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Availability of food in terms of region

Scientific problem. In the context of the transformation of Slovak (centrally controlled) economy, market economy has gone through a number of qualitative and quantitative changes in the food retail sector. One of the most visible change has become the entry of multinational retailers and the related massive allocation of investment resources to the deployment of new, modern large-scale retailing formats - supermarkets, hypermarkets, shopping malls. This development occurs organizational changes – growing part of retail turnover takes place in a group of some of the largest companies (the process of concentration) as well as the spatial variation, which results in a new location of retail units. There is a reduction of some local stores.

New spatial arrangement as well as a strong focus on customer motorized without direct legislative regulation by the state led ultimately to the creation of the territories in which the option to procure food is not enough. Food availability is one of the possible areas of application of retail management in terms of regional disparities. Contribution is oriented to define one of the possible extremes that can occur with this and thus are areas, which are characterized by the lack of availability of food for its people in terms of Prešov region. Areas are described in the literature defined as food deserts.

Analysis of recent researches and publications. The scientific works of such scholars as J. Agyeman [9], P. Apparicio [1], D. Bennison [6], J. Block [11], A. Bonanno [2], F. Ciari [3], R. Clarke [6], M. Cloutier [1], J. Dawson [4], A. Drewnowski, A. Goldman [5], C. Guy [6], C. Heidkamp [10], H. Hino [5], P. Hurvitz,

J. Jiao [7], I. Kawachi [11], F. Križan [8], J. Mcentee [9], A. Moudon [7], S. Russell [10], R. Searmur [1], J. Ulmer [7], R. Walker [11] and others deal with the problems of availability of food in terms of regional level.

The objective of the article is to work out the problem of the availability of food in terms of Prešov region.

Material and methods. Paper focuses research of food deserts into several steps of the analysis:

a) Graphical analysis of locating stores with food – illustrations of grocery stores determined by the classification on the classical (traditional) and on modern retail formats.

b) Analysis of motorization of the population – attention is focused on examining the indicators of the number of cars per capita and the analysis of transport network in the region. These characteristics indirectly determine and delimit the grounds of food deserts. They also characterize the area in which the retail chain store is weak, but this area is not behaving as a food desert.

c) Analysis of appropriate characteristics of the consumers – those variables are classified as determinants which help clarifying of food deserts.

d) Analysis of the terms of accessibility – paper uses selected rates of availability in mapping potential areas of underserved food availability.

e) Cartographic output – with program GIS for determination of locations within the Prešov region, which are based on the higher of actions defined as food deserts.

Statement of the main results of the study. Food deserts are relatively new problem, respectively they are one of the newest interest in research of retailing but most published works

on this subject are represented mainly by studies and articles in professional journals. The focus of the publications, however, differs significantly, which is associated both with the interdisciplinary nature of the problems but also with the way of the authors defining and interpreting food desert and also on whether it is a domestic or foreign author. In recent years, food deserts have become the object of numerous studies, which is maintaining an interdisciplinary character. This is evidenced by the increased interest in the issue not only by geographers and economists, but also sociologists, doctors or politicians.

For research of paper, it is useful to understand a food desert as an area in which is (after taking into account the required criteria) insufficient availability of food. The analysis of the food retail continues to focus on the second largest territorial unit in Slovakia, which is located in the east area – Prešov Region. Currently, it ranks among the regions with weaker levels of economic indicators and with large potential risks. But in comparison with other regions of the Slovak Republic, Prešov Region could be defined as administrative area which can offer one of the highest amounts of food consumers.

When analyzing food availability in the first step post it focuses on the description of the investigated area selected for the parameters affecting directly or indirectly the issue of food retail. They take into account the different areas that can be defined as a potential barrier to the development of the food retail, but on the other hand as a limiting factor for increasing the availability of (healthy and quality) food.

Prešov region is situated in north-eastern Slovakia. Its area of 8,973 km² accounts for 18,3% of the state and is the second largest region in Slovakia. Population of the Prešov region is the largest in Slovakia. Relief of area is quite bumpy. In addition to extensive mountains here, there are also affected complexes as several large and small protected natural parks. These natural barriers must be taken into account in developing strategies for food retail and also with it's necessary to count with them in the analysis of food availability in the region.

The structure of the transport facilities in the Prešov region is currently ready to serve for transportation for shopping in other parts espe-

cially for shorter distances. It is for this reason that prevail especially roads of II. and III. classes that do not provide quick transfer as in the case of highways or expressways. Therefore, it is also reflected in the dynamics of the modernization of food retail.

As a first step in examining the issue of food deserts is necessary to analyze the existing retail network of stores with food, based on data from the Statistical Office of the Slovak Republic for the year 2016. Commenting on this area it is important to note that there are a number of foreign studies that focus on research of localization of food stores. They are using the different characteristics and often try to target on the lowest local (spatial) level. For example the work of the authors Guy, Beninson and Clarke by which it can be distinguished the location of shopping centers in several categories within the city [Guy, Benninson, Clarke, 2005] to the edge of the city center (edge-of-center); outside the city center (out-of-center); overland (out-of-town), also seen as the edges of the city, other urban areas and new residential areas.

Prešov Region is one of the regions of the Slovak Republic, which is characterized by major regional differences within its territory. Retail is still represented by the dominance of classical food retail formats while compared to the Slovakia as a whole achieves this high level of proportion – up to 19,0%. In other words, almost one of five classic format of grocery store is located right in the Prešov region. This means that the retail store does not go far on optimum level of modernization. The lowest level of provided spatial analysis in food deserts the community. The following output from GIS provides an insight into food retail network in the Prešov region.

Presented map (Figure 1) identifies some facts concerning the location of the food retail: looking at the location of selected types of retail outlets of food, it is possible to identify several centers. First, the city of Prešov is defined as the center but also in other parts of the region, there is the beginning of standing out of the village as "local" shopping centers or shopping heads. The described reality is summary illustrated in Figure 1, which determines by GIS through the various centers and purchasing plotted with positional power. Intervals were

produced by statistical method "Jenks natural breaks optimization", therefore intervals are uneven.

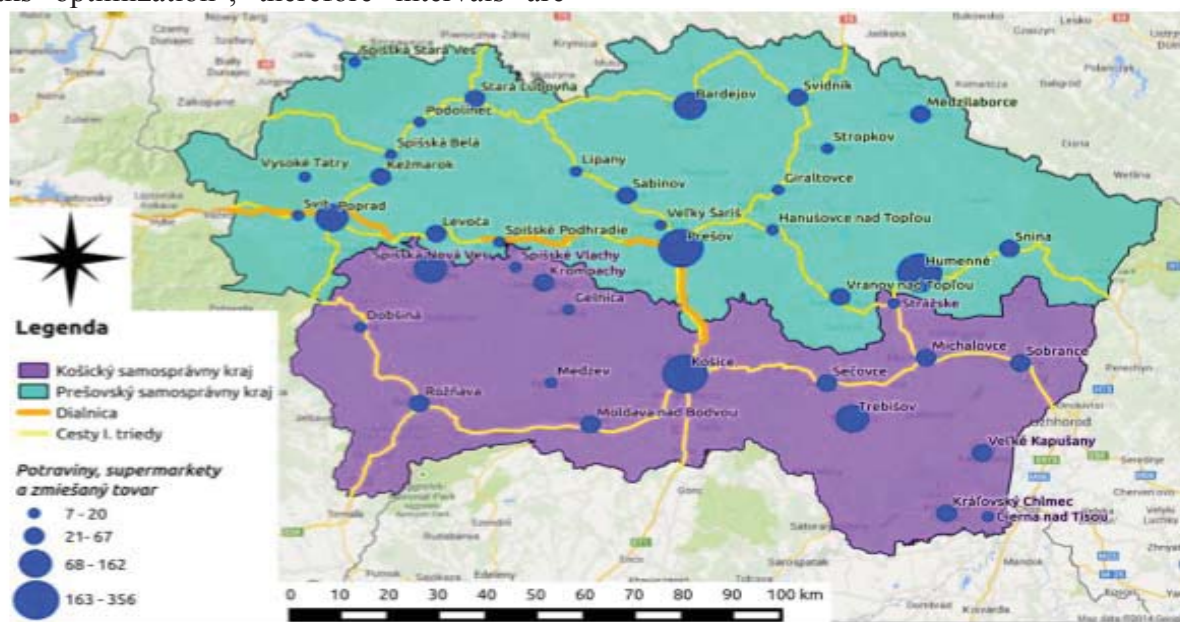


Figure 1. Economic analysis of rural multi functionality

Source: Own procession.

While the area of transport were by the authors until the 70s of the 20th century considered as the main localization factors that affect the deployment of such production and non-production activities, until today its role has transformed more into the role of one of system components. In interpreting areas of motorization, post uses the number of cars per capita in the Prešov region. Due to the receipt of the most recent data for the area of food retail from the year 2016, also this post refers mentioned indicator to the situation from 2016.

Number of cars per capita in Prešov region is presenting by number 0,320 and on one person in productive age of life the number is lower – 0,262. These values are under the average for Slovakia as a whole area. It is obvious that high number of cars per capita is related to higher transport capacity for the purchase of food and greater ability to purchase in large quantities. This means that the region with the higher number does not need to such a dense network of retail stores. Second, the higher proportion of the big sized stores shops are expected – also for large quantities of purchases of consumers. The structure of the transport facilities in this region is not as optimal to this territory – having even only one shopping gradient. Analysis of the transport situation and the

possibility of transportation has demonstrated the lower availability of various food retailer. So ultimately, it determines the occurrence of food deserts.

As the addition to a comprehensive analysis of the food deserts for Prešov region, paper analyses the character and the behavior of food consumers. For the needs of this article is a partial study turned into "paradoxical" direction. This means that it is no respecter of higher territorial unit through retail localization and the subsequent impact on the character of the consumer. On the contrary – paper looks at the consumer as the impetus for the subsequent development of retail trade and hence food deserts. The reason for the inclusion of this supplementary analysis is the recognition of the difference in consumer behavior depending on what area is decided. Ultimately, other decisions are consumer making in food deserts and other in other areas (for example in food oases) [Walker, Bloick, Kawachi, 2012].

The economic activity rate is 57,7% and the region is characterized by one of the highest levels of unemployment compared with other higher territorial units. This is also reflected in the development of net cash outflows that are covered up to 80-85% of net cash income. Around 91% of consumer spending is, due to

low income, going on financing of mostly things what they absolutely need – i.e. food, housing with related expenses and provision of transport. It is important to note that for this reason, strong potential of food market could be seen in the range of the Prešov region for the development and modernization of food retail.

Binary also called trivial availability is a quantitative indication of the distance between the starting point and destination point. It is defined as linear equation:

$$Dst1_i = d_{ij} \quad (1)$$

for $i = 1, 2, 3, \dots, M$, $j = 1, 2, 3, \dots, N$.

In this equation d_{ij} represent distance between community and food retail store, M means number of communities and N is number of food retail stores.

This availability is intended as a basis for further specified rates. Due to the acceptance of

the scope and structure of the available data, this rate reflects transport distance by the car. To measure the distance it is possible to use various alternatives. Since many experts prefer to travel (transport) time which they compared to measuring the distance (in km) for more informative, the contribution is in favor of this option. Availability, as such, can be measured either from individual residences or from the individual statistical regions. Post defines it as a possibility of measurement through the middle of the regions, so due to this paper can examine the status of these power centers. To this extent, the availability of the specified criteria, which limit identification of food deserts, is limit availability to 30 minutes. The data in Table 1 together with a graphical representation of individual centers (Figure 2) offer status areas by binary scale availability.

1. Binary availability

Centrum	Rate	Character
Bardejov	15 min	
Humenné	32 min	Food desert
Kežmarok	39 min	Food desert
Levoča	19 min	
Medzilaborce	41 min	Food desert
Poprad	28 min	Food desert
Prešov	11 min	
Sabinov	14 min	
Snina	44 min	Food desert
Stará Ľubovňa	27 min	
Stopkov	14 min	
Svidník	18 min	
Vranov nad Topľou	17 min	

Source: Own procession.

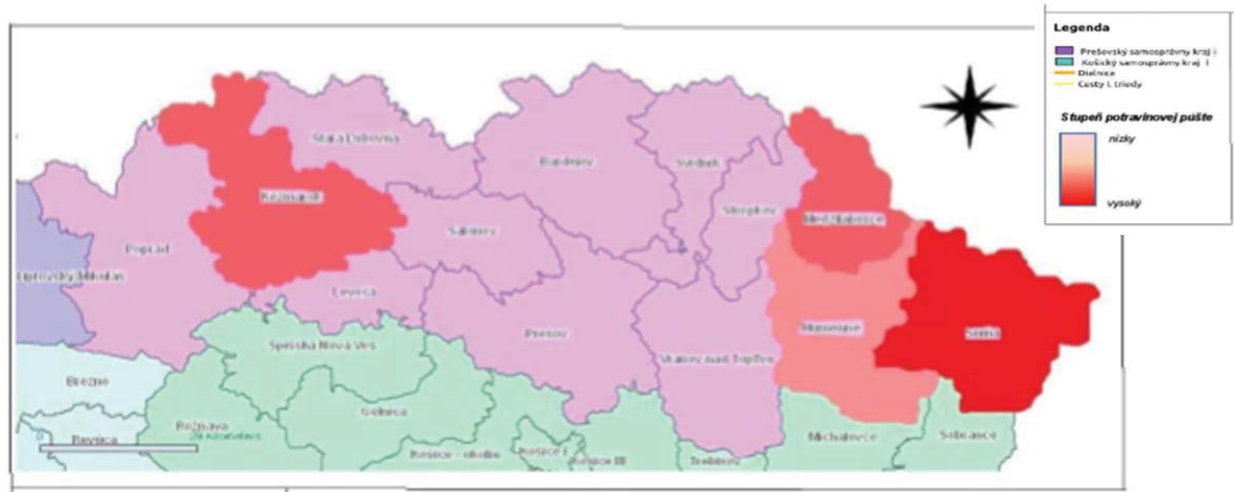


Figure 2. Food deserts in Prešov region according to binary availability

Source: Own procession.

This is a quantitative statement that interprets the cumulative amount of transmission times that the consumer must overcome to be shipped to any destination point in the retail network. It is defined as the total set of retail as the sum of the minimum observed from the point of consumption to all other nodes of the plurality:

$$Dst2_i = \sum_j^m d_{ij} \quad (2)$$

for $i = 1, 2, 3, \dots, M$, $j = 1, 2, 3, \dots, N$.

In this equation d_{ij} represent distance between community and food retail store, M means number of communities and N is number of food retail stores.

The availability rate is negative, i.e. the smaller value achieved; given target point (hypermarket, supermarket) is better available. For the needs of analysis of food deserts limit to the availability is usually determined of more than 200 minutes. For the needs of analysis of food deserts in terms of Prešov region paper adapted levels of food deserts by the nature of the territory. Since it features a greater number of centers – and the parallel posts of foreign authors analyzing a similar area to the limit in a similar range – limit was determined as the availability of over 1,500 minutes. Table 2 along with a graphical representation (Figure 3) provides the status of a particular center areas through the metric availability.

2. Metric availability

Centrum	Rate	Character
Bardejov	1 676 min	Food desert
Humenné	1 987 min	Food desert
Kežmarok	2 138 min	Food desert
Levoča	2 008 min	Food desert
Medzilaborce	2 116 min	Food desert
Poprad	2 354 min	Food desert
Prešov	1 468 min	
Sabinov	1 576 min	Food desert
Snina	2 289 min	Food desert
Stará Ľubovňa	1 944 min	Food desert
Stopkov	1 641 min	Food desert
Svidník	1 706 min	Food desert
Vranov nad Topľou	1 684 min	Food desert

Source: Own procession.

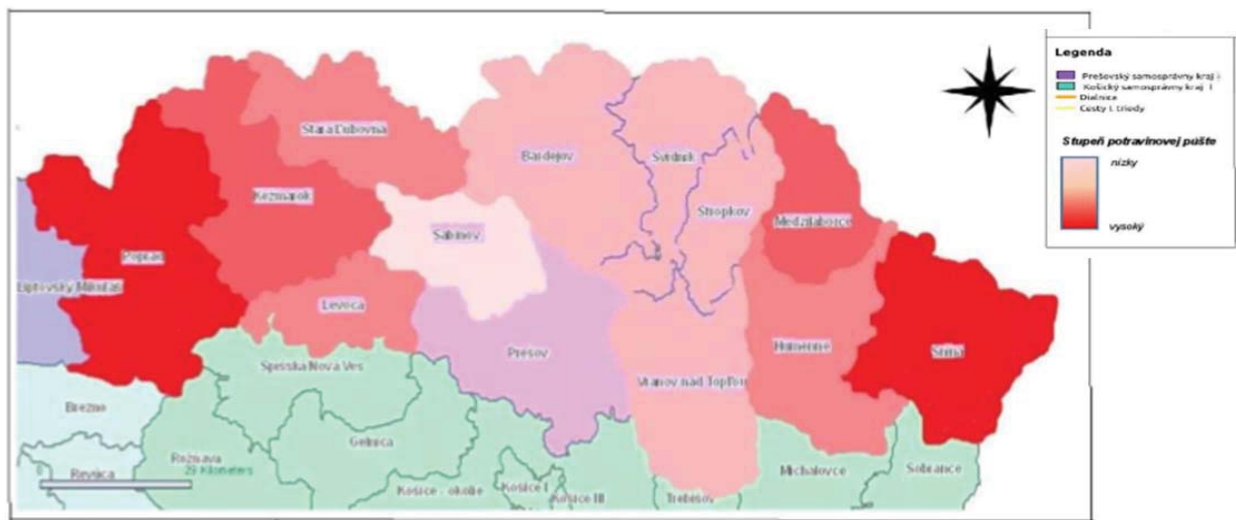


Figure 3. Food deserts in Prešov region according to metric availability

Source: Own procession.

This level of availability is characterized as a quantitative indication of the amount of direct connection S_p from the point of consumption

(community) in all target points (food retailer). It is defined as:

$$Dst3_i = \sum_j S_p \quad (3)$$

for $i = 1, 2, 3, \dots, M, \quad j = 1, 2, 3, \dots, N$

In this equation M means number of communities and N is number of food retail stores.

This availability has a positive rate, i.e. thus, greater value achieved by the availability is better. The limit in the definition of food deserts was determined to availability under 5 connecting routes in terms of transport network in the examined area. Paper accounts with highways,

roads of I. and II. classes. As connecting routes were included those roads that directly been associated with a given municipality connecting with other centers.

In Table 3 are presented each area of Prešov region using topological direct access. Subsequently, the connection is illustrated through the results of GIS (Figure 4).

3. Topological direct availability

Centrum	Rate	Character
Bardejov	5 routes	
Humenné	3 routes	Food desert
Kežmarok	2 routes	Food desert
Levoča	2 routes	Food desert
Medzilaborce	2 routes	Food desert
Poprad	5 routes	
Prešov	5 routes	
Sabinov	2 routes	Food desert
Snina	1 routes	Food desert
Stará Ľubovňa	3 routes	Food desert
Stopkov	3 routes	Food desert
Svidník	2 routes	Food desert
Vranov nad Topľou	2 routes	Food desert

Source: Own procession.

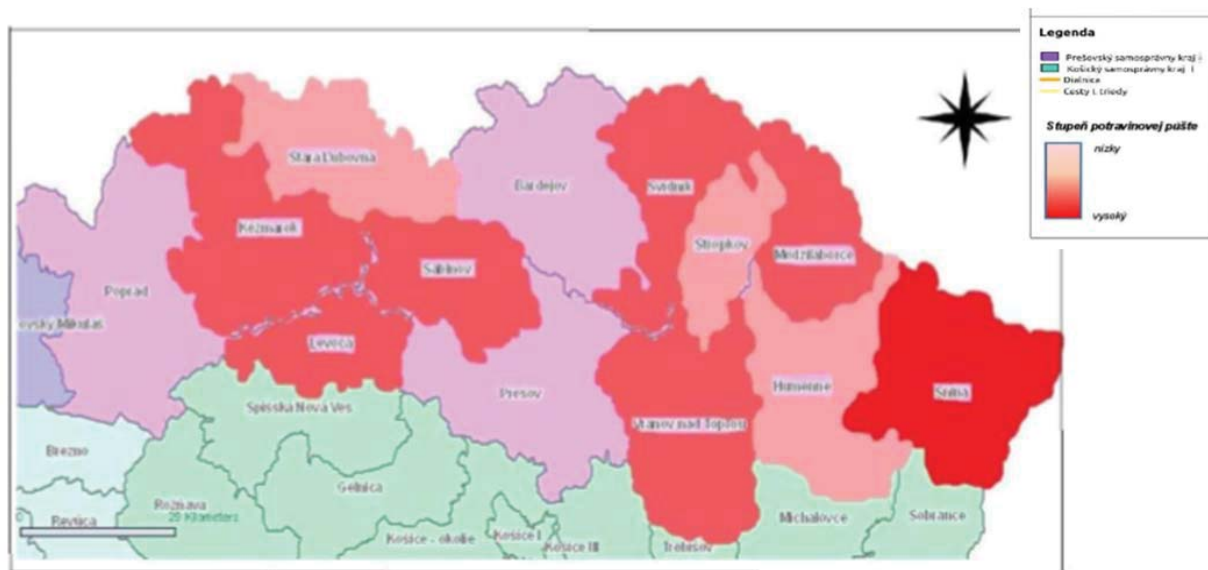


Figure 4. Food deserts in Prešov region according to topological direct availability

Source: Own procession.

Last defined level of availability quantifies the amount of retail food available at some distance from the village. It is expressed as:

$$Dst4_{i,jl} = \sum_{j=1}^N O_j \quad (4)$$

for $i = 1, 2, 3, \dots, M, \quad j = 1, 2, 3, \dots, N, \quad l = 1, 2, 3, \dots, O$

In this equation O_j represent number of food retail store in some distance from the communi-

ty, M means number of communities, N is number of food retail stores and O is number of km of road network.

Through Table 4 is presented the area of food desert for Prešov region using rate-based opportunities. Since by using rate-based opportunities county does not have a food desert, graphical representation absent.

4. Availability based on opportunities

Centrum	Rate
Bardejov	169
Humenné	301
Kežmarok	61
Levoča	55
Medzilaborce	35
Poprad	171
Prešov	240
Sabinov	38
Snina	68
Stará Ľubovňa	56
Stopkov	21
Svidník	41
Vranov nad Topľou	55

Source: Own procession.

Analysis concludes that every of rates showed different results. But the evaluation repeats some the individual areas with the weakest food availability repeatedly. Going through the whole analysis, these areas are: Humenné, Kežmarok, Medzilaborce a Snina.

To conclude, the analysis use guidance from the author Križan. He produced some general

recommendations for the types of retail grocery stores in relation to the territory of their location [Križan, 2009]. On this basis, it is important to present Table 5 with recommended formats of selected stores in relation to the population whose should spread.

5. Types of food retail stores depending on size of served inhabitants

Served inhabitants	Type of food retail store
8 – 10 thous.	DIS
10 – 30 thous.	DIS, MSM, VSM
30 – 50 thous.	DIS, MSM, VSM, MHP
50 – 100 thous.	DIS, MSM, VSM, MHP, HBM
More than 100 thous. inhabitants	DIS, MSM, VSM, MHP, HBM, VHP, RNC

Note: DIS – discount store, MSM – small supermarket, VSM – large supermarket, MHP – small hypermarket, VHP – large hypermarket, HBM – hobby market, RNC – regional shopping center

Source: Own procession according to Križan, 2009.

Conclusions. Prešov region as the second largest region of Slovak Republic represents the area with 4 areas on lower functional classification were defined as food deserts. This means that these areas have insufficient availability of food for their inhabitants. Prešov region is characterized by high rate of regional disparities; this impact can be seen also in availability of food inside the whole area. One central point for purchasing – the city of Prešov is not enough for satisfying of basic needs and it is necessary to hold the trend of begging of new smaller local shopping centers.

Many authors, from Slovak republic as well as from abroad are pointing on the possibilities, which are setting up with creation of food deserts.

Some of them are very useful and adaptive in terms of Prešov region and subsequently in condition of Slovak republic as the whole – selling from small farms of households or new creating sector of economy defined as small farmers. These subsectors could be defined as potential solutions for maintaining the status of optimal availability of (healthy and qualified) food for inhabitants.

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Новини АПК

Україна збільшує експортний потенціал насіння

Мінагрополітики спільно з асоціацією «Українське насіннєве товариство» представили звіт про виробництво насіння цукрового буряку в Україні, який був схвалений під час щорічних зборів учасників Насіннєвих Схем Організації економічного співробітництва та розвитку (ОЕСР) у м. Прага (Чеська Республіка). Захід відбувся за запрошенням Секретаріату Насіннєвих Схем Організації економічного співробітництва та розвитку та в рамках заходів з виконання Меморандуму про взаєморозуміння між Урядом України та Організацією економічного співробітництва та розвитку про поглиблення співробітництва на 2017-2018 роки.

Під час заходу українська сторона взяла участь у обговоренні декількох питань. Зокрема, щодо внесення змін у правила, які стосуються розширення членства у Насіннєвих Схемах та фінансових зобов'язань країн-учасників.

Результатом обговорення стало погодження на розширення участі України у Насіннєвих Схемах стосовно цукрового та кормового буряку. Також було прийнято рішення, що Секретаріат ОЕСР подасть рекомендації щодо розширення участі України у Насіннєвих Схемах Комітету з сільського господарства та Раді ОЕСР.

Довідково:

Згідно з рішенням Ради ОЕСР від 16 листопада 2009 року Україна приєдналася до Насіннєвих Схем ОЕСР стосовно зернових (кукурудза та сорго). 19 грудня 2014 року (рішення № С (2014) Україна розширила участь у насіннєвих Схемах ОЕСР щодо насіння хрестоцвітних, олійних та прядивних культур. У червні 2016 року Мінагрополітики звернулось до Секретаріату ОЕСР із заявою стосовно розширення участі у насіннєвих Схемах щодо цукрового та кормового буряку.

Прес-служба Мінагрополітики України