constructed by the author.

Table A 19: ATT estimates on farm productivity across three additional matching algorithms

NN Mahalanobis Matching	DP17 (t-2)				DP1617 (t-1)			
	ATT (S.E.)	t-value	Treated	Control	ATT (S.E.)	t-value	Treated	Control
NN Mahalanobis Matching (5)								
land_prod	-507.82 (953.56)	-0.53	66	185	4552.12 (5625.01)	0.81	71	176
totaloutput_input	-0.68 (0.45)	-1.51	66	185	-0.29 (0.30)	-0.98	71	176
output_AWU	1185.53 (2826.14)	0.42	66	185	1865.10 (1816.54)	1.03	71	176
Radius Matching								
land_prod	476.60 (999.06)	0.97	59	354	6893.52 (6223.09)	0.93	64	354
totaloutput_input	-0.26 (0.40)	-0.92	59	354	0.12 (0.40)	-0.49	64	354
output_AWU	585.35 (2116.48)	0.56	59	354	1204.23 (2329.80)	1.11	64	354
Kernel Matching								
land_prod	466.93 (1375.60)	0.58	60	354	6893.52 (6253.76)	0.95	64	354
totaloutput_input	-0.26 (0.46)	-0.60	60	354	0.12 (0.46)	-0.26	64	354
output_AWU	569.44 (2481.45)	0.55	60	354	1204.23 (2682.63)	1	64	354
N			69	457			73	457

Notes: Significance levels: *p < 0.1, **p < 0.05, ***p < 0.01;

DP17 refers to the treated (participant farmers) in the DP Program only in 2017 (one-time receivers);

DP1617 refers to the treated (participant farmers) in the DP Program in 2016 & 2017 (two-time receivers);

S.E. does not take into account that the propensity score is estimated;

Source: Own estimations based on FADN Data.

Table A 20: ATT estimates on farm income across three additional matching algorithms

NN Mahalanobis Matching	DP17 (t-2)				DP1617 (t-1)			
	ATT (S.E.)	t-value	Treated	Control	ATT (S.E.)	t-value	Treated	Control
NN Mahalanobis Matching (5)								
netincome_UAA	-141.68 (858.32)	-0.17	66	185	4893.81 (5741.01)	0.85	71	176
netincome_laborh	0.91 (1.61)	0.56	66	185	1.29 (0.99)	1.30	71	176
Radius Matching								
netincome_UAA	314.10 (908.62)	1.02	59	354	6851.44 (6352.42)	0.97	64	354
netincome_laborh	0.01 (1.19)	0.54	59	354	0.48 (1.28)	1.26	64	354
Kernel Matching								
netincome_UAA	303.23 (1235.15)	0.67	60	354	6851.44 (6379.43)	1	64	354
netincome_laborh	-0.04 (1.40)	0.56	60	354	0.48 (1.48)	1.20	64	354
N			69	457			73	457

Notes: Significance levels: *p < 0.1, **p < 0.05, ***p < 0.01;

DP17 refers to the treated (participant farmers) in the DP Program only in 2017 (one-time receivers);

DP1617 refers to the treated (participant farmers) in the DP Program in 2016 & 2017 (two-time receivers);

S.E. does not take into account that the propensity score is estimated;

Source: Own estimations based on FADN Data.

Table A 21: ATT estimates on farm size across three additional matching algorithms

NN Mahalanobis Matching	DP17 (t-2)				DP1617 (t-1)			
	ATT (S.E.)	t-value	Treated	Control	ATT (S.E.)	t-value	Treated	Control
NN Mahalanobis Matching (5)								
SE025	1.21** (0.49)	2.44	66	185	1.72*** (0.62)	2.78	71	176
SE085	1.95*** (0.66)	2.95	57	166	1.87*** (0.66)	2.82	61	143
Radius Matching								
SE025	0.89*** (0.41)	2.61	59	354	1.12*** (0.53)	2.83	64	354
SE085	0.56*** (0.53)	2.97	52	303	0.48*** (0.60)	3.46	55	303
Kernel Matching								
SE025	0.88*** (0.42)	3.12	60	354	1.12*** (0.54)	3.22	64	354
SE085	0.56*** (0.54)	3.01	52	303	0.48*** (0.61)	4.37	55	303
N			69	457			73	457

Notes: Significance levels: *p < 0.1, **p < 0.05, ***p < 0.01;

DP17 refers to the treated (participant farmers) in the DP Program only in 2017 (one-time receivers);

DP1617 refers to the treated (participant farmers) in the DP Program in 2016 & 2017 (two-time receivers);

S.E. does not take into account that the propensity score is estimated;

Source: Own estimations based on FADN Data.

Table A 22: ATT estimates on the environment across three additional matching algorithms

NN Mahalanobis Matching	DP17 (t-2)				DP1617 (t-1)			
	ATT (S.E.)	t-value	Treated	Control	ATT (S.E.)	t-value	Treated	Control
NN Mahalanobis Matching (5)								
SE085	1.95*** (0.66)	2.95	57	166	1.87*** (0.66)	2.82	61	143
SE295	905.16 (643.27)	1.41	66	185	357.86 (251.76)	1.42	71	176
SE300	122.06 (100.50)	1.21	66	185	49.43* (25.37)	1.95	71	176
shgrassland	-10.32*** (4.06)	-2.54	66	185	-0.83 (5.02)	-0.17	71	176
Radius Matching								
SE085	0.56*** (0.53)	2.97	52	303	0.48*** (0.60)	3.46	55	303
SE295	250.63** (99.31)	2.20	59	354	91.72 (114.72)	0.82	64	354
SE300	0.75 (26.45)	0.8	59	354	32.61* (23.89)	1.69	64	354
shgrassland	-7.51*** (3.87)	-2.74	59	354	7.10 (4.45)	0.38	64	354
Kernel Matching								
SE085	0.56*** (0.54)	3.01	52	303	0.48*** (0.61)	4.37	55	303
SE295	247.77* (105.63)	1.76	60	354	91.72 (120.51)	0.88	64	354
SE300	1.15 (27.48)	0.64	60	354	32.61 (24.98)	1.31	64	354
shgrassland	-7.38** (4.16)	-2.35	60	354	7.10 (4.74)	0.20	64	354
N			69	457			73	457

Notes: Significance levels: *p < 0.1, **p < 0.05, ***p < 0.01;

DP17 refers to the treated (participant farmers) in the DP Program only in 2017 (one-time receivers);

DP1617 refers to the treated (participant farmers) in the DP Program in 2016 & 2017 (two-time receivers);

S.E. does not take into account that the propensity score is estimated;

Source: Own estimations based on FADN Data.

EGZON BAJRAMI

AREAS OF EXPERTISE

Energetic and enthusiastic individual with over ten years of experience. Key areas of expertise include:

- Agricultural Policies
- Extension Services
- Agricultural Insurance
- Agribusiness
- Rural Development
- Agriculture Information and Statistics

SKILLS

- Policy Analysis
- Impact Assessment
- Project Planning & Monitoring
- Survey Design
- Data collection
- Quantitative & Qualitative Data Analysis
- Data Visualization

EDUCATION

Martin-Luther-Universität Halle-Wittenberg
Leibniz Institute of Agricultural Development in Transition Economies (IAMO)
Department of Agricultural Policy
Halle (Saale), DE

PhD Candidate

Master of Science in Agricultural Economics
University of Arkansas, Dale Bumpers College of Agricultural, Food and Life Sciences, Fayetteville, AR.

EXPERIENCE

World Bank Group/ International Finance Corporation
Agricultural Economist - Consultant

- Worked closely with a team of local experts to develop daily, monthly, and annual detailed crop plans;
- Assisted in measuring, analyzing, and interpreting crops data;
- Conducted economic analysis of the agricultural sector;
- Engaged with a team of national and international experts to assess the potential of the agricultural sector;
- Worked closely with a team of local and international experts to develop the first agriculture insurance system in Kosovo;
- Assembled and analyzed key risks and value chains, understanding costs of production and economic implications of crop/ animal husbandry development;

- Worked collaboratively with both the team and government officials to develop and amend the necessary regulations required by the state program;
- Analyzed the data for trends and statistical tests in yields, hectares planted, and other characteristics;
- Provided training, coaching, and consultations primarily to private sector insurance and reinsurance firms but also other stakeholder representatives as needed;

University of Prishtina "Hasan Prishtina"
Department of Agricultural Economics

Teaching Assistant

- Co-taught a number of classes including, "Agricultural Policy," "Data analysis," "Agribusiness value chain" & "Basic statistics";
- Supported students on their research work: including survey design, data collection, and statistical analysis of various data sets;
- Leader of the study group of the research entitled *"Agricultural policy and its impact on Kosovo`s rural demographics";*
- Assisted professors with research topics and drafting publications;
- Responsible for various teaching assistant jobs, including grading and reinforcing class material to undergraduate and graduate students.

Food and Agriculture Organization – FAO
Agricultural Economist - National Consultant

- Analyzed FADN panel data and Agricultural Household Survey panel data about the impact of past policies on small farms:
- Compiled reports on the results from these analyses;
- Designed questionnaires for data collection, focus groups, and case study interviews;
- Worked closely with a team of local experts to develop daily, monthly, and annual crop plans for Kosovo;
- Prepared and submitted assignment reports;
- Conducted economic analysis of the agricultural sector in Kosovo;
- Engaged with a team of national and international experts to assess the potential of the agricultural sector in Kosovo;

UNDP
National Consultant

- Worked with e team of experts to finalize the research needs, outline the methodology, define research questions, and select data sources that were analyzed for Human Development Report (HDR) 2017 for Kosovo;
- Statistically analyzed various data sets regarding the agriculture sector and rural areas in Kosovo;
- Author of the paper on *Agricultural and Rural Development in Kosovo for HDR 2017*;

Agro Business Consulting L.L.C
Consultant

- Provided consultancy services for project proposals;
- Advised on compliance with current legislation and use of governmental or EU schemes;
- Assisted on measuring, analyzing and interpreting data;
- Assisted drafting project proposals for Grant Measure 2 of Ministry of Agriculture "Measure 101: Investments in physical assets of agricultural households";
- Visit farms to conduct analyses and collect data;
- Established business relationships by identifying and cultivating prospective clients;

University of Arkansas
Department of Agricultural Economics and Agribusiness

Research Assistant

- Assisted professor on research topics and drafting publications;
- Statistically analyzed various data sets;
- Leader of the study group of the research entitled *"Immigration policy and its impact on U.S. Agriculture";*
- Co-author of research entitled: *"Are dairy subsidies effective on increasing income and milk productivity in Kosovo?";*
- Co-author of research entitled: *"Impact Assessment of the Direct Payment (DP) Program in the dairy sector in Kosovo";*
- Co-author of research entitled: *"Farm level efficiency analysis of dairy farms in Kosovo*";
- Responsible for various teaching assistant jobs, including grading and reinforcing class material to undergraduate students.

GIZ "Deutsche Gesellschaft für Internationale Zusammenarbeit"
Intern

- Investigated the current status of local companies working in the Medicinal and Aromatic Plants Sector (MAP). Author of the report: "*Assessment of GIZ contribution for development of the NWFP sector in Kosovo and needs for further sector development*";
- Co-author of the report: "Local Action Groups in Kosovo";
- Designed guideline interviews/ surveys and collected & analyzed data;
- Translated ad hoc English to Albanian and vice versa in expert interviews with single interview partners and groups;
- Contributed to analyzing interviews with reference to research questions and derived recommendations for the next study phase;
- Cooperated closely with a team of international interns and national long-term experts;

TECHNICAL SKILLS

Proficient in R, Stata, Tableau, MAXQDA & QGIS.

Languages: Fluent in English, Albanian & German; Beginner in Croatian & Spanish.

PUBLICATIONS & PRESENTATIONS

- **Selected paper:** Czyżewski, B., Kryszak, Ł., Bajrami, E., Lucasenco, E., Muntean, A., Tosović-Stevanović, A. (2023). Embeddedness, Sustainable Practices and Economic Performance in Farm Succession: The Case of Small-Scale Farming in Eastern Europe. Paper for presentation at the XVII Congress of the European Association of Agricultural Economists (EAAE), August 29th - September 1st, 2023, Rennes, France.

- Bajrami, E. (2023). Prices fluctuation of agricultural products and of basic basket in the last decade: Measures to withstand inflation in uncertain economic circumstances. Friedrich Ebert Stiftung - Kosovo. Study carried out in collaboration with the Parliamentary Committee for Environment, Agriculture, Planning and Development and the Heinrich Boll Foundation.

- Herzfeld, T., Möllers, J., Bajrami, E., Davidova, S., Gjonbalaj, M., Miftari, I., Krasniqi, N., Xhabali, V. (2022). Commercialization of smallholder farms in Kosovo. Budapest: Food and Agriculture Organization (FAO).

- Bajrami, E., Wailes, E., Dixon, B., Musliu, A., and Durand-Morat, A. (2019). Do coupled subsidies increase milk productivity, land use, herd size and income? Evidence from Kosovo. Studies in Agricultural Economics 121, 134-143.

- Möllers, J., Traikova, D., Herzfeld, T., Bajrami, E. (2018). Wenn Migration unfreiwillig endet: Wie kann die Integration von Rückkehrern im Kosovo gelingen? IAMO Jahreszahl 20: 63-70.

- Bajrami, E., Wailes, E., Dixon, B., Musliu, A., and Durand-Morat, A. (2018). Factors affecting the technical efficiency of dairy farms in Kosovo. Journal of Central European Agriculture 4 (18): 823-840.

- Möllers, J.,Traikova, D.,Herzfeld, T., and Bajrami, E. (2017). Study on rural migration and return migration in Kosovo. IAMO Discussion Paper No. 166, Halle (Saale): IAMO.

- Möllers, J.,Traikova, D.,Herzfeld, T., and Bajrami, E. (2017). Involuntary return migration to Kosovo: Tackling challenges for successful reintegration. IAMO Policy Brief No. 33, Halle (Saale).

- Musliu, A., Bajrami, E., Tsiboe, F., and Popp, J. S. (2016). Evaluating the impact of the Value Added Tax reform on raw milk collection in Kosovo. New Medit: A Mediterranean Journal of Economics, Agriculture and Environment, (V.1., 2017).

- **Selected poster:** Bajrami, E., Herzfeld, T., Möllers, J., Dufhues, T. (2021). Farmers' preferences towards extension services: Insights from a Discrete Choice Experiment. XVI EAAE Virtual Congress "Raising the Impact of Agricultural Economics: Multidisciplinarity, Stakeholder Engagement and Novel Approaches, Prag / Online, Tschechische Republik.

- **Selected paper:** Bajrami, E., Dufhues, T., Herzfeld, T., Möllers, J. (2020). Less direct payments for an improved extension service?: Insights from a Discrete Choice Experiment. Envisioning the Future of Extension, Washington D.C., USA.

- **Selected paper:** Bajrami, E., Ostapchuk, I. (2019). Evaluating the Effects of Coupled Direct Payments on Farm Income Using Dose Response Function. Evidence from Kosovo. 171st EAAE Seminar - Measuring and evaluating farm income and well-being of farm families in Europe, Taenikon, Schweiz.

- **Selected paper:** Bajrami, E., Herzfeld, T., Möllers, J., Dufhues, T. (2019). Farmers` preferences towards extension services. Insights from a Discrete Choice Experiment in Kosovo. IAMO Forum 2019 "Small farms in transition: How to stimulate inclusive growth", Halle (Saale), Deutschland.

- **Selected poster:** Tsiboe, F., Nalley, L. L., and Bajrami, E. (2018). Economic Incentives Necessary for Adoption of Environmentally Friendly Cocoa Production in Ghana. Poster prepared for presentation at the Southern Agricultural Economics Association's 2018 Annual Meeting, Jacksonville, Florida February 2-6, 2018.

- **Selected paper:** Rudi, J., and Bajrami, E. (2017). The Impact of Education Policies on Student Performance in Kosovo. Selected paper for presentation at the ASEEES Convention 2017, Chicago, IL, USA.

- **Selected poster:** Bajrami, E., Tsiboe, F., Musliu, A., Miftari, I., Wailes, E., Dixon, B. (2017). Estimating the effect of direct payments on technical efficiency: the case of dairy farms in the region of Prishtina and Peja, Kosovo. Poster prepared for presentation at the XV EAAE Congress "Towards Sustainable Agri-Food Systems: Balancing between Markets and Society" - August 28th to September 1st, 2017, Parma, Italy.

- **Selected poster:** Bajrami, E., Wailes, E., Dixon, B., and Musliu, A. (2016). Are dairy subsidies effective to increase milk productivity and income in Kosovo? A Propensity Score Matching Approach. Selected Poster prepared for presentation at the 2016 Agricultural & Applied Economics Association Annual Meeting, Boston, MA, July 31- Aug. 2.

- **Selected poster:** Miftari, I., Waldhardt, R., Bajrami, E., Gjonbalaj, M. (2014). Supply scale and demand for agricultural advisory services in Kosovo. Poster paper prepared for presentation at the EAAE 2014 Congress "Agri-Food and Rural Innovations for Healthier Societies"- August 26 to 29, 2014, Ljubljana, Slovenia.

Eidesstattliche Erklärung / *Declaration under Oath*

Ich erkläre an Eides statt, dass ich die Arbeit selbstständig und ohne fremde Hilfe verfasst, keine anderen als die von mir angegebenen Quellen und Hilfsmittel benutzt und die den benutzten Werken wörtlich oder inhaltlich entnommenen Stellen als solche kenntlich gemacht habe.
I declare under penalty of perjury that this thesis is my own work entirely and has been written without any help from other people. I used only the sources mentioned and included all the citations correctly both in word or content.

Datum / Date

Unterschrift des Antragstellers / *Signature of the applicant*