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## **Sustainable gastronomy: a study of catering facilities-traditional farms in rural Vojvodina (R. Serbia)**

### **Abstract**

Sustainable gastronomy is vital for the social, economic and environmental development of every economic-tourist region. It has been extensively studied, providing insights into current management practices and potential future activities concerning

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the gastronomic offer and heritage in the hospitality industry. Vojvodina, located in the north of the Republic of Serbia, is an important multicultural region characterised by a blend of gastronomic influences from its current inhabitants and those who have historically shaped its identity. The fertile plains, combined with its culinary heritage, have made this region one of the most significant economic-tourist areas today, attracting visitors due to its unique gastronomic offerings. This study analysed ten catering farms using a specifically designed GastroFarm Model, which incorporates defined subindicators of the environmental, social and economic dimensions. An overview of the results is presented in a ternary diagram. The study revealed a significant dominance of the economic-social dimension in the management practices of the farms studied, providing insights into aspects clearly visible to consumers (the traditional offerings and ethnic dishes).

**Keywords:** sustainable gastronomy, food, farms, catering facility, rural areas, Vojvodina

## Introduction

Sustainable gastronomy is an emerging field of study that integrates environmental, social, and economic principles with hospitality and tourism practices (Rinaldi 2017; Pasco-Dalla-Porta et al. 2018; Sorcaru 2019; Carral et al. 2020). Its significance was especially highlighted in the 2030 Agenda and the aims of Sustainable Development Goals (SDG) (United Nations 2015). The sustainable gastronomy approach encompasses a broad spectrum of activities in managing catering facilities that provide food services, promoting responsible food procurement, offerings and consumption, as well as the responsible handling of food waste and various other activities (Nyberg et al. 2022). The socially responsible aspects of sustainable gastronomy include fair food service practices and support for local economies. This interdisciplinary approach encourages a holistic view of sustainable gastronomy, focusing on environmental, social and economic dimensions to create a resilient and ethnically aware culinary future for each region (Diaconescu et al. 2016; Pasco-Dalla-Porta et al. 2018).

This study was conducted in the Autonomous Province of Vojvodina, an important agricultural and tourist region in the northernmost part of the Republic of Serbia (RS). This region is characterised by a rich culinary tradition deeply rooted in its cultural and historical heritage, as well as its unique

gastronomy (Blešić et al. 2021; Kalenjuk Pivarski et al. 2023). The culinary diversity of Vojvodina is shaped by its multicultural identity, reflecting the cohabitation of numerous ethnic groups. The fertile plains of Vojvodina have historically supported the production of diverse crops, contributing to a broad spectrum of local ingredients specific to this region. The lifestyle in this agricultural area is closely linked to farm life and agricultural households (a neuter singular noun: *salaš/sāla:f/*). Therefore, this study focuses on farm characteristics of Vojvodina, which have, in recent years, adapted to increased tourist popularity by transforming into catering facilities that offer visitors authentic tastes and the atmosphere of traditional Vojvodina households (Grubišić and Antonijević 2013; Banjac et al. 2016; Kalenjuk et al. 2018).

This paper aims to assess the level of sustainable gastronomy in these facilities according to environmental, social and economic parameters, by applying the specially designed GastroFarm Model. The objective was to compile data on the state, management practices and preservation of tradition and gastronomy, addressing the following research question: What is the dominant dimension of sustainable gastronomy in the management practices of catering farms in Vojvodina?

## **Literature Review**

### **Traditional farms in Vojvodina**

Farms in Vojvodina are authentic agricultural properties that perpetuate their traditions through tourism by offering food and beverages, as well as various activities in the atmosphere of an agricultural household (Blešić et al. 2021; Kalenjuk Pivarski et al. 2023). These authentic locations are inherently linked to agriculture, cattle-breeding, and indigenous food production. They provide visitors with a unique combination of nature, tradition, and gastronomic pleasure. The gastronomy of the Vojvodina farms is part of the rich heritage of traditional cuisine, renowned for its authentic dishes and local ingredients (Kalenjuk Pivarski et al. 2022). In the pastoral idyll of Vojvodina's farms, visitors can enjoy authentic local specialities, sample wine and local beer, visit orchards and vineyards, learn to prepare various traditional dishes, and participate in gastronomic and cultural festivities (Đerčan et al. 2017).

These gastronomic experiences not only satisfy culinary preferences but also provide insights into agricultural production and cattle-breeding that underpin the rural lifestyle in these areas, making them significant destinations for rural tourism (Banjac et al. 2016).

### The gastronomic offer in Vojvodina

The gastronomic offerings in Vojvodina represent a rich combination of cultural influences and traditional recipes, creating a unique culinary synthesis that reflects the historical and geographical features of this multicultural region (Blešić et al. 2021; Kalenjuk Pivarski et al. 2023). The essence of Vojvodina cuisine lies in its fertile land, which supports diverse agricultural production. Various types of grains, vegetables and fruits contribute to the wide variety of flavours in the dishes (Šmugović et al. 2023). Traditional dishes such as *sarma*, *đuveč*, goulash (*gulaš*) and paprikash (*paprikaš*) frequently include ingredients grown directly in Vojvodina's fields and farms, reflecting the historical influences of Austria-Hungary and Turkey, as well as the contributions of various ethnic groups which settled in the area (Hungarians, Germans, Slovaks, Romanians, Montenegrins, Roma, Croatians, Bosniaks, Rusyns, Ukrainians, Macedonians, et al.) (Lukić et al. 2017; Grubor et al. 2021; Blešić et al. 2021; Grubor et al. 2022; Kalenjuk Pivarski et al. 2023).

Among the characteristic dishes of Vojvodina are various baked goods and pastries (*pita*, *gibanica*, and various yeast-based products: bread, doughnuts, strudels and cakes) (Psodorov et al. 2018). The gastronomic offer is complemented by various types of local sausages that reflect the different ethnic influences in Vojvodina. The diverse array of dairy products is also an essential part of Vojvodina's gastronomic offerings. Numerous types of cheese, *kajmak* and *pavlaka*, often produced traditionally, contribute not only to the taste of the dishes but also to the region's cultural identity. Dishes made from traditionally roasted meats, such as homemade grilled sausages, pork neck and juicy *ćevapčići* (grilled minced meat), as well as meats prepared through traditional methods under the bell (*ispod sača*) or slow-cooked in clay pots, are staple items on the menus of traditional households and modern farms adapted to catering facilities (Kalenjuk et al. 2017).

Meat dishes, along with a variety of meat products, are prepared with care and seasoned with spices characteristic of the region, contributing to the

unique experience of Vojvodina cuisine (Ivanović et al. 2022). Local ingredients enhance the specific tastes and aromas of traditional dishes, including paprika, which is a basic ingredient of Vojvodina cuisine. Numerous studies have highlighted the prominence of dishes such as goulash, *đuveč* (stewed meat with vegetables and rice) and *kulen* (a spicy, savoury sausage), which exemplify features of the Serbian culinary tradition alongside those of its neighbouring cultures (Grubor et al. 2022).

### **Research on subindicators within the GastroFarm Model dimensions**

The following is a review of the literature and research that contributed to identifying significant elements within the defined dimensions, serving as a basis for determining subindicators for evaluating the creation of the GastroFarm Model.

#### **Determining subindicators for defining the environmental dimension**

The environmental dimension of gastronomy plays a key role in shaping sustainable food systems and mitigating the environmental impact of culinary practices. The elements of importance for defining subindicators are examined below. Existing research highlights the significance of adopting environmentally acceptable approaches in the gastronomic sector to address various challenges, such as sustainable ingredient procurement, emphasising local products, and the use of autochthonous and seasonal products (Heatherington 2014; Rinaldi 2017; Ćirić et al. 2021; Mishra 2023). Concerning local products, the focus is on reducing the carbon footprint associated with transport and supporting regional environmental and economic systems (Rinaldi 2017; Bilska et al. 2020). It is also essential to mention the production, consumption, and offering of organic products (Paffarini et al. 2021), as well as the preparation and use of products with fewer preservatives (Chiang and Sheu 2020). Further, responsible management practices regarding food waste in the gastronomic industry contribute to reducing environmental pollution and resource depletion. Adopting organic agriculture and ethi-

cal hunting and fishing practices aligns with the environmental dimension of gastronomy, promoting biodiversity preservation and minimising the negative environmental impact of food production (Rinaldi 2017). This dimension also emphasises traditional thermal processing methods, which provide better sensory quality and have a lower negative environmental impact. The environmental dimension focuses significantly on preparing and presenting dishes in optimal portions to reduce food waste, as well as separating waste during food preparation and recycling food waste with controlled, reduced use of PVC packaging (Rinaldi 2017; Bilska et al. 2020).

The GastroFarm model offers numerous environmental benefits. By promoting the use of local, seasonal and organic products, it reduces environmental impact and improves the ecological footprint of gastronomic establishments. Additionally, practices such as recycling, waste separation and optimal portioning decrease waste and conserve natural resources, while organic agriculture and ethical hunting and fishing methods contribute to biodiversity preservation.

However, this dimension has limitations too. Sustainable practices can increase procurement, recycling and waste management costs, while seasonal factors and the availability of indigenous products can affect the consistency of offerings.

### Determining subindicators for defining the social dimension

The social dimension of gastronomy extends beyond simple culinary experiences and encompasses numerous socio-cultural elements that shape how people experience and enjoy food. Studies highlight the importance of gastronomy as a social construct that impacts shared associations, identity formation, and cultural expression. Further, gastronomy serves as a means of social exchange, facilitating diversity and promoting intercultural understanding (Rinaldi 2017). Thus, gastronomy's social dimension transcends the mere act of consuming food; it becomes a dynamic force that shapes societies, defines identities and fosters connections among individuals and communities (Pasco-Dalla-Porta et al. 2018). Consequently, an important role in hospitality is played by the offering of dishes prepared from traditional food products (Kalenjuk Pivarski et al. 2023), as well as dishes from the ethnic groups inhabiting a particular area, such as traditional Hungarian, Slovak,

Romanian, Montenegrin, Romani, Bunjevac and Serbian dishes. This highlights the significance of an authentic and recognisable offer in every catering facility (Grubor et al. 2022; Kalenjuk Pivarski et al. 2022). The social dimension refers to an offer that is both recognisable and understandable, including local dishes for which the facility is known. Therefore, how the menu is promoted and presented is crucial. Adequately written menus (including descriptions and information about the dishes) facilitate hospitality workers in presenting their gastronomic offerings to consumers, while availability in multiple languages enhances their importance and utility (Petric et al. 2019). These elements form the basis for defining subindicators for researching the social dimension.

The model's social dimension strengthens cultural identity by offering traditional dishes and local specialities, thus supporting the preservation of cultural heritage. Additionally, showcasing ethnic dishes enhances intercultural exchange and attracts visitors from diverse backgrounds. Multilingual menu options further increase accessibility for international guests.

Limitations of this dimension include the complexity of adapting menus to various cultural and linguistic preferences, which requires additional planning and resources. Emphasis on international standards may also lead to cultural homogenisation, potentially compromising the authenticity of local dishes.

### Determining subindicators for defining the economic dimension

The economic dimension of gastronomy is a multifaceted field that includes various sectors, significantly contributing to both the global and local economy, as well as the balance between supply and demand. This serves as the basis for defining and further researching possible subindicators suitable for the economic dimension in the created research model. Studies indicate that the economic impact of gastronomy is reflected in job creation, income generation and tourism development (Rinaldi 2017). The restaurant industry, as a fundamental component of the gastronomic business, plays a key role in providing jobs and distributing income (Carral et al. 2020). Further, independent production, distribution from local producers, adaptation to the seasonal nature of food, and consumption with minimal reliance on imported products contribute to the agricultural and food industry significantly,

thereby increasing the economic importance of gastronomy (Privitera et al. 2018; Ćirić et al. 2021), along with adequate food waste management (Yodkhayan and Muneenam 2023). Culinary tourism, as a growing trend, serves as an economic catalyst, attracting visitors to regions renowned for their gastronomic offerings (Kalenjuk et al. 2012; Diaconescu et al. 2016), such as dishes with protected designation of origin (PDO) and authenticity labels (Ćirić et al. 2020; Kalenjuk Pivarski et al. 2023). The promotion of traditional food and unique dishes specific to the ethnic groups inhabiting those locations further enhances the economic dimension (Grubor et al. 2022; Kalenjuk Pivarski et al. 2023). Support for local production processes – whether in meat, milk, fruit, vegetables, or processed foods – strengthens local economies by reducing reliance on imported products and promoting local resilience. Additionally, the gastronomic sector stimulates entrepreneurship, enabling chefs and artisans to capitalise on unique local culinary traditions by adapting their offerings to tourist demand. In essence, the economic dimension of gastronomy extends beyond the mere production and serving of food and beverages, serving as an indispensable element of local and global economies, and fostering employment, entrepreneurship and economic growth (Koufadakis and Manola 2020).

The model has a strong economic impact by promoting culinary tourism, attracting visitors to regions known for their gastronomy and improving revenues. Relying on local producers reduces the need for imports, thus supporting the local economy and employment.

On the other hand, reliance on the tourism sector may lead to seasonal fluctuations in demand, limiting growth. Additionally, the increased costs of using local products and sustainable practices can impact profitability.

## Methodology

### Place and time of research

The research was conducted in the Autonomous Province of Vojvodina, the northernmost region of the Serbian Republic. It included traditional Vojvodina farms adapted into hospitality establishments offering food, beverages and additional services. Only registered farms that provided voluntary con-



sent were included in the study, numbering 10 facilities. Data collection was done through farm visits from 10 November to 10 December 2023. The exact locations of the studied farms are shown in Figure 1. Upon obtaining their consent, all ethical principles of research were adhered to.



**Figure 1:** The place of research with the locations of the studied farms

Source: the authors

## Research design

The GastroFarm Model was developed for this study, based on previous studies and valorisation models in tourism, rural development and agriculture (Du Cros 2001; Đerčan et al. 2023; Ćirić et al. 2021), with a special focus on gastronomic valorisation (Pasco-Dalla-Porta et al. 2018). The model was adapted to the specifics of the region and type of hospitality establishments. The GastroFarm Model measures three sustainability dimensions – environmental, social, and economic – with each dimension represented by 10 sub-

indicators. Point allocation was carried out using a predefined scale from 1 to 5, where

- 1 signifies poor performance in a specific sustainability aspect, and
- 5 signifies excellent performance.

Each dimension could achieve a maximum score of 50 points. Data were collected through direct visits to the facilities and interviews with key stakeholders (restaurant managers, food and beverage (F&B) managers, kitchen chefs, owners and executives). During these visits, researchers analysed each facility's activities thoroughly, focusing on the relevant aspects of each sub-indicator, which enabled an objective allocation of points. The evaluation process consisted of the following steps:

1. Interviews with farm management – the questions addressed ecological practices, waste management, the use of local and traditional products, socio-cultural aspects of the offering and the economic balance between supply and demand.
2. On-site observation and assessment – researchers directly observed working conditions, menu offerings, food preparation methods, portion sizes and waste management practices.
3. Application of the evaluation matrix – points were normalised and distributed according to the sustainability matrix (Table 1), which categorises different types of sustainable hospitality establishments (F1–F9) depending on the dominant sustainability dimension.

**Table 1.** Sustainability matrix for determining types of catering farms based on dimensions of sustainable gastronomy

Types of Farms Based on the Dominant Dimension of Sustainable Development		Maximum and Minimum Values (%) for Each of the Dimensions of Sustainable Development					
		I		II		III	
		max	min	max	min	max	min
F1	Environmental	100	60	40	0	40	0
F2	Environmentally-social	60	33,3	50	20	33,3	0
F3	Environmentally-economic	60	33,3	33,3	0	50	20
F4	Social	40	0	100	60	40	0
F5	Socially-environmental	50	20	60	33,3	33,3	0
F6	Socially-economic	33,3	0	60	33,3	50	20

Types of Farms Based on the Dominant Dimension of Sustainable Development		Maximum and Minimum Values (%) for Each of the Dimensions of Sustainable Development					
		I		II		III	
		max	min	max	min	max	min
F7	Economic	40	0	40	0	100	60
F8	Economically-environmental	50	20	33,3	0	60	33,3
F9	Economically-social	33,3	0	50	20	60	33,3

Source: Đerčan et al. 2023

### Point allocation by subindicators

Points were assigned by the researchers based on data collected during interviews and on-site observations. Scores were based on a detailed understanding of each facility's practices vis-a-vis predefined criteria in the GastroFarm Model. After assigning points, average scores for each dimension were normalised to enable inter se comparisons.

Based on the GastroFarm Model, the dominant sustainability dimensions of each facility were clearly identified. The average scores for each dimension were normalised, and by applying the matrix in Table 1, each farm was classified according to its dominant dimension of sustainable gastronomy (Đerčan et al. 2023). The matrix includes three basic types: F1–Environmental, F4–Social, and F7–Economic, along with six transitional types, depending on which dimension predominated in the overall result.

### Presentation of results

Results were presented using a ternary diagram, a common graphical tool for illustrating the relationship between three variables on a two-dimensional plane. The sides of the diagram represent percentages (1–100%) of the analysed dimensions. A point on the diagram is determined by the combination of these percentages and corresponds to the user structure of the studied farm or hospitality facility. In cases of deviation from the optimal point (the centroid of the triangle) towards one of the corners, the results were interpreted as specificity in that segment of sustainable gastronomy.

## Results

### Basic features of the studied catering farms

Based on the interviews with the management of the catering farms and the insights gained into their practices, basic information was collected that could be significant for interpreting the processed dimensions in further research. The owners and their families reside on some of the farms that have been adapted into catering facilities, enabling interaction between visitors and the household, fostering an understanding of the tradition and living culture, agricultural and food production, and local gastronomy. At the same time, household members constitute the primary workforce, supplemented by individuals from nearby rural areas. The structure of the workforce varies based on the features of the facilities presented in Table 2.

Certain farms, besides catering services, also provide accommodation and organise various functions (private ones such as birthdays, weddings, christenings, etc. and – excursions, business meetings, conferences, seminars, etc.). The capacities of the farms in the catering segment vary seasonally (summer/winter) and range from facilities accommodating smaller groups of up to 30 guests to those that can host over 300.

The users' structure differs. Besides numerous local visitors, the importance of international visitors must be emphasised, as well as visitors attracted to the locations in various ways. Most foreign visitors are from Bosnia and Herzegovina, Austria, Italy, Hungary, Croatia and Slovenia. A significant number of tourists from China, America and Russia have been observed in recent years. The farms provide accommodation for short-term visitors, including those on single-day excursions, and weekend stays, and those who solely use catering services while visiting to enjoy traditional cuisine.

**Table 2.** Basic features of the farms studied

Name	Core business	Type of catering service	Specific features
Salaš 137 (the number included in the name represents the number of plots over which the farm spreads)	A la cart Restaurant	A la cart Private functions	An equestrian club, shooting parties
Pajin salaš (the nickname of the old farm owner)	A la cart	A la cart Private functions	A plaque awarded at the International Agricultural Fair in Novi Sad for the gastronomic offer and elite quality service in 2019 An airplane in the yard
Brkin salaš (in English the name would translate to Brka's farm)	A rural-tourist household	Private functions Menus on demand upon reservation	A zoo, an adrenalin park
Salaš Orah (in English the name would translate to a walnut farm)	A la cart	A la cart	Live music
Bulač salaš (the name of the farm originates from the nickname of its founder, Bulač)	A bed and breakfast	Bed and breakfast, Private functions, catering	A specially designed garden with a playground for children
Salaš Miris Dunja (in English the name means that the farm smells of quinces)	Accommodation	Breakfast, private functions, pre-booked group visits	An open pool, a quince orchard
Vojvodanski salaš (in English the name would translate to a farm in Vojvodina)	A la cart	A la cart Private functions	A specially designed garden with a playground
Dedin salaš	Private functions	Private functions A la cart forthcoming	A museum, an orchard
Naš salaš (in English the name would translate to our farm)	A la cart	A la cart, private functions, bed and breakfast	Authentic rooms meant for accommodation, an ethnic collection and a gallery of paintings
Salaš vinarije Zvonko Bogdan (the farm is part of a winery belonging to a well-known singer of old folk music, specific to the region, Zvonko Bogdan, for whom it is named)	Private functions	Private functions, team building, pre-booked visits	The Ludaš lake

## The environmental dimension of sustainable gastronomy

The analysis of the management practices of the farms adapted into catering facilities led to the conclusion that all the facilities are, to a certain extent environmentally oriented, with a significant offer of dishes prepared using products from the local market, thereby diminishing the potential pollutants associated with transporting products from remote locations. The availability of organic products varies, unlike the preparation of dishes using autochthonous plants and products. Only the farm Salaš 137 offers a dish known as *Carsko pile*, prepared using free-range chicken. Traditional methods of thermal processing of food are considered environment-friendly; many facilities prepare food using slow cooking in clay pots, barbequing, or traditional methods such as *ispod sača*, or on a horizontal spit. In terms of environmental protection, the focus is on controlling food waste, which is aimed at portion sizes offered and served, waste separation and recycling, with scores varying among the studied farms. Portions are generally large on all farms, ranging from 300 to 400g of meat per person. However, several facilities, such as Salaš 137, pack leftovers for guests to take home. The reduced use of preservatives is present to a certain extent, but not excessively, and no significant deviations were observed in the use of PVC packaging compared to the increasing attention paid to separating glass and organic waste.

Based on the data obtained and the ranking of the defined subindicators related to environmental features (Table 3), the total score of all ten subindicators was 306 (out of a maximum of 500). The lowest subindicator score pertains to the use of organic products (21 out of 50), while the highest score was noted for the subindicator related to the preparation of dishes from autochthonous products (42 out of 50).

**Table 3.** Environmental dimension of sustainable gastronomy

Subindicators	Salaš 137	Pajin salaš	Brkin salaš	Salaš Orah	Bulač salaš	Salaš Miris Dunja	Vojvodanski-salaš	Dedin salaš	Naš salaš	Salaš vinarije ZvonkoBogdan	Total
The environmental orientation in food preparation	4	3	4	3	3	2	3	3	3	3	31
Procurement of provisions from the local market (minimum amount of transport)	5	3	4	3	3	3	3	4	3	3	34
Offer of organic products	4	3	2	3	1	2	1	1	2	2	21
Preparation of dishes made of autochthonous products	5	4	4	4	4	5	4	4	5	3	42
Preparation of dishes using traditional methods of thermal processing	3	3	5	3	3	2	4	3	4	4	34
Preparing and serving optimum portions	4	3	5	4	4	4	5	3	4	4	40
Separating food waste during the preparation process	3	2	2	2	3	2	2	1	3	3	23
Recycling food waste during the preparation process	4	3	3	4	4	2	3	2	4	3	32
Reduced use of preserving agents	2	2	3	3	2	2	2	2	2	2	22
Reduced use of PVC packaging	4	2	3	3	2	3	2	3	2	3	27
Overall score	38	28	35	32	29	27	29	26	32	30	306

## Social dimension of sustainable gastronomy

The analysis of the management practices of the farms with a focus on their gastronomic offerings as a significant element of the social dimension revealed that all facilities are highly focused on offering dishes prepared from traditional food products, which include various products made from meat, milk, fruit and vegetables. A similar analysis of the ethnic structure of the population and the six most dominant ethnic groups in Serbia indicated an absence of dishes made by Romanians and the Roma, while a considerable offering of dishes from Serbian and Hungarian cuisines was observed. The scrutiny of the structure and offerings revealed that all facilities have a similar selection of dishes typical of such establishments, including a specific sausage known as *kulen* and goulash (Appendix 2), as well as dishes such as paprikash, *ajmokac*, soups, broths, and baked goods (strudels, pies, doughnuts, *gomboce* – dumplings). Each facility has its own signature dish, making it recognisable and unique to its guests. Salaš 137 offers its guests its own speciality, the Serbian burger, while Salaš Orah features the *salašarska lepinja* (a round bread lathered in meat drippings), Vojvođanski salaš offers stuffed *vojvođanski ćevap* (a meat dish comprising local ingredients), and Dedin salaš serves pulled pork. Most facilities provide menus in several languages, but Vojvođanski salaš lacks one, while Salaš vinarije Zvonko Bogdan distinguishes itself by offering menus in Hungarian.

Analysing the subindicators of the social dimension led to the determination of the overall score as 331 (out of a maximum of 500) (Table 4). The lowest scores were noted for the offering of dishes from the Romanian and Roma ethnic groups in Vojvodina (10 out of 50) and the highest was awarded to the subindicator related to the offering of traditional Serbian dishes (49 out of 50) and the offering of dishes prepared from traditional food products from Vojvodina (48).



**Table 4.** The social dimension of sustainable gastronomy

Subindicators	Salaš I37	Pajin salaš	Brkin salaš	Salaš Orah	Bulač salaš	Salaš Miris Dunja	Vojvođanski-salaš	Dedin salaš	Naš salaš	Salaš vinarije Zvonko Bogdan	Total
Offer of dishes prepared using traditional products from Vojvodina	5	5	5	5	5	4	4	5	5	5	48
Offer of traditional Hungarian dishes	5	4	4	5	4	4	4	5	4	5	44
Offer of traditional Slovak dishes	4	3	3	3	3	3	3	3	3	3	31
Offer of traditional Romanian dishes	1	1	1	1	1	1	1	1	1	1	10
Offer of traditional Montenegrin dishes	3	3	3	4	3	3	3	3	5	2	32
Offer of traditional Romani dishes	1	1	1	1	1	1	1	1	1	1	10
Offer of traditional Bunjevac dishes	3	3	2	3	2	2	2	2	2	4	25
Offer of traditional Serbian dishes	5	5	4	5	5	5	5	5	5	5	49
Offer of local dishes for which the facility is known	5	5	4	5	4	3	5	4	5	4	44
The gastronomic offer written in a variety of languages	5	4	3	4	4	4	1	4	4	5	38
Total score	37	34	30	36	32	30	29	33	35	35	331

### **Economic dimension of sustainable gastronomy**

By compiling data obtained from management regarding economic subindicators, information was gathered about the operational methods of the facilities, as shown in Table 5. Some farms source food from their own production processes. The facilities frequently produce their own types of sausages and meat products, such as ham and bacon, for their guests. Besides independently producing meat, facilities such as Salaš Miris Dunja and Brkin salaš also raise poultry and produce eggs, as well as make preserves and cheese. Salaš Orah has greenhouses for growing various types of plants. Most facilities procure their products from local producers while using imported products to a lesser extent. The adaptation of the gastronomic offer to the seasonal nature of products was observed in facilities such as Naš salaš and others. The offering of dishes made from products with PDO is low. The promotion of traditional dishes is significant, with a greater emphasis on dishes originating from the ethnic groups of Vojvodina; for instance, Naš salaš even organises Montenegrin nights that include the promotion of food and culture. The gastronomic offerings are fully adapted to tourist demand, as evidenced by the balance between supply and demand. Food waste is distributed to animal shelters (Salaš vinarije Zvonko Bogdan), and national kitchens, or sold at reduced prices, *inter alia*.

The overall score for this dimension is 378 (out of a maximum of 500), ranking it first among the three dimensions. The lowest score was noted for the subindicator related to the offering of dishes made from products with PDO (17). This finding contrasts slightly with the previously obtained data on the use of traditional products. The highest score was awarded for the adaptability of the offer to the tourist demand (46) and the economic balance between supply and demand (45).

**Table 5.** Economic dimension of sustainable gastronomy

Subindicators	Salaš 137	Pejin salaš	Brkin- salaš	Salaš Orah	Bulač salaš	Salaš Miris Dunja	Vojvođanski salaš	Dedin salaš	Naš salaš	Salaš vinarije Zvonko Bogdan	Total
Own production process (of meat, milk, fruit, vegetables, processed foods)	4	4	4	5	1	5	1	1	2	3	30
Procurement of produce from local producers	4	5	5	5	5	5	4	2	5	4	44
Reduced consumption of imported products	3	5	5	5	4	5	5	2	5	4	43
Adaptation of the gastronomic offer (from the menu) to seasonal products	4	4	4	4	3	4	3	4	5	4	39
Offer of dishes made from products with protected designation of origin	2	1	2	1	2	2	1	2	2	2	17
Promotion of traditional dishes	3	3	4	3	4	3	4	4	4	4	36
Promotion of dishes of the ethnic groups in Vojvodina	3	4	4	3	4	4	3	4	4	5	38
Adaptation of the offer to meet the tourist demand	5	4	5	5	4	4	5	5	4	5	46
Economic balance between supply and demand	4	5	4	5	5	4	4	4	5	5	45
Handling food waste	4	4	3	4	5	4	4	3	5	4	40
Total score	36	39	40	40	37	40	34	31	41	40	378

### A summary analysis of the subindicators

By analysing the overall results obtained through the specially designed GastroFarm Model, the highest scores were determined for the economic dimension of sustainable gastronomy, followed by the subindicators related to environmental protection, while the lowest scores were noted for the social subindicators.

The defined methodologies were applied, and with the aim of obtaining the required data, individual analyses of the catering farms were conducted, as shown in Table 6. For each subindicator, the maximum score that could be awarded was 50. The environmental dimension of the studied catering farms was evaluated in a range of 26–38. The highest score was awarded to Salaš 137, Brkin salaš and Naš salaš, and the lowest score to Dedin salaš. The social dimension was evaluated in a range from 29 to 37, with the highest score again awarded to Salaš 137 and the lowest to Brkin salaš, Salaš Miris Dunja and Vojvođanski salaš. The economic dimension was evaluated in a range from 31 to 41, with the highest score awarded to Naš salaš and the lowest to Dedin salaš.

**Table 6.** Summary scores based on the dimensions of sustainable gastronomy and the rank of the catering farm

Farm	I	II	III	Total Score	Rank
Salaš 137	38	37	36	111	1
Pajin salaš	28	34	39	101	6
Brkin salaš	35	30	40	105	5
Salaš Orah	32	36	40	108	4
Bulać salaš	29	32	37	98	7
Salaš Miris Dunja	27	30	40	97	8
Vojvođanski salaš	29	29	34	92	9
Dedin salaš	26	33	31	90	10
Naš salaš	32	35	41	108	3
Salaš vinarije Zvonko Bogdan	30	35	40	105	2

The data obtained were normalised to 100%, enabling a comparison of the relative values shown in Table 7.

**Table 7.** Normalised values of the subindicators and the type of farm

Farm	I	II	III	Type
Salaš 137	34.2	33.3	32.4	F2
Pajin salaš	27.7	33.7	38.6	F9
Brkin salaš	33.3	28.6	38.1	F8
Salaš Orah	29.6	33.3	37.0	F9
Bulač salaš	29.6	32.7	37.8	F9
Salaš Miris Dunja	27.8	30.9	41.2	F9
Vojvodanski salaš	31.5	31.5	37.0	F9
Dedin salaš	28.9	36.7	34.4	F6
Naš salaš	29.6	32.4	38.0	F9
Salaš vinarije Zvonk Bogdan	28.6	33.3	38.1	F9

The values obtained were further used as input for the designed matrix to determine the type to which the analysed catering farms belong, as illustrated in the ternary diagram (Figure 2). Based on the data obtained and the application of the GastroFarm Model, a high score was noted for the economic dimension. The dominance of the economic-social dimension (category F9) was observed in seven of the ten farms. The economic-environmental dimension was prevalent in Brkin salaš and the social-economic dimension in Naš salaš. Notably, the environmental-social dimension was prevalent only in the farm Salaš 137, which is recognised as the initiator of such hospitality in Vojvodina and was the first to offer hospitality-tourist services in 1996 (<https://www.premiumsrbija.rs/restorani/salas-137/>).

## Discussion

Based on the field study and insights gained into the management practices of the facilities, it was concluded that the weakest subindicator pertains to the use of organic products. This finding is particularly concerning, given that Vojvodina is an agricultural region where organic food production should be prioritised (Tomaš-Simin and Popović-Vranješ 2013). The high selling price of these products presents a significant barrier, reflected in the elevated prices of dishes in these catering facilities (Končar et al. 2019). While this may explain

their limited presence, the lack of organic produce usage represents a missed opportunity for both sustainability and economic growth in this region.

In contrast, the highest score was awarded to the subindicator concerning the use of autochthonous products in food preparation. The reliance on local fruits, vegetables and grains, as well as indigenous breeds of animals like the Mangulica pig, reflects commendable efforts to preserve the local ecosystem (Luković et al. 2023). This practice not only supports biodiversity but also strengthens the cultural identity of Vojvodina's cuisine. Pork, particularly from autochthonous breeds, is a staple in the region, underscoring its importance in local food traditions (Radović et al. 2017).

The study also highlighted a significant reliance on local markets for sourcing ingredients, which reduces pollution associated with long-distance food transport (Rinaldi, 2017; Bilska et al. 2020). This practice aligns with global environmental goals, particularly in developing regions where such initiatives are crucial for reducing carbon footprints (Bosona and Gebresenbet 2011; Kriewald et al. 2019).

Concerning culinary techniques, the use of traditional methods such as slow cooking in clay pots, barbequing and roasting *ispod sača* (under the bell) emerged as essential aspects of Vojvodina's gastronomic identity (Baltić et al. 2018). These methods, often reserved for special occasions, represent a deep cultural connection to the region's heritage and are critical for preserving its culinary authenticity.

Food waste management, particularly portion control, is another key issue. The large portion sizes characteristic of the region pose a challenge in waste reduction (Milosevic et al. 2012). However, the growing practice of allowing guests to take leftovers home demonstrates a positive shift towards minimising food waste and maximising the value of meals paid for (Wang et al. 2016).

A unique feature of these catering facilities is the independent production of certain food items, such as jams, sausages, and bread, with reduced use of preservatives. This emphasises the importance of producing healthier, locally sourced foods that reflect the area's authentic characteristics (Gassara et al. 2016). Additionally, the reduced use of PVC packaging further underscores their commitment to environmental sustainability (Ye et al. 2017).

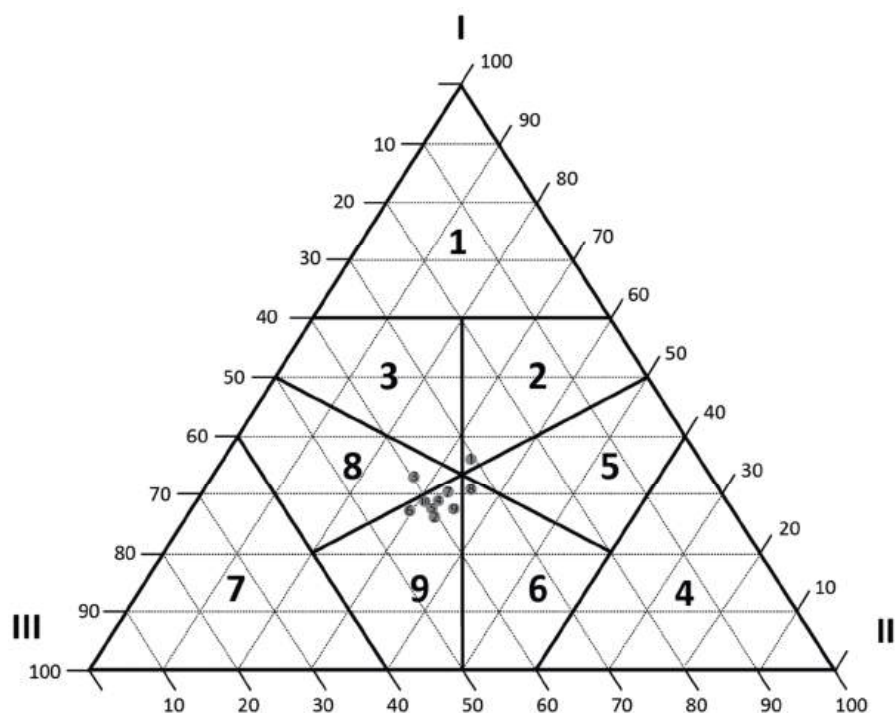
However, the absence of dishes from the Romanian and Roma ethnic groups is notable, as these groups represent a significant portion of the lo-

cal population. This lack of representation in the gastronomic offerings is a missed opportunity to showcase the rich cultural diversity of the region and preserve the traditions of these minority groups (Grubor et al. 2022; Kalenjuk Pivarski et al. 2023a). The strong representation of traditional Serbian dishes, while expected given the region's demographics, underscores the need for greater inclusion of minority cuisines to fully reflect Vojvodina's multicultural identity.

Further, the weakest subindicator identified was the lack of dishes made with products carrying a PDO. This contrasts with the use of traditional products but is understandable, given the high costs associated with PDO items, which often drive catering facilities to seek more affordable alternatives or rely on their own production (Ćirić et al. 2020). The underutilisation of PDO products represents a missed opportunity to promote the region's gastronomic heritage and its high-quality certified goods (Stošić et al. 2022; Šmugović et al. 2023).

On a positive note, the highest scores were attributed to the adaptation of offerings to tourist demand and maintaining an economic balance between supply and demand. This demonstrates a clear understanding of market dynamics and the importance of catering to tourists' preferences while promoting local gastronomy (Daniela and Adina-Gabriela 2015). Facilities have increasingly integrated their production processes, including the independent production of sausages, ham, bacon, preserves and cheese, which aligns with the expectations for such catering (Lang and Lemmerer 2019).

The seasonal adaptation of menus is also a prevalent practice, ensuring the use of fresh, high-quality products and enhancing the authenticity of the dining experience (Yu and Zhang 2020). This seasonal focus not only boosts the quality of offerings but also supports local producers and reduces reliance on imports. Lastly, food waste redistribution remains an area for potential improvement, with some farms finding innovative ways to repurpose waste (Giroto et al. 2015). The efficient use of surplus food could further strengthen their sustainability practices and contribute to regional environmental goals.



**Figure 2:** Ternary diagram positions of farms based on the dimensions of sustainable gastronomy

## Conclusion

Based on research using the GastroFarm Model, the main research question, namely: ‘What is the dominant dimension of sustainable gastronomy in the management practices of catering farms in Vojvodina?’ has been answered. The results indicate that most surveyed establishments are dominated by the socio-economic dimension. This orientation highlights the importance of economic adaptation to tourism demand and emphasises traditional Serbian dishes and products native to the region. The gastronomy of catering farms is largely tailored to the needs of tourists through an authentic offer at appropriate prices, maintaining an economic balance between supply and demand.



Although Vojvodina offers a rich and diverse gastronomic experience, including Serbian, Hungarian and other ethnic cuisines, a lack of representation of certain ethnic cuisines, such as Romani and Romanian, has been observed. This raises the issue of cultural inclusivity in gastronomic tourism and indicates opportunities for improving the social dimension of sustainability. Increased inclusion of dishes from these minority groups would not only contribute to the cultural richness of the region but also attract a broader audience while simultaneously strengthening social cohesion and preserving cultural identities.

The study's results indicate a pressing need for better integration of ecological considerations into the operations of catering farms. While economic adaptability is highly regarded, ecological aspects, such as the use of organic products and waste reduction, remain underdeveloped. Enhancing ecological practices, such as the incorporation of indigenous and seasonal products, could significantly contribute to the overall sustainability of these establishments by reducing their environmental footprint and strengthening local ecosystems.

The development of sustainable gastronomic tourism in Vojvodina could have a significant impact on the region's economic and social development. Catering farms that offer authentic dishes based on local resources and traditional preparation methods not only support local agricultural producers but also promote the region's unique cultural identity. Increasing ecological and social sustainability could enhance Vojvodina's position as a leading destination for gastronomic tourism, further contributing to the region's sustainable future development.

### **Theoretical implementations**

The literature review and similar studies presented in this paper were corroborated by data obtained from the field, which thoroughly updates the theoretical principles regarding sustainable gastronomy and hospitality in rural areas, particularly concerning facilities with cultural and historical significance, such as catering farms. The study results provide valuable information that can be used by various institutions and bodies involved in economic development, tourism and hospitality, as well as by policymakers and strategists.

### **Practical implications**

The designed GastroFarm Model can be applied in various catering facilities and contexts concerning sustainability, as it offers the potential to gather data facilitating the sustainable development of the economy and tourism. The results obtained provide clear guidelines for future activities in sustainable gastronomy and the further development of the studied gastro-tourist locations. Naturally, certain subindicators may require adaptation to the specific tourist region being studied, particularly regarding dishes unique to various ethnic groups.

### **Research limitations**

The research limitations include the availability of certain farms operating as catering facilities. In Vojvodina, numerous farms provide various hospitality services; however, some are operational only during specific seasons (spring/summer, autumn) and were therefore closed during the study period. Additional limitations were related to the reluctance of some farm managers to participate in this type of study and to share data regarding their everyday business operations.

### **Suggestions for future research**

Future research could focus on obtaining more detailed information regarding the individual indicators analysed in this study. Special attention could be given to surveying or interviewing the key actors involved in the operations of these catering facilities – the managers who participated in the decision-making process and whose choices shaped the gastronomic offerings and the remaining business dealings – as well as investigating the fundamental factors influencing decision-making in everyday operations.

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