



Competitiveness of diversification strategies in agricultural dairy farms: Empirical findings for rural regions in Switzerland

Andreas Hochuli^a, Janina Hochuli^b, Dierk Schmid^{c,*}

^a Bern University of Applied Sciences, School of Agricultural, Forest and Food Sciences HAFL, Departement for Agricultural Economics, Länggasse 85, CH-3052, Zollikofen, Switzerland

^b Department of Health Sciences and Technology, Food Science Master, Universitätstrasse 2, 8092, Zürich, Switzerland

^c Agroscope, Tänikon, 8356, Ettenhausen, Switzerland

ARTICLE INFO

Keywords:

Competitiveness of dairy farms

Diversification strategy

Direct marketing

Agritourism

Farm income

Rural regions Switzerland

ABSTRACT

Compared to all other branches of Swiss agriculture, milk production has the largest economic significance. The price pressure on Swiss dairy farms is growing even though the market is heavily protected by tariff barriers in relation to Europe and the rest of the world. Against this background, the question arises for dairy farms as to which strategic orientation for their own farm is most profitable. The options are specialization in milk production, diversification such as with direct marketing or agritourism or an exit from milk production. However, the latter is not possible for farms with a high capital lockup in the dairy industry. Diversification into a complementary branch of farming such as direct marketing or agritourism can, in contrast, be linked to existing milk production. The present study examines three different strategies for dairy farms – highly specialized milk production, diversification into direct marketing and diversification into agritourism.

Based on the analysis of a Kruskal–Wallis Tests on accounting data from over 3500 specialized dairy farms and those with direct marketing and agritourism in Switzerland, a pattern can be identified of the biggest competitive advantage for the group of diversified dairy farms with agritourism. For Switzerland as a whole, the farm income as well as the labour productivity of dairy farms with agritourism perform best in this comparison. Because it is a niche market, however, only a small percentage of farms will be able to go into agritourism; most will have to resort to other options to meet the challenges of the dairy market.

1. Introduction

Milk production is the most important branch of Swiss agriculture. In 2017, around 20% (Swiss francs [CHF] 2.1 billion) of total agricultural production (CHF 10.3 billion) was earned by milk production (Federal Statistical Office (FSO), 2019a). For farmers, the strategic question often arises as to whether specialization in milk production is more profitable than on-farm diversification with agriculture-related activities (Roest et al., 2018). Particularly because the price of milk as a commodity has been subject to increased volatility for two decades in Switzerland, diversification strategies have become increasingly important for dairy farms. Various contributions in the academic literature on the subject of diversification in agriculture assume that the diversification strategy with the direct marketing of a farm's own products or services on the farm such as agritourism can absorb price volatility (Barbieri, 2010;

Barbieri and Mahoney, 2009; Darnhofer, 2014; Hansson et al., 2013). In line with some definitions of the term *diversification* in the literature, in this study the point of departure is taken from diversification in terms of the vertical integration of the value chain as on-farm diversification (Hansson et al., 2010). This concerns, for example, the processing of agricultural raw materials on the farm and the direct marketing of the products or services on the farm, such as agritourism (Barnes et al., 2015; Hansson et al., 2010). Agritourism includes services such as on-farm gastronomy, guest rooms or agricultural events (McGehee, 2007).

Neither diversification strategies, direct marketing and agritourism, are supported by Swiss agricultural policy with direct payments. For farmers, the entrepreneurial risk is therefore more important in comparison with the production of food. At the same time, this means that the requirements for the entrepreneurial thinking and behaviour of

* Corresponding author. , .

E-mail addresses: andreas.hochuli@bfh.ch (A. Hochuli), jhochuli@student.ethz.ch (J. Hochuli), dierk.schmid@agroscope.admin.ch (D. Schmid).

URL: <https://www.agroscope.admin.ch> (D. Schmid).

<https://doi.org/10.1016/j.jrurstud.2021.01.021>

Received 13 August 2020; Received in revised form 9 December 2020; Accepted 4 January 2021

Available online 14 January 2021

0743-0167/© 2021 The Authors.

Published by Elsevier Ltd.

This is an open access article under the CC BY-NC-ND license

(<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

farmers are higher than for subsidized farming sectors (Clark, 2009). Following McGehee and Kim (2004), the most important entrepreneurial motivation to enter the agritourism business is the additional income. The second most important motivation is the utilization of the workforce on the farm. According to the study by McGehee and Kim (2004), of the six main motivations for running agritourism activities on a farm, four are economically oriented. In addition, Nickerson et al. (2001) followed the argument that agritourism activities require entrepreneurial skills with the aim of improving farm income. Often, the farms are also too small to generate sufficient income for the families. Farmers thus act upon the hope of being able to generate a higher income for the family by entering agritourism (Meert et al., 2005). Even though agritourism offers the possibility of achieving higher agricultural incomes, this diversification strategy remains a niche in European agriculture. The main reasons for this are relatively high investments in guest rooms or on-farm hospitality services, uncertain return on investment, general entrepreneurial risks and lack of management knowledge for the operation of agritourism services (Sharpley and Vass, 2006).

Compared to agritourism, the diversification strategy of direct marketing is much more widespread in European and Swiss agriculture. The reasons are founded in higher legal restrictions on agritourism facilities and the relatively lower entrepreneurial risks of direct marketing (Tonner and Wilson, 2015). Direct marketing from the farm entails various distribution possibilities. These include farmers markets in the city as well as farm shops or mail order from the farm. The main reasons for entering direct marketing include the hope for a better income and the utilization of the farm labour force. Consumers are increasingly looking for security of supply and traceability of food back to the farm (Uematsu and Mishra, 2011). In addition to the motivation to achieve a higher income with direct marketing, other factors can be identified in the literature which promote the entry into direct marketing. A study on the success factors for direct marketing in the south-eastern United States shows, in line with other studies, that entrepreneurship, a willingness to take risks and differentiated marketing are important conditions for success (Ahearn and Sterns, 2013). In short, direct marketing and agritourism as successful diversification strategies for farms require entrepreneurship, a willingness to take risks, risk management and differentiated marketing.

Besides these entrepreneurial aspects, the geographical location of dairy farms is an important factor in the strategic orientation towards specialization or diversification (Lange et al., 2013). Considering the topographical conditions of Switzerland, the present study differentiates between three regions, which are also distinguished in Swiss agricultural policy legislation. These are the so-called plains region, hill region and mountain region (Federal Council of Switzerland, 2018). Because of the different altitudes and topography, agricultural production conditions in the hill and mountain regions are more difficult than in the plains region. This can be seen in the different production volumes and therefore in the farm income and different costs of production (Schmid and Roesch, 2011). On average, farms in the plains region generate up to twice as much income as farms in the hill and mountain regions. In the context of these regional differences, the question arises for dairy farms as to which of the three farm strategies – specialization in milk production, milk production with diversification in direct marketing or diversification in agritourism – is most efficient.

Many regions in Switzerland are strongly characterized by agriculture. In remote regions, the population is migrating. Between 2000 and 2017, for example, around 31% of municipalities in mountainous areas registered a decline in population (Federal Statistical Office (FSO), 2019b). Farms with competitive strategies have a higher spatial persistence and therefore support the rural areas.

The importance of direct marketing, also known as direct sales, has increased significantly in Swiss agriculture in recent years. Since 2010, the number of farms offering direct marketing increased by 60%, to 11,360 of a total of approximately 55,000 farms in 2016. In the plains

region one in four farms and in the hill and mountain regions one in five farms offered their goods for sale directly to customers. The number of dairy farms with diversification by agritourism is much smaller. In the last census, in 2016, there were around 2500 farms throughout Switzerland offering agritourism services (Federal Statistical Office (FSO), 2019a). However, the agricultural business census does not show the economic importance of direct marketing or agritourism.

Against the background of price fluctuations in the dairy sector, we are investigating whether the strongly entrepreneurially motivated diversification strategies of direct marketing and agritourism are also correspondingly economically successful in Switzerland and can make a contribution to stability in remote regions. The aim of these study is to test the hypothesis that there is no difference in farm income or labour productivity between the three farm strategies specialization, diversification with direct marketing and diversification with agritourism. Furthermore, this hypothesis is to be tested regarding farm locations in plane, hill and mountain regions. This can be used to show whether the choice of farm strategies has comparative competitive advantages. This study examines panel data from the Swiss Federal Research Institute for Agriculture and Food (Agroscope), regarding the labour productivity of a total of more than 3500 dairy farms with specialization and diversification strategies in the three regions from 2010 to 2015 (Hoop and Schmid, 2015a).

2. Theoretical background

2.1. Definitions

In general, there are two different strategies which can be implemented on dairy farms – diversification or specialization (Hansson et al., 2010; Roest et al., 2018). Many different definitions of the term *diversification* can be found in the literature. In this study, the concept of diversification is based on terms of vertical integration of the value chain. Therefore, diversification refers to dairy farms that not only earn money from milk production itself but also have another source of income (Barnes et al., 2015). In line with this definition, a distinction between on-farm and off-farm diversification can be made. Off-farm diversification describes an income source that is not related to the farm itself, such as employment in another business. On-farm diversification, alternatively, refers to different activities related to the farm itself, such as direct marketing; agritourism; the processing of raw materials, such as milk to cheese; the rental of resources, such as machinery; or the offering of consultation and education services (Barnes et al., 2015; Hansson et al., 2010). It is important to distinguish on-farm diversification and so-called pluriactivity, which covers all the income-generating activities of the farm household and thus also takes off-farm work into account (Barnes et al., 2015). This study focuses on the on-farm diversification, which concerns different activities within the dairy farm, such as direct marketing and agritourism, which are discussed in more detail. The term *agritourism* applies to farms that, on one hand, produce agricultural products, and on the other hand, incorporate a touristic component, such as on-farm accommodations or agricultural activities. Thus, examples of agritourism are bed-and-breakfasts, farm tours or pick-your-own produce (McGehee, 2007; McGehee and Kim, 2004; Sharpley and Vass, 2006). Direct marketing means that the dairy farms sell their products directly to the consumer. Various distribution possibilities, such as farmers markets, you-pick stations or farm shops, are included in the concept of direct marketing (Brown et al., 2006; Uematsu and Mishra, 2011). Direct marketing is considered a part of vertical integration since consumers perceive an existing product as a different one if it is sold within such distribution possibilities, and the traceability of the product increases its value (Barnes et al., 2015). In contrast to the diversification strategy, farms using the specialization strategy concentrate on the production of a single product. The aim of the specialization strategy is intensification and therefore an increase in productivity and efficiency. The

specialization strategy is usually accompanied by selling the agricultural products to large, centralized companies (Hansson et al., 2010; Roest et al., 2018). In this study, a dairy farm is considered to be specialized if the turnover from milk production is higher than 75% as a share of total turnover.

In the context of farm diversification, the term *entrepreneurial farmers* is often used. It is difficult to define this term precisely, and various concepts and definitions can be found in the literature (McGehee and Kim, 2004; Phelan, 2011; Vik and McElwee, 2011). However, in this study, farm entrepreneurship describes farmers who engage in various forms of diversification beyond typical agricultural activities. Therefore, farm entrepreneurship includes diversification through direct marketing and agritourism (McGehee and Kim, 2004; Vik and McElwee, 2011; Vik, J., McElwee, G., 2011). For farmers, it is increasingly important that they become entrepreneurial to remain competitive and improve profits. In line with this, it is also found that the most common reasons for becoming entrepreneurially active and entering the agritourism business are economic in nature (McGehee and Kim, 2004). To improve their economic situation, the farmers need to acquire a range of new skills, such as innovation, cooperation, networking and risk management (Vik, J., McElwee, G., 2011). Indeed, the biggest threat to the success of farm diversification is a lack of business skills (Phelan, 2011).

2.2. Diversification strategy

It is important to understand farmers' motivation for on-farm diversification. Several motives could be identified as to why farmers diversify their farms, and various reasons for diversification can be found in the literature. However, it is crucial to note that the motives for diversification include not only the economic aspect but are of a more complex nature. Hansson et al. (2013) identified two main reasons for farm diversification – first, that farmers want to develop a business to minimize risks and use idle resources better and, second, that diversification is also driven by social and lifestyle choices. Effectively, evidence can be found in the literature that income risk can be reduced through diversification strategies (McNally, 2001). Barbieri and Mahoney (2009) also observed that the desire to reduce risk and uncertainty was the main reason for farm diversification. Other reasons they found were to improve farm income, to fulfil a desire for growth and to achieve personal as well as family aspirations. According to Nickerson et al. (2001), the reasons for diversification can be classified into different categories. Some of the categorized motivations for diversification are to counteract fluctuations in income, to enhance income, to create employment for the family, to better use the farm's resources and to educate the consumer about farm life (Barbieri and Mahoney, 2009; Hansson et al., 2013; Nickerson et al., 2001).

Due to environmental, social and political changes, for farmers it is increasingly difficult to persist using traditional agricultural methods. Thus, increasingly, more farmers are becoming entrepreneurially active and deciding to implement a type of diversification strategy (Morris et al., 2017; Phelan, 2011). However, the ability to adjust to changing marketing signals or social trends relies largely on the farm's flexibility. The ability to diversify the farm depends on the available resources, such as land, fixed capital, skills or staff and technologies (Morris et al., 2017; Yoshida et al., 2019). Further, it is important for farmers to be connected to each other as well as to farm extension services in order to improve communication and information and thus to be able to react to market opportunities as they arise (Morris et al., 2017; Phelan, 2011). Therefore, technology adaption and innovation are key factors for a successful diversification strategy. Regarding the adaption of technology, financial performance relies heavily on the skills and abilities of the farmers (Morris et al., 2017). Not only can a lack of resources inhibit the success of diversification but also the farmer's own level of education and willingness to cooperate. Many farmers do not consult business advice services and have only a limited social network with farmers who are diversified, and therefore they may miss arising market opportunities.

This may restrict their entrepreneurial success in farm diversification (Morris et al., 2017; Yoshida et al., 2019).

2.2.1. Agritourism

Entering agritourism offers the possibility to increase farm income (McGehee et al., 2007; McGehee and Kim, 2004; Veeck et al., 2006). However, agritourism as a diversification strategy remains a niche in European agriculture, which can be explained by various challenges, such as high investment costs, uncertain return on investment and lack of knowledge of how to operate agritourism services (Sharpley and Vass, 2006). Only limited research has been conducted to identify the attitude of farmers towards diversification strategies in agritourism (Rauniyar et al., 2020; Sharpley and Vass, 2006). Nevertheless, it is recognized that on-farm accommodations are the most common form of agritourism (Sharpley and Vass, 2006). Even though additional income is the main driving force to enter agritourism, the extra revenue from agritourism is usually minimal. However, this additional income can still contribute to the survival of a farm and therefore may make a difference (McGehee and Kim, 2004). The low profit can partly be attributed to the facts that businesses in agritourism usually operate on a small scale and are seasonally dependent (Sharpley and Vass, 2006). Furthermore, not every region is attractive to tourists, and the provided accommodation and activities must meet the demands and expected quality standards of the guests (Huber et al., 2020; Sharpley and Vass, 2006). For offers in agritourism, a location close to urban centres or highly frequented tourist destinations is an important success factor. According to various studies, the potential for significant economic success with agritourism seems to increase in the proximity of such locations (Detre et al., 2011; Lange et al., 2013; Meraner et al., 2015). In addition, sound marketing of the farm business is crucial, but usually farmers do not have the skills or resources for an effective marketing campaign (Sharpley and Vass, 2006; Veeck et al., 2006). Therefore, it is important that farms cooperate with each other to create a successful marketing strategy and assure high quality (Engeset and Heggem, 2015).

2.2.2. Direct marketing

Compared to the diversification strategy of agritourism, the diversification strategy of direct marketing is more common and is becoming increasingly important. In Switzerland, the number of farms that have implemented the direct marketing strategy has increased in recent years (Detre et al., 2011; Federal Statistical Office (FSO), 2019a). This increase can be explained by the facts that the implementation of direct marketing is associated with relatively few entrepreneurial risks and that farmers can sell their products for a higher price if they eliminate intermediaries and sell directly to the consumer (Ahearn and Sterns, 2013; Detre et al., 2011; Tonner and Wilson, 2015). Thus, they can increase their agricultural income (Detre et al., 2011). However, the profitability of direct marketing depends on a farm's characteristics, such as size or method of production, staff and type of product and location, among others. Therefore, for economic success, it is crucial to adopt a differentiated marketing strategy that fits the characteristics of the farm (Brown et al., 2006; Detre et al., 2011).

2.3. Specialization strategy

The specialization strategy has not gained the same attention in the literature as the diversification strategy although it is another interesting strategy to follow due to the possibility of improving production efficiency (Hansson et al., 2010; Roest et al., 2018). Higher production efficiency has the potential to lower production costs and increase farm revenue. Thus, the specialization of a farm can lead to competitive advantages and an improved economic situation because of large-scale production (Hansson, 2007; Hansson et al., 2010; Roest et al., 2018). Hansson et al. (2010) found that farms that are financially well off are more likely to enhance their specialization in the future. This may be explained by the fact that successful farm entrepreneurs want to

continue investing in their business (Hansson et al., 2010). However, there are different driving and inhibiting forces that influence the success of specialized dairy farms. These include, for example, geographical location, the machinery used and the business skills and attitude of the farmers (Hansson, 2007; Hansson et al., 2010). Further, while specialization increases farm efficiency, it also makes the farms more vulnerable. When prices are volatile, highly specialized farms have a higher market risk since production costs remain at a constant level but prices can decrease (Hansson et al., 2010; Roest et al., 2018).

3. Data

Agroscope is the leading scientific competence centre for agriculture and nutrition. Agroscope annually surveys the accounting results of Swiss farms. The accounts of reference farms are used to assess the economic situation of Swiss agriculture as accurately as possible. The accounts of the reference farms are financial accounts with partial-cost accounting. The data obtained can be considered as annual panels although the composition of the panel may change from year to year. From 2010 to 2015, up to 2400 reference farms represented approximately 44,000 Swiss farms each year and over 90% of agricultural production (Hoop and Schmid, 2015b).

For the present study, a panel of accounting results for the years 2010–2015 was analysed. First, all dairy farms were selected. In line with the classification structure of the European agriculture system and the corresponding methodology of Agroscope (Kommission der Europäischen Union, 2008; Renner et al., 2019), the definition of a dairy farm is as follows: the farm may have a maximum of 25% open arable land and a maximum of 10% of special crops (e.g. fruit, vines, vegetables) in relation to the total agricultural area; more than 75% cattle in relation to the total livestock; more than 25% dairy cows in relation to the total cattle population; and a maximum of 25% suckler cows in relation to the total cattle population. All other farms were excluded. The dairy farms were then divided into three farm types of specialized, diversified with direct marketing and diversified with agritourism, where a specialized dairy farm must achieve 75% or more turnover from milk production as a share of total turnover. Diversified dairy farms have less than a 75% share of turnover with milk production in relation to total turnover and have a branch with direct marketing or agritourism. Thus, the farm types were strictly divided to ensure that they were not overlapping. In the end, these farm types were classified into the three major Swiss regions related to agricultural production – the plains region, the hill region and the mountain region. Using this categorization, a total of over 3500 dairy farms could be analysed.

4. Methods

From the selected data panel, two economic output variables were analysed as indicators for gross value added and labour productivity. Gross value added is equated with farm income, which is calculated as total turnover, including direct payments, minus costs for advance material and services. Labour productivity is calculated by dividing farm income by the number of full-time equivalent (FTE) jobs on the farm. Because the two variables had a strongly right-skewed distribution and are therefore susceptible to distorted mean values, both farm income and farm income per FTE were trimmed with the corresponding 10% and 90% quantiles. All data lower respectively higher the decile values were excluded. This trimming has the advantage that the mean values are less distorted and more robust as estimators (Berkes and Horváth, 2012; Liu et al., 2014). According to Berkes and Horváth (2012), the trimming of large samples is a standard statistical method to obtain robust estimators and tests. However, the two variables were not even normally distributed, even with this trimming. As the normal distribution of the data is an important precondition for parametric tests, the variables were analysed with a non-parametric test. First, the median differences of the three farm types were tested with the Kruskal–Wallis test (one-way

ANOVA on ranks). The significance level was determined at $\alpha = 0.05$. A p-value smaller than 0.05 indicates that at least two median values differ significantly from each other.

Using the Kruskal–Wallis multiple-comparison z-value test (Dunn's test), the distributions, respectively the medians of the farm income and the farm income per FTE, could be compared pairwise. The significance level was set at $\alpha = 0.05$. The z-value was determined for the pairwise comparison of the medians of the farm types with the Bonferroni multiple comparison procedure (z-value > 2.3940). The statistical analyses were performed with the NCSS statistical software package.

As a comparison of the farm types by the economic output indicator of farm income, the two variables of labour and agricultural area as economic factor inputs were analysed. The same analytical methods described above were used. The reason for this analysis is that economic theory states that higher output is associated with higher input factors. A higher farm income should therefore be justified by a higher input of labour (FTE) and capital (agricultural area). Under this assumption, the Kruskal–Wallis multiple-comparison z-value test should provide the same results for all three indicators – farm income, FTE and utilized agricultural area.

5. Results

5.1. Descriptive statistics

An important indicator for assessing labour productivity is the farm income per FTE. The descriptive statistics for the overall situation in Switzerland show the number of observations for each farm type, whereby 117 farms could be analysed for the dairy farms with agritourism, 1019 for those with direct marketing and 2403 for the specialized dairy farms (Table 1). The shares of these farm types correspond approximately to the situation of all dairy farms throughout Switzerland. The median farm income per FTE decreases with increasing geographical altitude, which can be expected because production output decreases with increasing altitude due to climatic and topographic factors. The plains region (Table 2) has the highest median farm income per FTE, followed by the hill region (Table 3) and the mountain region (Table 4). The quartiles also show this pattern. An exception is the diversified dairy farms with agritourism in the hill region. The two quartiles of farm income per FTE are higher than in the plains region. The medians are very close to the mean values due to the trimming.

5.2. Comparison of farm types and regions

For dairy farms, the question arises as to which group, grouped by the three strategic options, is most profitable. It can be expected that dairy farms with an additional on-farm source of income will generate a higher farm income than specialized dairy farms. The data analysis for Switzerland as well as for the regions shows that this assumption can be confirmed throughout but that the differences between farm types are not always significant (Table 5). Looking at dairy farm types with agritourism for Switzerland overall, there is a significant difference in farm income of CHF 27,591 in comparison with dairy farms diversified by direct marketing. The difference in farm income between specialized dairy farms and dairy farms with agritourism is also significant, amounting to CHF 30,217.

Looking at Switzerland overall, the group of farms with the diversification strategy of agritourism seems to be successful, without, however, taking into account the labour input or the size of the farm (e.g. the agricultural land or the number of dairy cows).

A significant difference can only be observed in the plains region. The difference between the farm income of specialized dairy farms compared to those with direct marketing is CHF 15,413. The difference between dairy farms with agritourism and direct marketing is higher but not significant at CHF 23,059. The largest significant differences in farm income between farm types are found in the hill region. Diversified dairy

Table 1

Farm income per FTE in CHF, Switzerland.

Farm Income per FTE in CHF	Statistical Indicators							
	n	Mean	Median	SD	Min	Max	25%	75%
All regions Switzerland								
Agritourism Dairy Farms	117	54,981	54,754	16,831	22,321	92,215	41,013	67,471
Direct Marketing Dairy Farms	1019	48,728	45,911	17,502	20,616	95,571	35,121	59,266
Specialized Dairy Farms	2403	54,439	52,802	19,526	20,650	95,683	38,709	69,345

Table 2

Farm income per FTE in CHF, plains region.

Farm Income per FTE in CHF	Statistical Indicators							
	n	Mean	Median	SD	Min	Max	25%	75%
Plains Region (1)								
Agritourism Dairy Farms	37	55,858	54,702	16,685	22,321	88,077	41,293	68,172
Direct Marketing Dairy Farms	277	55,098	53,423	18,559	20,616	95,309	40,954	68,533
Specialized Dairy Farms	721	58,687	59,301	19,143	20,650	95,683	43,438	73,139

Table 3

Farm income per FTE in CHF, hill region.

Farm Income per FTE in CHF	Statistical Indicators							
	n	Mean	Median	SD	Min	Max	25%	75%
Hill Region (2)								
Agritourism Dairy Farms	41	61,524	63,305	13,704	25,526	84,908	53,548	71,659
Direct Marketing Dairy Farms	312	48,657	45,168	17,739	20,965	95,571	35,355	59,364
Specialized Dairy Farms	976	54,969	53,260	19,519	20,716	95,388	39,584	69,349

Table 4

Farm income per FTE in CHF, mountain region.

Farm Income per FTE in CHF	Statistical Indicators							
	n	Mean	Median	SD	Min	Max	25%	75%
Mountain Region (3)								
Agritourism Dairy Farms	39	47,272	43,649	17,186	23,421	92,215	32,603	58,391
Direct Marketing Dairy Farms	430	44,675	43,159	15,314	20,780	93,105	33,042	53,594
Specialized Dairy Farms	706	49,366	46,847	18,795	20,836	95,195	34,347	60,569

farms with agritourism also perform well in the hill region. The difference to the dairy farms with direct marketing amounts to CHF 32,910 and to the specialized dairy farms CHF 38,535. In the mountain region, the differences between farm types are not significant. However, considerable differences in the amounts can be observed. Again, it is the group of dairy farms with agritourism that shows income advantages. In comparison to the dairy farms with direct marketing, the income is CHF 22,381 higher, and that of the specialized dairy farms is CHF 24,039 higher. In the overall assessment of farm income for all of Switzerland and the three regions, considerable advantages of the group of dairy farms diversified with agritourism over the other two farm types can be identified.

In addition to farm income, Table 5 provides the structural indicators of FTE and agricultural area in hectares (ha). The median values of the FTE respectively the area show the median farm size per farm type and region. For Switzerland, the comparison between the FTE of dairy farms with agritourism and those with direct marketing does not show any significant difference; they differ by only 0.02 FTE. However, as explained above, the two types of farms differ significantly in terms of farm income. This is an indication that the labour factor input has no significant impact on farm income. However, the two farm types differ significantly in terms of agricultural area, by 1.650 ha. Therefore, it cannot be completely ruled out that the higher farm income of dairy farms with agritourism is at least partly due to the size of the agricultural area. For the plains and mountain regions, no significant differences between these farm types can be found, and for the hill region, only for the farm income.

The comparison between the two farm types, agritourism dairy farms

and specialized dairy farms, for Switzerland overall shows significant differences both in farm income and FTE but not in utilized agricultural area. Dairy farms with agritourism generate a significantly higher farm income of CHF 30,217, with 0.360 more FTE. Also, in the hill region, the farm income and the FTE of farms with agritourism are significantly different. Therefore, it cannot be ruled out that this difference is due to the higher labour input for agritourism services. For the plains region and the mountain region, only a significant difference in FTE was found. Nevertheless, the higher differences in farm income must be considered in the interpretation and conclusions.

For Switzerland overall, a significant difference in FTE and utilized agricultural area can be found between specialized dairy farms and those with direct marketing. The agricultural area is 2.050 ha smaller for farms with direct marketing. However, the labour input in this respect is 0.340 FTE higher for direct marketers but without achieving a significantly higher farm income. Looking at these two farm types, it can be concluded for the whole of Switzerland and for the hill region that the higher labour input is due to direct marketing. The same pattern can be identified for the hill and mountain regions. In the plains region, however, the farm income of direct marketing farms is significantly higher by CHF 15,413.

Farm income provides information on the total turnover, including direct payments, less costs for advance material and services. Table 6 shows the median values of farm income per FTE by farm type and region. This indicator gives information on the productivity of the factor of labour. Table 6 also shows the differences in farm income per FTE between farm types, the z-scores of the Kruskal–Wallis multiple-comparison z-value test and the p-scores of the test. It should be noted

Table 5

Kruskal–Wallis Multiple-Comparison z-Value Test (Dunn's Test) of Farm Income (CHF), FTE and Agricultural Area (ha).

Dairy Farms Switzerland Farm Type	Median of Groups			Difference between Groups			p α = 0.05
	Agritourism (a)	Direct Marketing (b)	Specialization (c)	a - b	a - c	b - c	
All Regions Switzerland							
Farm Income (in CHF)	n = 114 111,964	n = 971 84,373	n = 2452 81,748	27,591 ^a z = 4.5715	30,217 ^a z = 5.2082	2626 z = 1.2237	0.000001
FTE	1.91	1.89	1.55	0.020 z = 0.9158	0.360 ^a z = 6.4048	0.340 ^a z = 13.7929	0.000000
Agricultural Area (ha)	21.8	20.15	22.2	1.650 ^a z = 2.9425	−0.400 z = 0.2042	−2.050 ^a z = 8.1989	0.000000
Plains Region (1)							
Farm Income (in CHF)	n = 36 113,150	n = 235 105,504	n = 744 90,091	7646 z = 0.9249	23,059 z = 2.3589	15,413 ^a z = 3.1675	0.000026
FTE	1.78	1.94	1.54	−0.160 z = 0.4122	0.240 ^a z = 3.1304	0.400 ^a z = 8.1249	0.000000
Agricultural Area (ha)	21.72	20.31	22.18	1.410 z = 1.1450	−0.460 z = 0.7547	−1.870 ^a z = 4.4596	0.000046
Hill Region (2)							
Farm Income (in CHF)	n = 39 120,333	n = 302 87,423	n = 976 81,799	32,910 ^a z = 3.5938	38,535 ^a z = 4.4953	5625 z = 1.8614	0.000003
FTE	2.00	1.93	1.54	0.070 z = 0.5291	0.460 ^a z = 3.9822	0.390 ^a z = 11.2428	0.000000
Agricultural Area (ha)	21.63	19.35	21.66	2.280 z = 2.3299	−0.030 z = 0.0599	−2.310 ^a z = 5.8721	0.000000
Mountain Region (3)							
Farm Income (in CHF)	n = 39 97,573	n = 434 75,192	n = 732 73,535	22,381 z = 2.1818	24,039 z = 2.3350	1658 z = 0.3136	0.065475
FTE	1.94	1.77	1.61	0.170 z = 2.1068	0.330 ^a z = 4.0357	0.160 ^a z = 5.1342	0.000000
Agricultural Area (ha)	23.50	20.95	23.31	2.550 z = 1.8741	0.190 z = 0.0635	−2.360 ^a z = 4.9990	0.000003

^a Bonferroni test: Medians significantly different if |z|-value > 2.3940.**Table 6**

Kruskal–Wallis Multiple-Comparison z-Value Test (Dunn's Test) of Farm Income per FTE in CHF and Dairy Farm Types.

Farm Income per FTE Dairy Farm Types	Median of Groups (CHF)			Differences between Groups			p α = 0.05
	Agritourism (a)	Direct Marketing (b)	Specialization (c)	a - b	a - c	b - c	
All regions Switzerland	54,754	45,911	52,802	8843 ^a	1952	−6891 ^a	0.000000
Number of observations (n)	117	1019	2403	z = 3.6917	z = 0.7087	z = 7.8448	
Plains region (1)	54,702	53,423	59,301	1279	−4599	−5878 ^a	0.016978
Number of observations (n)	37	277	721	z = 0.2367	z = 0.9245	z = 2.7905	
Hill region (2)	63,305	45,168	53,260	18,138 ^a	10,046 ^a	−8092 ^a	0.000000
Number of observations (n)	41	312	976	z = 4.5296	z = 2.6562	z = 5.0588	
Mountain region (3)	43,649	43,159	46,847	,491	−3198	−3688 ^a	0.001284
Number of observations (n)	39	430	706	z = 0.7320	z = 0.6123	z = 3.6477	

^a Bonferroni test: Medians significantly different if |z|-value > 2.3940.

that differences with a negative sign must be understood as an absolute value.

Looking at Switzerland overall, significant differences can be observed between the groups of dairy farms with agritourism and those with direct marketing (CHF 8843) and between specialized dairy farms and diversified dairy farms with direct marketing (CHF 6891). The descriptive statistics and box plots in Fig. 1 illustrate these findings, while Fig. 2 shows a graphic comparison between the regions.

With a difference of CHF 5,878, only the specialized dairy farms in the plains region differ significantly from the diversified ones with direct marketing. The strongest and most significant differences between the farm types are found in the hill region. Dairy farms with agritourism differ from those with direct marketing by an amount of CHF 18,138 and from specialist farms by CHF 10,046, while the farm income per FTE of specialized dairy farms is CHF 8092 higher than that of direct marketers. In the mountain region, as in the plains region, a significant difference can only be observed between specialized dairy farms and those with direct marketing, with specialized dairy farms performing better by CHF 3688.

The box plots of Figs. 1 and 2 show the data distribution of the analysed variable of farm income per FTE for the three farm types in

Switzerland and per region. The corresponding statistical key indicators can be found in Table 6. As already described in the Introduction section, farm income is made up of the total turnover from products sold on the market plus direct payments minus material costs. Region 1 corresponds to the plains region, 2 is the hill region and 3 is the mountain region.

6. Discussion and practical implications

Many studies deal with the objectives of different operating strategies in diversification and specialization. A frequently cited reason is income improvement or income stabilization (Barbieri and Mahoney, 2009; Hansson et al., 2013; McGehee and Kim, 2004; Nickerson et al., 2001). In the context of a liberalized market environment for milk in Switzerland, where lower prices and higher price volatility are expected (El Benni and Finger, 2013), the question arises as to whether diversification strategies offer general advantages over specialization strategies.

The income objective mentioned in studies on diversification seems to be more in terms of additional income linked to stability, use of free capacity or self-fulfilment rather than increasing the productivity of the labour used on the farm. From an economic point of view, however, the

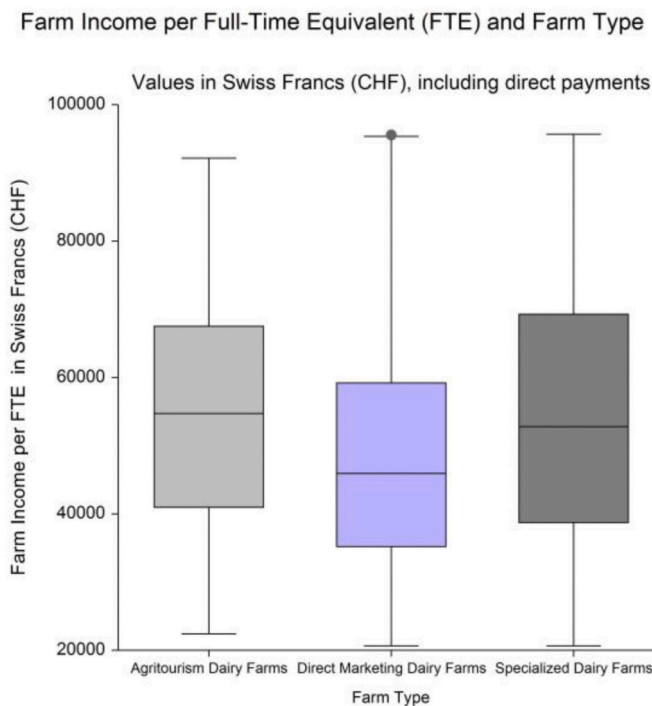


Fig. 1. Box plots of farm income per FTE and farm type.

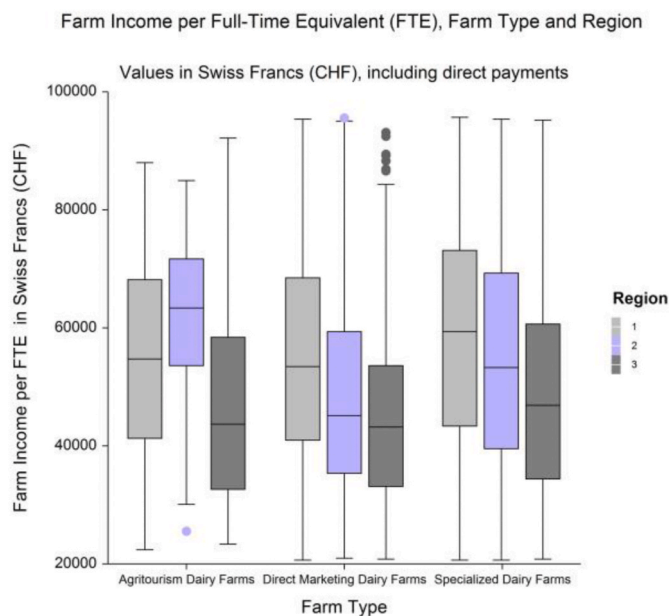


Fig. 2. Box plots of farm income per FTE, farm type and region.

consideration of the optimal factor allocation – specifically, that of labour productivity – is relevant.

The use of the key figures of agricultural income and farm income per FTE can answer two questions concerning the strategies or the orientation of the farm. Are there differences, first, in the extent of economic power and, second, in labour efficiency? The analysis has shown that the results of the two indicators differ.

In terms of both assessment criteria, the group of farms with agritourism achieves the best results in comparison with the direct marketing and specialization groups of farms, both across Switzerland and in the individual regions. As one might argue that it is due to the size of the farm, we have introduced the factors of agricultural area and FTE. In

view of the partly significant but also smaller group differences concerning agricultural area, it can be assumed that these economic differences cannot be traced back to economies of scale. Therefore, these farms have succeeded in gaining both a higher level of income and higher productivity through more efficient use of labour than the other two groups of farms. If one assumes that the objectives from the studies also apply to Switzerland, one can conclude that they are being achieved. The diversification strategy has been successful for these farms. This finding is consistent with the results of several studies (Clark (2009); Ferguson and Lovell (2019); Khanal and Mishra (2014); Tew and Barbieri (2012); Vogt (2014)) in which diversification or agritourism has improved farm income or in which a positive correlation between labour income and diversification has been investigated. The research of Schilling et al. (2014) is in line with these findings although only for small American farms.

As Tew and Barbieri (2012) report in their study that agritourism offers often do not have to be paid for, they serve as a catalyst for a farm's success. In our case, we do not know for sure whether agritourism or any other business is the reason for better profitability because we have only aggregated performance indicators at the farm level. However, due to the grouping, it is highly likely that it is due to the diversification strategy. Additionally, it has to be mentioned that the methods used do not identify causality. Therefore, it might be possible that the degree of economic success of a farm determines its strategy.

According to the findings in Mamardashvili et al. (2014), by contrast, farms with a higher share of other gainful activity outputs are less efficient. As reported by Che (2007), possible reasons for the lack of return and efficiency are bigger investments and higher wages. In our case, it seems that those points are mostly under control.

In Switzerland, dairy farms with a direct marketing strategy do not achieve significantly different farm incomes compared to farms with milk specialization. In this respect, the goal of increasing farm income would not be achieved. However, it must be said that the farm income of these farms is not smaller, either. Looking at farm size, one might argue that farms in the direct marketing group are significantly smaller than farms with agritourism or specialized farms and that their farm income is underestimated for reasons of economies of scale. In terms of labour productivity, however, these farms perform significantly worse than those with the specialization strategy. This finding is in line with the investigations by Park et al. (2014), Uematsu and Mishra (2011), Schilling et al. (2012) and García-Cornejo et al. (2020). The higher gross sales for direct marketing companies identified in the study by Detre et al. (2011) initially appears to be a positive result, but due to the lack of information on costs and labour input, it is not possible to make a final assessment of whether income or labour productivity also increased.

One explanation could be that the amount of labour required is underestimated or that the marketing strategy does not increase turnover enough. The change in business strategy from a pure production farm to a farm with processing and direct marketing can lead to efficiency losses. The change to elaborations of products more complex than fresh milk (García-Cornejo et al., 2020) or production-related tasks in general is also considered to lead to efficiency losses. However, since we do not know exactly the extent to which the farms are engaged in direct sales or processing, due to the lack of available information, we must remain speculative.

At best, the economic objective plays no or only a subordinate role for these farms, and objectives such as the utilization of free capacities and self-realization are more important. The direct marketing strategy seems less effective in achieving income goals. Although the goal of improving income has not been achieved in the case of direct marketing, it should be noted that the diversification strategies examined do not produce worse results in terms of income power than the specialization strategy.

In terms of regional differences, farms with agritourism in the hill region are more successful compared to those in the plains and mountain regions. To associate this with a special proximity to tourist offers

(Bartolini et al., 2014; Meraner et al., 2015), the population of the country, the proximity to urban centres (Veeck et al., 2006) or the mobility infrastructure (Lucha et al., 2016) is hardly likely since all regions in Switzerland have both tourist and non-tourist areas, and the distances within the country are not far such that every place can easily be reached. There can be great regional variation in terms of terrain, scenic and recreational qualities, climate and the availability of nearby attractions, which can influence the type and popularity of agritourism offers and tourists' preferences for particular destinations. It is therefore not possible to draw direct conclusions regarding the potential for agritourism from the location of a farm, and it is more likely that the potential for agritourism is accidental or has other influences. The reasons that make it more profitable for farms in the hill region to engage in agritourism would need further investigation. The poorer performance of farms in the mountain region can be attributed to the generally more difficult production conditions. The reasons for the lower incomes of farms with direct marketing in the regions with increasing altitude seem to be not only the naturally more difficult production conditions but also the lack of proximity to 'direct marketing markets' – that is, areas with a higher population density and a higher proportion of the population with higher consumption demands in terms of locality, sustainability or other factors (Detre et al., 2011; Meraner et al., 2015).

The farm income advantages of specialized dairy farms, which also decrease with regional altitude, cannot be explained only by the naturally more laborious production conditions and by economies of scale or farm size, which is smaller in the hill and mountain regions. It can be said that neither of the diversification directions examined produced worse results in terms of farm income levels but that the direct marketing strategy performed worse in terms of labour productivity. Regionally, there are slight differences in the favourability of the individual types of diversification, especially for the farms with agritourism in the hill region. As already seen for Switzerland as a whole, the economies of scale also seem to have a smaller impact in the regions between the three farm types.

Therefore, consultants or policy makers promoting direct marketing should understand that the labour resources or workload should be carefully taken into account. Farms should consider their objectives, using free capacity while increasing or maintaining productivity. Agritourism offers good income opportunities but only for limited number of farms because it is a niche market and the competition is intense.

7. Conclusions and limitations of the study

In this study, we analysed the economic performance of Swiss dairy farms with specialization and diversification strategies in a static comparison. Farms with agritourism performed better than farms with direct marketing and specialization in terms of both income and labour productivity. The labour productivity of the group of farms with direct marketing was worse. Regional differences seem to be rather coincidental or would need further investigation regarding the outstanding results of the farms with agritourism in the hill region.

However, despite the economic advantages identified, it must be considered when thinking about entering agritourism that this also suits the characteristics of the farm and the preferences of the farm-managing families. The situation is different with guests staying on the farm, and without a certain openness and hospitality, the farm-managing families may create more problems than they solve. Moreover, it is necessary to provide a service that meets the demand and stands out from established tourism businesses in positive aspects. For these considerations as well as for planning, the much-cited entrepreneurial skills are needed in addition to a certain willingness to take risks. As an enterprise, one should rely on the help of consultants or networks of the existing providers of tourism offers.

Income goals seem to be achieved by farms with agritourism. However, this is only possible for a small group of farms. Therefore, getting into agritourism is not a panacea, and most of the remaining farms will

have to resort to other measures. The small number of farms in the groups with diversification also limits reliability and the possibility of generalizing the results. This must be considered when interpreting the study's results.

The lack of information on the possible reasons for the good performance of agritourism farms in the hill area is a drawback of using accounting data. Accordingly, the thematically limited available key figures from the accounting network allow only limited conclusions to be drawn. For example, in order to analyse the differences in the regions more closely, it would be necessary to obtain more data on the farms and the farm-managing families, such as business objectives, type of agritourism, marketing forms of direct sales or workload in detail with separate surveys.

The static comparison of the groups used here leaves open the question of whether the farms have benefited from a change in farm orientation. Therefore, studies that examine the situation before and after the changeover could also be of interest. It is to be expected, however, that a limited number of farms will be found within a suitable period and that therefore the use of case studies would be appropriate.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

References

- Ahearn, M., Sterns, J., 2013. Direct-to-Consumer sales of farm products. *Producers and Supply Chains in the Southeast* 45 (3), 497–508.
- Barbieri, C., 2010. An importance-performance analysis of the motivations behind agritourism and other farm enterprise developments in Canada. *Journal of Rural and Community Development* 5 (1/2), 1–20.
- Barbieri, C., Mahoney, E., 2009. Why is diversification an attractive farm adjustment strategy? Insights from Texas farmers and ranchers. *J. Rural Stud.* 25 (1), 58–66. <https://doi.org/10.1016/j.jrurstud.2008.06.001>.
- Barnes, A.P., Hansson, H., Manevska-Tasevska, G., Shrestha, S.S., Thomson, S.G., 2015. The influence of diversification on long-term viability of the agricultural sector. *Land Use Policy* 49, 404–412. <https://doi.org/10.1016/j.landusepol.2015.08.023>.
- Bartolini, F., Andreoli, M., Brunori, G., 2014. Explaining determinants of the on-farm diversification: empirical evidence from Tuscany region. *Bio base Appl. Econ.* 3 (2), 137–157. <https://doi.org/10.13128/BAE-12994>.
- Berkes, I., Horváth, L., 2012. The central limit theorem for sums of trimmed variables with heavy tails. *Stoch. Process. their Appl.* 122 (2), 449–465. <https://doi.org/10.1016/j.spa.2011.10.005>.
- Brown, C., Gandee, J.E., D'Souza, G., 2006. West Virginia farm direct marketing: a county level analysis. *J. Agric. Appl. Econ.* 38 (3), 575–584.
- Che, D., 2007. Agritourism and its potential contribution to the agricultural economy. *CAB Reviews: Perspectives in Agriculture, Veterinary Science, Nutrition and Natural Resources* 2. <https://doi.org/10.1079/PAVSNNR20072063>, 063.
- Clark, J., 2009. Entrepreneurship and diversification on English farms: identifying business enterprise characteristics and change processes. *Enterpren. Reg. Dev.* 21 (2), 213–236. <https://doi.org/10.1080/08985620802261559>.
- Darnhofer, I., 2014. Resilience and why it matters for farm management. *Eur. Rev. Agric. Econ.* 41 (3), 461–484. <https://doi.org/10.1093/erae/jbu012>.
- Detre, J.D., Mark, T.B., Mishra, A.K., Adhikari, A., 2011. Linkage between direct marketing and farm income: a double-hurdle approach. *Agribusiness* 27 (1), 19–33. <https://doi.org/10.1002/agr.20248>.
- El Benni, N., Finger, R., 2013. Gross revenue risk in Swiss dairy farming. *J. Dairy Sci.* 96 (2), 936–948. <https://doi.org/10.3168/jds.2012-5695>.
- Engeset, A.B., Heggem, R., 2015. Strategies in Norwegian farm tourism: product development, challenges, and solutions. *Scand. J. Hospit. Tourism* 15 (1–2), 122–137. <https://doi.org/10.1080/15022250.2015.1005332>.
- Federal Council of Switzerland, 2018. Ordinance on the Agricultural Production Register and the Elimination of Zones.
- Federal Statistical Office (FSO), 2019a. Food and Agriculture: Pocket Statistics 2019. <https://www.bfs.admin.ch/bfs/de/home/statistiken/land-forstwirtschaft/landwirtschaft/assetdetail.8706379.html>.
- Federal Statistical Office (FSO), 2019b. Raumgliederungen der Schweiz: neue statistische definition der Berggebiete. *BFS Aktuell*.
- Ferguson, R.S., Lovell, S.T., 2019. Diversification and labor productivity on US permaculture farms. *Renew. Agric. Food Syst.* 34, 326–337. <https://doi.org/10.1017/S1742170517000497>, 04.
- García-Cornejo, B., Pérez-Méndez, J.A., Roibás, D., Wall, A., 2020. Efficiency and sustainability in farm diversification initiatives in northern Spain. *Sustainability* 12 (10), 39–83. <https://doi.org/10.3390/su12103983>.

- Hansson, H., 2007. Strategy factors as drivers and restraints on dairy farm performance: evidence from Sweden. *Agric. Syst.* 94 (3), 726–737. <https://doi.org/10.1016/j.agsy.2007.03.002>.
- Hansson, H., Ferguson, R., Olofsson, C., Rantamäki-Lahtinen, L., 2013. Farmers' motives for diversifying their farm business – the influence of family. *J. Rural Stud.* 32, 240–250. <https://doi.org/10.1016/j.jrurstud.2013.07.002>.
- Hansson, H., Ferguson, R., Olofsson, C., 2010. Understanding the diversification and specialization of farm businesses. *AFSci* 19 (4), 269. <https://doi.org/10.2137/145960610794197605>.
- Hoop, D., Schmid, D., 2015a. Grundlagenbericht 2015: Zentrale Auswertung von Buchhaltungsdaten. *Agroscope INH, Ettenhausen*.
- Hoop, D., Schmid, D., 2015b. Zentrale Auswertung von Buchhaltungsdaten: Grundlagenbericht 2014. *Agroscope. Institut für Nachhaltigkeitswissenschaften INH*.
- Huber, M., Hofstetter, P., Hochuli, A., 2020. A demand-driven success factor Analysis for agritourism in Switzerland. *Journal of Rural and Community Development* 15 (1), 1–16.
- Khanal, A.R., Mishra, A.K., 2014. Agritourism and off-farm work: survival strategies for small farms. *Agric. Econ.* 45 (S1), 65–76. <https://doi.org/10.1111/agec.12130>.
- Kommission der Europäischen Union, 2008. Verordnung (EG), Nr. 1242/2008 Der Kommission vom 8. Dezember 2008 zur Errichtung eines gemeinschaftlichen Klassifizierungssystems der landwirtschaftlichen Betriebe. *Amtsblatt der Europäischen Union*.
- Lange, A., Piore, A., Siebert, R., Zasada, I., 2013. Spatial differentiation of farm diversification: how rural attractiveness and vicinity to cities determine farm households' response to the CAP. *Land Use Policy* 31, 136–144. <https://doi.org/10.1016/j.landusepol.2012.02.010>.
- Liu, X., Mosler, K., Mozharovskiy, P., 2014. Fast Computation of Tukey Trimmed Regions and Median in Dimension $P > 2$, p. 28.
- Lucha, C., Ferreira, G., Walker, M., Groover, G., 2016. Profitability of Virginia's agritourism industry: a regression analysis. *Agric. Resour. Econ. Rev.* 45 (1), 173–207. <https://doi.org/10.1017/age.2016.12>.
- Mamardashvili, P., Bokusheva, R., Schmid, D., 2014. Heterogeneous farm output and technical efficiency estimates: heterogeneous farm output and technical efficiency estimates. *German Journal of Agricultural Economics* 63, 16. <https://doi.org/10.22004/ag.econ.253147>, 01.
- McGehee, N.G., 2007. An agritourism systems model: a weberian perspective. *J. Sustain. Tourism* 15 (2), 111–124. <https://doi.org/10.2167/jost634.0>.
- McGehee, N.G., Kim, K., 2004. Motivation for agri-tourism entrepreneurship. *J. Trav. Res.* 43 (2), 161–170. <https://doi.org/10.1177/0047287504268245>.
- McGehee, N.G., Kim, K., Jennings, G.R., 2007. Gender and motivation for agri-tourism entrepreneurship. *Tourism Manag.* 28 (1), 280–289. <https://doi.org/10.1016/j.tourman.2005.12.022>.
- McNally, S., 2001. Farm diversification in England and Wales — what can we learn from the farm business survey? *J. Rural Stud.* 17 (2), 247–257. [https://doi.org/10.1016/S0743-0167\(00\)00050-4](https://doi.org/10.1016/S0743-0167(00)00050-4).
- Meert, H., van Huylenbroeck, G., Vernimmen, T., Bourgeois, M., van Hecke, E., 2005. Farm household survival strategies and diversification on marginal farms. *J. Rural Stud.* 21 (1), 81–97. <https://doi.org/10.1016/j.jrurstud.2004.08.007>.
- Meraner, M., Heijman, W., Kuhlman, T., Finger, R., 2015. Determinants of farm diversification in The Netherlands. *Land Use Policy* 42, 767–780. <https://doi.org/10.1016/j.landusepol.2014.10.013>.
- Morris, W., Henley, A., Dowell, D., 2017. Farm diversification, entrepreneurship and technology adoption: analysis of upland farmers in Wales. *J. Rural Stud.* 53, 132–143. <https://doi.org/10.1016/j.jrurstud.2017.05.014>.
- Nickerson, N.P., Black, R.J., McCool, S.F., 2001. Agritourism: motivations behind farm/ranch business diversification. *J. Trav. Res.* 40, 19–26.
- Park, T., Mishra, A.K., Wozniak, S.J., 2014. Do farm operators benefit from direct to consumer marketing strategies? *Agric. Econ.* 45 (2), 213–224. <https://doi.org/10.1111/agec.12042>.
- Phelan, C., 2011. Exploring entrepreneurial skills and competencies in farm tourism. In: Paper Prepared for the 'Ninth Rural Entrepreneurship Conference. Nottingham Trent University, Nottingham Business School, 23rd–24th June 2011.
- Rauniyar, S., Awasthi, M.K., Kapoor, S., Mishra, A.K., 2020. Agritourism: structured literature review and bibliometric analysis. *Tour. Recreat. Res.* 1–19. <https://doi.org/10.1080/02508281.2020.1753913>.
- Renner, S., Pierrick, J., Hoop, D., Schmid, D., Dux, D., Weber, A., Lips, M., 2019. Survey System of the Swiss Farm Accountancy Data Network with Two Samples : Income Situation Sample and Farm Management (68).
- Roest, K. de, Ferrari, P., Knickel, K., 2018. Specialisation and economies of scale or diversification and economies of scope? Assessing different agricultural development pathways. *J. Rural Stud.* 59, 222–231. <https://doi.org/10.1016/j.jrurstud.2017.04.013>.
- Schilling, B., Sullivan, K., Komar, S., 2012. Examining the economic benefits of agritourism: the case of New Jersey. *Journal of Agriculture, Food Systems, and Community Development* 3 (1), 199–214. <https://doi.org/10.5304/jafscd.2012.031.011>.
- Schilling, B.J., Attavanich, W., Jin, Y., 2014. Does agritourism enhance farm profitability? *J. Agric. Resour. Econ.* 39 (1), 69–87. www.jstor.org/stable/44131315.
- Schmid, D., Roesch, A., 2011. Die wirtschaftliche Entwicklung der schweizerischen Landwirtschaft 2010: Hauptbericht Nr. 34 der Zentralen Auswertung von Buchhaltungsdaten (Zeitreihe 2001–2010).
- Sharpley, R., Vass, A., 2006. Tourism, farming and diversification: an attitudinal study. *Tourism Manag.* 27 (5), 1040–1052. <https://doi.org/10.1016/j.tourman.2005.10.025>.
- Tew, C., Barbieri, C., 2012. The perceived benefits of agritourism: the provider's perspective. *Tourism Manag.* 33 (1), 215–224. <https://doi.org/10.1016/j.tourman.2011.02.005>.
- Tonner, A., Wilson, J., 2015. Farm retailing: motivations and practice. *Int. J. Enterpren. Innovat.* 16 (2), 111–121. <https://doi.org/10.5367/ije.2015.0181>.
- Uematsu, H., Mishra, A.K., 2011. Use of direct marketing strategies by farmers and their impact on farm business income. *Agric. Resour. Econ. Rev.* 40 (1), 1–19. <https://doi.org/10.1017/S1068280500004482>.
- Veeck, G., Che, D., Veeck, A., 2006. America's changing farmscape: a study of agricultural tourism in Michigan*. *Prof. Geogr.* 58 (3), 235–248. <https://doi.org/10.1111/j.1467-9272.2006.00565.x>.
- Vik, J., McElwee, G., 2011. Diversification and the entrepreneurial motivations of farmers in Norway*. *J. Small Bus. Manag.* 49 (3), 390–410. <https://doi.org/10.1111/j.1540-627X.2011.00327.x>.
- Vogt, L., 2014. The economic side of agrotourism: business performance and competitive factors. *Econ. Agro-Alimentare* (3), 77–102. <https://doi.org/10.3280/ECAG2013-003006>.
- Yoshida, S., Yagi, H., Kiminami, A., Garrod, G., 2019. Farm diversification and sustainability of multifunctional peri-urban agriculture: entrepreneurial attributes of advanced diversification in Japan. *Sustainability* 11 (10), 28–87. <https://doi.org/10.3390/su11102887>.