A few notes on the study of short food supply chains on the example of farm boxes in the Czech Republic

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Abstract
Besides other topics, foreign scientists (agricultural economists, rural geographers, geographers of agriculture/food) especially from Western Europe and the U.S.A., pay attention to the development of short food supply chains (SFSCs)/alternative food networks (AFNs) in the long-term perspective. Such schemes were established as one of the substitute options of food distribution in the space of “traditional forms” of food distribution and consumption. With view to the actual dramatic development of alternative food networks in the Czech Republic, it is not surprising that in a recent period, a number of studies shift attention to this issue. Most studies are focused on the development of short (food) supply chains, particularly farmers' markets and direct sales. Because SFSCs/AFNs are a relatively current topic and an unexplored concept in many characteristics, the authors of the presented paper use the example of the box scheme (the so-called farm boxes) to describe selected aspects of its development in the Czech Republic while applying geographic, agroeconomic and marketing approaches. The analysis is based on data of specialized web databases which actors of the box scheme use to offer their product via on-line channels. First results reveal a regional differentiation of farm boxes in the Czech republic, relationships between customers, headquarters and supply points and differences in the nature of the product (for example the range of offered commodities...) and its management.

Key words: short food supply chains, alternative food networks, the Czech Republic, box schemes, regional differentiation

JEL classification: Q02, Q13, R12

1. Introduction: Short food supply chains
In the end of the 20th century, the Czech Republic had undergone a significant transformation, which resulted in transition from central planning economic model to the market economy model based on market liberalization. The demand side has become the dominating side of the market model, determining and managing the direction of product offerings in the market (including the food consumption). The disintegration of the previous system eliminated barriers to entry on the Czech market and thus the arrival of a new segment - wholesale chains was enabled. In a short period, wholesale chains dominated a large part of the food market since they offered a single-volume sale, with a wide range of products at low prices, and local retailers could not compete with them. These chains have become a dominant player in the market, however, at the expense of small retail shops.

The dynamics of development of the Czech grocery trade corresponded with the changes in the food-farming system and partly copied the development in the developed countries of Western Europe. In these countries, some disadvantages of agricultural system began to reveal, such as overproduction, increasing environmental pollution or degradation of food security/quality. Therefore, distrust in the quality of the food produced in the conventional farming and the genetic modification of food, known as GMOs, taking into account other negative factors, such as the occurrences of diseases, e.g. swine or bird flu, salmonella and other (Renting, Marsden & Banks, 2003), were considered as important factor influencing
consumer perception. But according to Maples et al. (2013 in Low et al., 2015), in a survey of consumer trends in the United States of America (USA), the safety of food was not proven to be the most important factor in buying local products, rather it was the knowledge of their origin. Zepeda and Nie (2012) further state that according to a survey of trends in the USA in 2011, 27% of respondents were concerned about the environmental impacts of imported products.

The increasing consumer demand for quality and awareness of food origin (which may be reflected in the rejection of the conventional ways of producing and selling food in large-format stores) resulted in searching for alternatives to food distribution, such that would meet the requirements of quality and of locality (Fendrychová, Spilková & Syrovátková, 2013). A new understanding of food in the eyes of consumers was generally supported by the increasing public interest in areas, such as the environment, health and welfare (not only in connection to the population).

Therefore, geographers, rural sociologists and agricultural economists pay attention to this trend and describe the short forms of distribution of the food chains including newly formed network of producers, consumers and other stakeholders. These concepts represent alternatives differing from standard systems food chains (Murdoch, Marsden & Banks, 2000). One of the described types of food network was based on the face to face approach, when consumers buy products directly from producers and their confidence was based on the personal approach (Holloway & Kneafsey, 2000; Knickel & Hof, 2002; Pretty, 1998 quoted in Renting, Marsden & Banks, 2003). The types of short food chains, such as mail order, internet advertising and box schemes (farm boxes) use this marketing concept; this paper singles out the issue of box schemes.

The concept of these networks has been taken from Western European countries and adapted to the conditions of the Czech Republic (Zagata, 2012). The author also describes, although even now wholesale chains still dominate the Czech market, food production and consumption, their market position start to change because new trends as changing lifestyles and attitudes towards food. In the Czech Republic we can already find farmers’ markets, box schemes, community-supported agriculture, and other forms of alternative food network. Farmers’ markets were first introduced initiative (Spilková & Perlin, 2013). After the introduction, farmers’ market gained popularity and served as a template for framing the rules of functioning structures for newcomers to the industry. Demand for these forms of sale spreads very quickly and continues to rise, documented by the increasing number of groups and communities that support this type of production and sales. Therefore, Zdráhal and Bečvářová (2013) state that these networks are now being seen as tools that have the potential to mitigate the effects of restructuring in European agriculture and would support to small agricultural producers.

The concept of box schemes is diversified and varies in the range of characteristics - according to the operator, methods of payment, risk sharing and other attribute. Also, bond and mutual relations among the both sides may be different. It depends on farmers (or responsible cooperatives) and customers what kind of relationship will be applied.

The aim of this paper is to evaluate the development and the characteristics of the selected segment of SFSCs ie. box schemes in the Czech Republic; especially spatial context and typography in terms of management and assortment of box schemes are analyzed. Given the limited scope of this paper, the objective is recognized only as a basic overview of the captured results. Because studies that would provide a more comprehensive characteristics box schemes in the Czech Republic are not available, the research questions are focused on selected basic characters, whose understating is necessary for further research in this area.
How is (spatial) localization of box schemes in the Czech Republic?
What are the differentiating features of box schemes according selected characteristics (origin, range of offered products, delivery)?

2. Date and methods

Data analysis was based on information of "box schemes community of Bohemia and Moravia" in the online website bedynky.cz (October 2015) (PRO-BIO League). Web captures cooperatives in the Czech Republic and database collects available information about the subjects. Information of the “community that supports local production and consumption” (nalok.cz) was used as an additional source. Created database of box schemes cooperatives was served for a deeper analysis. Group of “regional box schemes” (92) was identified, which included cooperatives with supplies only in the one region and the “national box schemes” (20), which accounted entities operating in several regions.

Characteristic of spatial distribution of cooperatives was based on knowledge of the municipality location of the seat of cooperatives. Information about way of the foundation (by farmers or consumers) was also taken into account. The box schemes cooperatives, which were difficult to determine according this attribute, were grouped as unclassified.

Another part of work was designed to evaluate box schemes types according to the classification of offered agricultural products and its range and method of distribution (possibility to deliver to a given address). Given the possibility of wide variation of product assortment has been divided into 7 categories, including dairy products, meat, eggs, vegetables, wine and alcohol, honey, fruit juices and syrups. Based on the determination of the frequency of each category cooperatives were divided into three groups according to the width of the range: wide range (1), narrow range (2) and specialized cooperatives. Specific key to the division into categories was as follows (two cooperatives could not be classified in any of the groups).

- The cooperatives, which were focused on one food categories, were included in the group of specialized cooperatives.
- Conversely, those operators that offer products in two or three categories, were classified as a narrow range.
- The third group is created, those cooperatives which are characterized by a wide range of offered food (offering four or more food categories).

3. Results and discussion

Box schemes initiatives grow as fast as other sectors of short food supply chains in the Czech Republic. While in the early years (2010) around 40 organizations were reported, in 2015 numbers of them rose to more than 100 cooperatives. During this time their numbers recorded dynamic development, which was characterized by their demise and the emergence of new co-operatives too. At the time of the presented research 112 box schemes cooperatives was captured and analyzed (October 2015).

Most of the cooperatives operate in regional scale. Cooperatives operate in more than one regions of the Czech Republic (“National cooperatives”), were represented only by 21 subjects and in average, each of them operate in 2.5 Czech regions. The importance of cooperatives operating in the two regions (15 subjects) was the higher; four of these cooperatives operate in three regions, one in four and one even in 7 regions. The cooperative, having the greatest coverage of the Czech Republic in its spatial scope (half of the regions) is
the Biofarm Sasov. The second most common farm is Farma-obchod.cz, which operates in four regions. By contrast, the regional cooperative operates only in one region of the country. Their number is 92, and thus they have a substantial share of the total box schemes. This category of cooperatives is therefore comprises only by subjects that are strongly embodied in their place of residence.

3.1 Localization of box schemes cooperatives

Generally, box schemes cooperatives are situated almost all regions of the Czech Republic. Looking more closely at their localization, it is apparent that they are concerned in the region presented by important regional centres (Prague, Brno, Ostrava, Czech Budejovice, Olomouc), in which they are able to find greater application of its products (the questions of number of consumers, but also purchase power).

Figure 1: Localization of box schemes cooperatives in the regions of the Czech republic

![Localization of box schemes cooperatives](source)

Further, detailed analysis of the location box schemes cooperatives in municipalities where the seat of cooperatives are situated, in order to verify whether box schemes distribution of agricultural products in terms of consumption are directed primarily to major cities in the Czech Republic. As Table 1 shows, although it confirmed that box schemes in the Czech Republic focus on end markets in large towns, concentration of the cooperatives of box schemes is less important. Only 32 monitored initiatives from 112 were located in the municipality where already some other cooperative operate. It means that nearly three quarters of monitored cooperatives operate in the municipality, where there was no competition.

Table 1: Box schemes cooperatives in the municipalities of the Czech Republic

<table>
<thead>
<tr>
<th>Municipality</th>
<th>Number of cooperatives</th>
</tr>
</thead>
<tbody>
<tr>
<td>Praha</td>
<td>10</td>
</tr>
<tr>
<td>Brno</td>
<td>9</td>
</tr>
<tr>
<td>Olomouc</td>
<td>3</td>
</tr>
<tr>
<td>Plzeň</td>
<td>3</td>
</tr>
<tr>
<td>České Budějovice</td>
<td>3</td>
</tr>
<tr>
<td>Liberec, Ostrava, Bilá Lhota, Hradec Králové, Litoměřice</td>
<td>2</td>
</tr>
</tbody>
</table>

Source: Pro-bio league; nalok.cz; edited by authors
Box schemes cooperatives are predominantly localized in the part of the region, where is also the large consumer market, however, the existence of entities that operate on a much wider area was also recorded. Current practice in these complex systems suggests that if cooperatives decide to expand beyond the region of its origin, it is especially the Prague, which is sufficient for such an expansion motive. Due to influence of Prague, a growing number of cooperatives in the area rose with increasing of population size of municipality where cooperative seat is localized, as following figure reports.

**Figure 2: Localization of box schemes cooperatives according population**

Source: Pro-bio league; nalok.cz; the Czech Statistical Office, edited by authors

### 3.2 Type of box schemes cooperatives in the Czech Republic

The following analysis is focused on aspects of their formation, organizational methods, a range of offered products and use of external ordering system. For these purposes, the basic set of monitored subjects was divided into three types of cooperatives. The first type is represented by group of a cooperatives established by farmers (identification of boxes with specific farm)(1), consumers (2), and a third type was formed by group, which was not possible to determine whether the first or second classification was acceptable.

#### 3.2.1 Establishment and Management

From the 112 reported subjects, 47 cooperatives were based on the initiative of consumers. A more detailed analysis of this group, however, showed that this group is not homogeneous and the two forms of organization exist, which are differed by aspect of intentions of their founders.

The first type is represented by cooperatives founded and organized by final consumers, when some elected member represents the cooperative. For this type, quality and domestic (Czech) food is very important. Cooperative is founded for the purpose of gathering local food products, which are distributed to their members or other residents in your neighborhood and would encourage healthy lifestyles in the region and small agricultural producers. The second (less frequent) type is presented by business cooperatives, eg. On-line stores (e-shops). Created cooperatives aim to regroup a broad portfolio of products that are offered. The difference between these organizations lies in the purpose of sale of goods, way of distribution and management and general objectives of their establishment. A significant role is also played by distance delivery, when the cooperatives of consumer type deliver only to nearby localities but the online shops supply customers in a greater distance.
3.2.2 Specialization
An analysis of the offered product portfolio showed that the subject of the exchange of local products were on generalized view foods like fruits and vegetables, dairy products, meat products, fruit juices and syrups, wines and alcohol, eggs and honey (7 different categories of foods). As can be seen in Fig. 3, the most important item that was offered by almost all cooperatives was vegetables and fruits. Other products offered in box schemes are represented by no seasonal products, but they were offered in less frequently - especially eggs, meat and dairy products. Another part of box schemes creating a higher added value - wine and other alcohol, was included by only one fifth of initiatives and honey was offered in this scheme only very rarely.

Figure 3: Frequency of product category in the box schemes

Source: Pro-bio league; nalok.cz; edited by authors

According the range of products the most of the initiatives aims to cover the widest portfolio of products. A third of subjects were focused on two or three product types and only one fifth presented the distinct specialty group. According to the origin and the management of cooperatives we can identify different approaches to the range of offered products. The cooperatives formed by farmers mainly focused on a narrower range of products and many of them were specialized. In contrast, the cooperatives initiated by consumers were mainly focused on providing a wide range of products. The smallest group was formed by specializing box schemes cooperatives, which represent 28% of farmer cooperatives and 15% consumer cooperatives.

| Table 2: Offered range of products in the relation of type of cooperatives according their establishment |
|-----------------------------------------------|-----------------|-----------------|-----------------|------------------|-----------------|
| Range of products                            | Farmers | Consumers | Unclassified | Total | Rel. Frequency (%) |
| Unclassified                                  | 0       | 2          | 0             | 2     | 1,1               |
| Specialized cooperatives                      | 13      | 7          | 4             | 24    | 21,4              |
| Narrow range                                  | 19      | 12         | 6             | 37    | 33,0              |
| Wide range                                    | 15      | 26         | 8             | 49    | 43,8              |
| Total                                         | 47      | 47         | 18            | 112   | 100,0             |

Source: Pro-bio league; nalok.cz; edited by authors

Results of the regional cooperatives show that they preferred a wide range of products (61% of subjects) while in the case of the national level, the representation of initiatives applying narrow and wide assortment is surprisingly uniform (consisting of 36% for both groups).

The group of initiatives aimed at a wide range of food was oriented on the diversity of offered products because many cooperatives try to offer uncommon foods, or even exotic fruit.
addition to local and expectable products, it was possible to find even the less common food. They try to distinguish themselves from others, but also attempt to offer a large selection of food. However, this effort could lead to the fact that one of the primary goals of box schemes and consumer expectations are not fulfilled - the local production and knowledge of the place of origin of the food.

3.2.3 Delivery
Further analysis revealed providing additional services to customers, primarily whether cooperatives also enables distribution of farm boxes directly to customers' homes. Mainly farmers cooperatives are among the entities that do not provide “home deliveries” (47% of cooperatives do not offer this option). As one of the reasons may be named the size of family farms, which are not sufficient and can not cover the costs, which involve distribution. Delivery to home is much more applied in cases of consumer-based initiatives, while 2/3 cooperatives offer this option. For many consumers it may appear as significant the fact that food within the box schemes is transported to their home and they have no concern with their procurement on the withdrawal site.

Despite the potentially strong position, which can be attributed to national cooperatives (due to their extensive distribution network), only 3/5 cooperatives provide delivery. The major part of deliveries in both forms of cooperatives according to the establishment and management are realized in Prague and the surrounding the Central Bohemia Region. In the case of regional level the shares of cooperatives offering distribution and cooperatives without them were close to the total shares and delivery to home was realized in the surrounding of seat of box schemes cooperatives.

There are many reasons that affect the decisions of box schemes actors for the establishment of this service. Influence on decisions about the provision may be largely linked with burdensome factors such as time, resources, finance, and human capital. Thus, some of a cooperatives request compensation payment for this service. Therefore, it is not surprising that cooperatives which do not offer this service are predominantly represented by small family farms than consumers based initiatives. In this type of cooperatives, delivery to home is connected with increased cost for box schemes management.

4. Conclusion
Based on the literature review, several reasons could be identified in the effort to exercise box schemes in the Czech Republic; these can be found either on the demand side (knowledge of the origin of food, quality of locality...) or the supply side (the goal to ensure regular consumption of agricultural products for a „fair price”, expand the distribution opportunities of access of local products on market and reduce the impact of business wholesale chains). As the development of numbers of cooperatives involved in the farm boxes scheme reveals, the dynamics of the box schemes environment is high. It can be seen that many players are not even able to cope with the demands placed on the system and consequently, they cease their business activities.

As the analysis of localization of the headquarters of box schemes cooperatives suggests, two types of localization can be distinguished. These cooperatives are established in the vicinity of important cities - location near regional cities gives advantage to such located box schemes initiatives, since city population represents large potential market of short food supply chains and many inhabitants have an experience with the AFNs for example through farmers markets (Syrovátková, Hrabák and Spilková, 2014). The second type is represented by cooperatives initiatives which are set up in areas suitable for farming. While cooperatives which are seated
near major regional cities (Central Bohemia region close to Prague, Ostrava) are formed and initiated especially by consumers themselves, agriculturally favored areas are significant in the case of cooperatives initiated by farmers who manage this land. However, high numbers of consumers who perceive an opportunity to consume the food produced by local farms are also concentrated in the agriculturally favored areas (the Vysočina Region and the South Bohemian Region).

In terms of product range offered by box schemes cooperatives, we can conclude that offer of products is mainly composed of a wide variety of food, especially in offer by consumer cooperatives. Cooperatives established by farmers are focused on a narrower range of food and they are often specialized. Among the most popular product categories, which are present in the majority of the contents of farm boxes, we can identify vegetables and fruits. Other farm products complementing the content of boxes may be eggs, fruit juices, dairy products and meat. Most cooperatives provide additional services for their customers, for example individual delivery of boxes to the specified address. These services represent the extra offers and are often carried out with view to a number of customers willing to pay extra fees in some cases. Therefore, these services are increasingly used particularly by cooperatives initiated and controlled by the consumers.

Even in the case of farm boxes, weak embeddedness of boxes in the minds of consumers and the uncertainty of sales seem to be a disadvantage increasing demand on time and finance. For some cooperatives, these facts constitute a major limitation, and its impact is even larger in the case that box schemes are managed by small family farms or enthusiastic consumers who manage the cooperatives mostly in their free time. In this point of view, significant fluctuations of box schemes cooperatives numbers in the Czech Republic could be explained by the above mentioned limits.

Regarding the presented findings, it is possible to analyze the role the local action groups (LAGs), and more generally of the new rural development program (RDP) in the Czech Republic, in the development of short food supply chains in the future. These activities can be supported by LAGs or RDP generally and many LAGs have already included support of short food supply chains into their project frameworks.

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