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FOODSTUFFS WASTAGE IN THE CZECH SOCIETY

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Abstract

Food wastage is the cause of environmental and ethical problems and expenditures in economic and social domain, what brings challenges on the internal markets, both to the producers as well as to consumers. Restriction of the wastage is an important starting step not only in the fight against hunger in the World, but also for population nutrition improvement. Restriction of foodstuffs wastage could bring about more efficient soil utilization and better water resources management. The growing world population further deepens the environmental impact of food wastage. The article analyzes the attitude of Czech households to food wastage. The supporting data were gathered via questionnaires, the results were evaluated using the statistical methods of qualitative data analysis. Nearly one half of responding households estimated the amount of food thrown to the municipal waste to equal 100 kg/year/person. Better approach to food wastage issues was recorded in case of urban households. In general the Czech households are not sufficiently informed about the non-profit organization campaigns that point out at this issue.

Keywords: Czech society, household, Food wastage, Environment, Municipal waste, Non-profit organization, Sample survey, Questionnaire, Statistical analysis

1   INTRODUCTION

The waste of foodstuffs is a phenomenon meeting general condemnation across generations and geographic areas. The FAO studies show that about one third of the foodstuffs produced for human consumption are not consumed globally, making about 1,3 billion tons yearly. Foodstuffs are wasted over the whole of the function chain, starting at the beginning of farm production up to the final consumption in households or at individuals.

According to the decree by the European Parliament and the Council of Europe (European Commission, 2011) No. 178/2002, foodstuffs are any matters or products, be it processed, partially processed, or unprocessed, prepared for consumption by man, or such that can be presumed to be consumed by man. Another foodstuff can be assumed unsuitable for human consumption CR, Act No. 110/2007 (CR, Zákon č. 110/2007 Sb. o potravinách a tabákových výrobcích a o změně a doplnění některých souvisejících zákonů, v platném znění k 1. 1. 2011., Act No. 110/2007 Coll. on foodstuffs and tobacco products and on amendments to certain related acts, as amended on 1 first 2011), due to rottenness, decomposition or contamination by heterogeneous or other matters.

From the viewpoint of foodstuffs consumption, the World and separate States can be subdivided into consumption classes according to income levels (Krautová, Lıbrová, 2009). The main criterion for inclusion in the appropriate class is the annual income. Most frequently, subdivision into countries with low incomes and countries with high incomes is applied. Some of the studies use also a third class including countries with medium incomes, so-called transition countries. All the classes can be environmentally dangerous. The high income countries or high consumption class demonstrate a high level of foodstuffs consumption by their inhabitants, which brings about high burdening of nature. Anyway, also the low income countries, or low consumption class can represent a risk for nature, who, in spite of their very low level of consumption often do not pay attention to environment protection, amidst their fight for survival. Also the expanding number of the consumption class member countries represents a menace to the environment.

Edible foodstuffs terminate in the waste bins, some of these still in their original packings and before the end of expiration term moreover. A question remains, how this is possible, how come that such a volume of food gets destroyed. Foodstuffs thrown away in the households represent 25 % of the total volume of foodstuffs purchased (as to weight). However, data on foodstuffs wastage, presented by EUROSTAT (Eurostat, 2012),

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differ between the member States, since each State has own definition and could choose own method of data collection.

Food wastage is the cause of environmental and ethical problems and expenditures in economic and social domain, what brings challenges on the internal markets, both to the producers as well as to consumers. Restriction of the wastage is an important starting step not only in the fight against hunger in the World, but also for population nutrition improvement. Restriction of foodstuffs wastage could bring about more efficient soil utilization and better water resources management (Instıtutıon of Mechanıcal Engıneers, 2012). It could have positive effects in the sector of agriculture all over the world and it could support the fight against malnutrition in the developing world.

Food wastage also brings a very harmful impact on the state of global climate. Agriculture causes more than one third of global production of greenhouse gases. With every wasted foodstuff moreover, dangerous gases emanate in the atmosphere, causing rapid increase of global temperature. Climate warming arrives this way, the consequences of which are most gravely felt by the developing countries population.

Global foodstuffs consumption and, all in all, the total human consumption causes problems, as seen from the environment viewpoint, mainly due to its permanent growth. Not only the global expenses for consumption of goods and services grow, but the people´s material requirements grow at the same time. However, the growth of the population as such, offers a partial explanation only, to this problem (Kearney, 2010). Changes have been introduced in agriculture over the last fifty years (higher foodstuffs heterogeneity, lower seasonal dependence on foodstuffs) and also world´s capacity to supply foodstuffs grew, thanks to higher farming productivity. Accessibility to foodstuffs also improved thanks to growing incomes and falling foodstuffs prices (Gustavsson, 2011). Reduction of the foodstuffs wastage is an important starting step not only against hunger in the world, but also for people´s nutrition improvement.

Also better education, enlightenment and people´s responsibility, policies at both the international and State levels, proper foodstuffs denomination, packaging and storage, can contribute to the reduction of food wastage. Anyway, first of all, prevention of foodstuffs waste formation should lead to its lower volumes. In order to raise the awareness of sustainable foodstuffs handling, the European Parliament appealed on the Council and the Commission, to proclaim 2014 the European Year of Fight against Foodstuffs Wastage as the key initiative for Europe citizens information and awareness raising, as well as for attention aiming of the Member States Governments at this important question and delimiting sufficient funds for the problems to be solved in this area in close future (ČSÚ, Czech statistical office, 2013). However, and regretfully, we have to state that 2014 has not been proclaimed the year of fight against foodstuffs wastage.

2   MATERIAL AND METHODS

The paper analyzes results of the questionnaire survey within Czech households aimed at discovering their attitudes towards foodstuffs wastage in broader connections.

The relationships between variables have been arranged using association and contingency tables, serving as the basic means for statistical assessment. As part of some more advanced analyses of relationships, computations of the chance relations and of relative risk level have been employed.

2.1   Analysis of the qualitative phenomena (attributes) relationships

A relationship between the qualitative statistical data may be called an association or the contingency. When relationships between the qualitative statistical attributes are being examined, data available usually come from sampling. It is good to find out then, whether they are related and whether generalization of the results obtained from the sample upon the original population is possible. Such questions can be answered using testing procedures where statistical significance of the relationship between two qualitative attributes under study is verified. In the present solution $\chi 2$ test has been used. The test is based on null hypothesis assuming independence of the two attributes. The test criterion is defined in general by:

$$\chi^2 = \sum_{i=1}^{k} \sum_{j=1}^{m} \frac{(n_{ij} - o_{ij})^2}{o_{ij}} \, , \tag{2.1}$$

where,   n ……size of the sample,

   nij ……observed frequency,

   oij ……expected (theoretical) frequency,

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i = 1, 2, …, k, where k is the number of varieties of one attribute,

j = 1, 2, …, m, where m is the number of varieties of the other attribute.

Theoretical frequencies are obtained as product of the corresponding marginal frequencies over the total population size. The $\chi 2$ test criterion has $\chi 2$ distribution at [(k–1)(m–1)] degrees of freedom. In case, $\chi 2$ test criterion value obtained exceeds the χ_α^2 critical value at α significance level and [(k–1)(m–1)] degrees of freedom, null hypothesis of independence between the two attributes can be rejected at α level of significance or, alternative hypothesis assuming a significant relationship (correlation) between the two attributes can be supported. Probability of the assumed correlation then is (1–α).

2.2   Measurement of the degree of relationship between qualitative attributes

Measurement of the degree of a statistical dependence between qualitative statistical attributes can be performed using either $\chi 2$ coefficients or the prediction measures. Considering nature of the survey and its organisation the analytical part of research has used measures based on the $\chi 2$ method. In order to measure the degree of relationship in the (2x2) table, V coefficient of association has been used:

$$V = \sqrt{\frac{\chi^2}{n}} \quad ,$$
(2.2)

where the $\chi 2$ coefficient is defined from (2.1) and n is the sample size.

In general contingency tables the degree of the relationship is assessed using the coefficient of mean square contingency C (Pearson contingency coefficient):

$$C = \sqrt{\frac{\chi^2}{n + \chi^2}} \quad ,$$
(2.3)

where the $\chi 2$ quantity is again defined by (2.1) and n is the sample size.

The Pearson coefficient of contingency assumes zero value in case of a total independence between two qualitative statistical attributes, and it approaches the unity limit in case of a total dependence.

The degree of relationship in a contingency table has also been measured using Cramér V coefficient :

$$V = \sqrt{\frac{\chi^2}{n\,(h-1)}} \quad , \text{ where h = min (k, m).}$$
(2.4)

2.3   Chance relations

A relation of chances (OR) describes how many times the chance of menace is higher, and it assumes values (0; ∞) :

$$OR = \frac{RR_1}{RR_2} = \frac{ad}{bc} \quad ,$$
(2.5)

where the relative risks (RR1 , RR2), are

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$$RR_1 = \frac{\frac{a}{a+b}}{\frac{c}{c+d}} = \frac{a\,(c+d)}{c\,(a+b)}, \qquad RR_2 = \frac{\frac{b}{a+b}}{\frac{d}{c+d}} = \frac{b\,(c+d)}{d\,(a+b)}$$

in the combination table (2.6)

a	b
c	d

3 RESULTS AND DISCUSSION
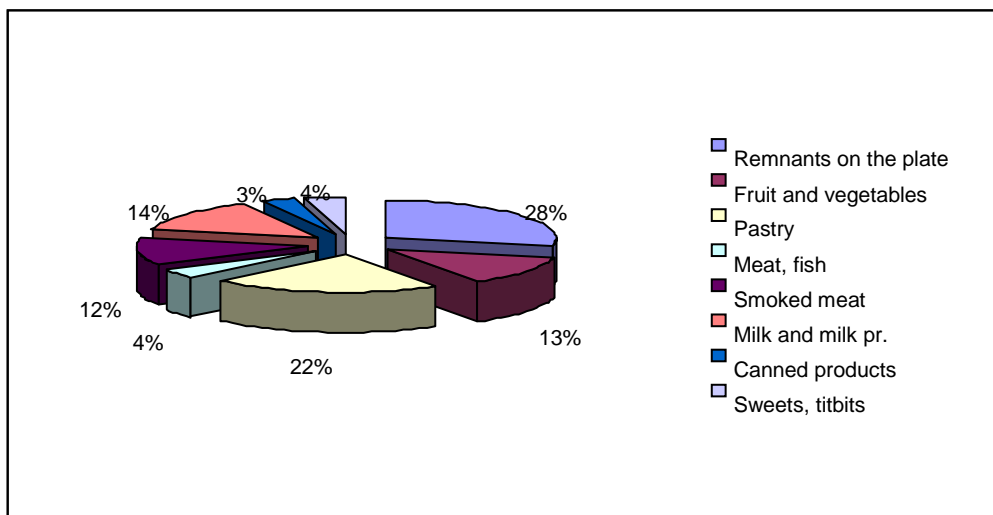
Data analysis from the questionnaire survey.

3.1 Description and measures of the data population

141 households selected at random, participated in completing the questionnaires, out of which, in 43 cases men were the respondents, in 98 cases they were women. As far as the household size is concerned, most of the respondents (93) belonged to 1–3member households, 41 respondent belonged to 4–5member households and only 7 respondents to 6+ households. As far as it concerns the household´s monthly income, most frequently the average monthly income group (about 1,200∈) was represented. There were 60 % of town households and only 40 % of rural households.

The strongest age class in the survey are the respondents 20–39 years of age (53 %), then persons of 40–59 years (24 %) and 59+ years (16 %). As it concerns the education level, the least represented group are persons of elementary education only (6 %), same as those having secondary school level without GCSE exam passed. On the other hand, the most represented are the groups with full secondary level (46 %) and University level (42 %) education.

3.2 Foodstuffs most often unconsumed and thrown away in households

The respondents were free here to choose at most three of the eight answers offered. The frequencies of answers at the separate variants are represented graphically in the Graph 1.
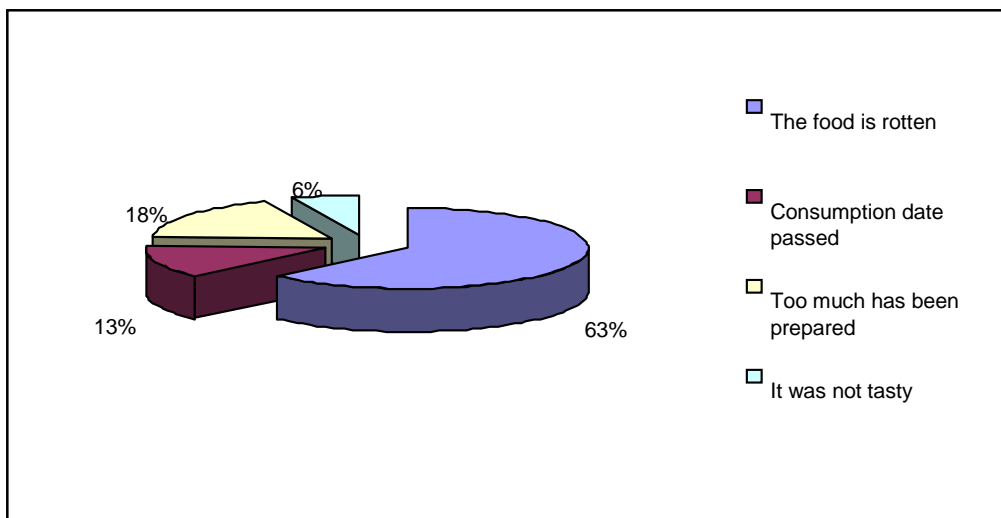

Source: Questionnaire survey

Graph 1. Foodstuffs most often thrown away.

Among the most often thrown away foodstuffs in the questionned households at the first place there are remnants of a finished meal on the plate (28 %), pastry and cereal products (22 %) and at the third place it is milk and milk products (14 %), among which there are cheeses, yoghurts and kefirs, all of these being among the fast rotten foodstuffs.

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3.3 Reasons for throwing away of foodstuffs

At this question the respondents were free to choose one only possible answer of the four offered. The Graph 2 shows the results.

Source: Questionnaire survey

Graph 2. Most frequent reasons of foodstuffs throwing away.

The respondents themselves offered several recommendations how to prevent useless foodstuffs wastage:

to plan the shopping ahead and to select only items from one´s own list in the shop, neglecting the items offered under an „Action";

to carefully read the consumption dates on the products, especially on such that rot fast;

to think about own expenses since foodstuffs wastage means money wastage;

to keep the fridge shipshape in order to keep the foodstuffs fresh as long as possible;

to store foodstuffs according to the instructions given on the package;

after having brought home new shopping, prefer shifting foodstuffs already stored in the fridge or in the larder to the front and the new ones to the back;

to serve smaller portions – more can be always offered;

to employ the freezer;

to compost food leftovers.

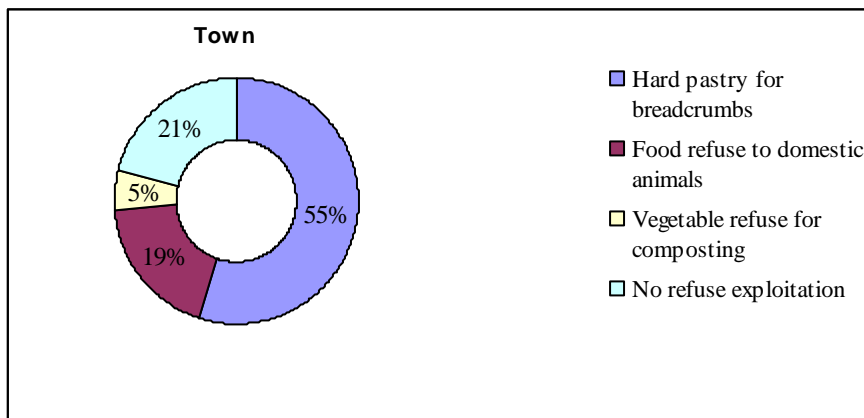## 3.4 Frequency of purchases of separate foodstuffs

Fruit and vegetables are purchased by most respondents once a week (35 %) and 2–3times a week (33 %). Pastry is purchased 2–3times (40 %) and 4–6times a week (31 %). Meat, smoked food and milk products are most often purchased once a week (43 % in both cases). As far as „big shopping" is concerned, this happens 1–3times a month (almost 44 % respondents). It is interesting, too, that 11 % of those questioned never go for such „big shopping".

3.5 Domestic foodstuffs production

The survey tried to find out, too, whether the households themselves produce traditional foodstuffs such as fruit jams, marmalades, ketchups, pastries, brad etc. It could be expected that village people will produce more foodstuffs in their households, since they have more raw materials of their own available. However, it was a surprise that out of the town people number all 43 % households produce their own foodstuffs, while of village people only 35 % do so.

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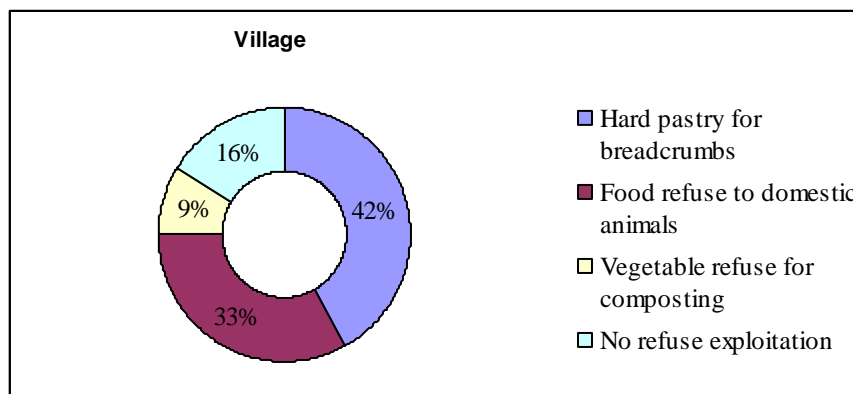*Proceedings of SOCIOINT14- International Conference on Social Sciences and Humanities*

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3.6   Exploitation of foodstuffs refuse

The respondents were free to choose one of the four answers offered. Exploitation of foodstuffs refuse was compared again with their places of living (town, village).

Town

- Hard pastry for breadcrumbs
- Food refuse to domestic animals
- Vegetable refuse for composting
- No refuse exploitation

21% | 5% | 19% | 55%

Source: Questionnaire survey

Graph 3. Foodstuffs refuse exploitation town.

Village

- Hard pastry for breadcrumbs
- Food refuse to domestic animals
- Vegetable refuse for composting
- No refuse exploitation

16% | 9% | 33% | 42%

Source: Questionnaire survey

Graph 4. Foodstuffs refuse exploitation village.

As it is obvious from the Graphs 3 and 4, the most frequent way of foodstuffs refuse exploitation is the use of hard pastry for breadcrumbs, both by town people and villagers. However, the share of this way of hard pastry exploitation is higher in towns. On the contrary, exploitation of food refuse for domestic animals and vegetable refuse for composting is more frequent in villages. All in all, 21 % town dwellers and 16 % of villagers do not exploit foodstuffs refuse at all.

Based on the response, almost a half of the respondents estimate that a weekly price of food refuse in their households makes it up to 50 Crowns. Anyway, as more realistic can be taken the answers of those, who chose to give an interval of 50–150 Crowns or 150–250 Crowns. Many people may not realize , or they do not want to admit the price for foodstuffs refuse to be so comparatively high. Not taking in question that foodstuffs are in many cases thrown away quite uselessly. It has been found that up to 20 % food falls away due to erroneous consumption dates. Thus, if we decide to choose the amount of 100 Crowns as the average weekly amount for food refuse, it makes 450 Crowns per month and more than 5,000 Crowns per year, which already is a significant amount for many households. Nowadays, when foodstuffs prices keep growing, it should become a matter of a serious consideration, to realize how much money we uselessly throw away annually.

To make a comparison, let us bring examples of countries where throwing away money for food refuse is much worse. For example, each British household throws away monthly for more than 1,800 Crowns – their garbage bins swallow annually 220 thousand breads, 1,6 million bananas and more than 5 million potatoes. Each inhabitant of Vienna throws 44 kilos of food still unpacked per year. Americans throw away up to one half of all foodstuffs. At that, surplus foodstuffs from the U.S. could feed up all those hungry in Africa. In the

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Czech country, 20–30 % of the garbage bins contents is made of foodstuffs refuse. In developed countries, among which the Czech republic belongs too, one throws away 85–115 kilos of foodstuffs per person, while in the countries developing this is 6–11 kilos only. Over the whole life span this makes 6,000 kilos per person as an average.

3.7 Knowledge of the difference between the note on minimum durability and the recommended consumption date

Foodstuffs inclined to rot fast and needing to be preserved at recommended temperature conditions are marked by the recommended consumption date. Yoghurts, fresh cheeses, curds, sweets and delicacies, some smoked goods and frozen products belong here. After passing the date these must not be sold any more, they must be destroyed since they may contain health risk. Foodstuffs with durability of more than a fortnight are marked by date of minimum durability. These are, e.g., conserves (canned food), pasta, drinks etc. If the product has three-months durability or less, it is enough to state day and month. If durability is longer than 3 months, it is enough to give month and year. If durability is longer than 18 months, year is enough. Three quarters of the respondents answered that they knew what are the differences in those markings which is a positive news. One quarter only responded negatively. Anyway, it comes out from various statistics that 45–49 % consumers do not know the difference between date of consumption and minimum durability and this expands the quantities of foodstuffs thrown away prematurely.

3.8 Foodstuffs wastage after the minimum durability term

64 % respondents answered this question saying that when deciding on throwing away a foodstuff, it is for them decisive to consider what kind of foodstuff it is. 22 % of them do not throw such foodstuffs at all, and the remaining 14 % do. As it concerns selling foodstuffs with the minimum durability term passed, these can be introduced in the offer only in case, they are free of health risks and are clearly marked as the „minimum durability term passed" goods and separately placed. (It is no way acceptable, to mark these by „Discount"or „Action" marking. After having the date of minimum durability passed, the producer does not guarantee the taste and nutrition qualities of the product. Responsibility for health defectlessness of foodstuffs having the minimum durability term passed is up to the seller.

The foodstuffs having the minimum durability term passed, such as conserves, bisquits, chocolates, drinks and pasta, mostly should not be dangerous, if packed in the original packing. At most, they lose their colour or taste. In spite of this, they terminate uselessly in garbage bins.

3.9 Wastage of foodstuffs and access to information

The association „Zachraň jídlo"(„Save the food") is working currently in the Czech Republic. It has been established by several friends who decided to make the society aware of food wastage. In September this year (2013) they arranged a happening under open sky in the Wenceslas Square, called „Banquet for a Thousand" where they prepared a lunch for more than one thousand people, from raw materials that otherwise would come to nothing – due to dissatisfied aesthetic presumptions only, or to the consumption date approaching. The food was donated by farmers and shopping chains. Those were, e.g., deformed carrots, vegetables close to consumption date, all those being unsellable in spite of being in perfect condition. Almost three quarters respondents never have heard of this Czech Association, nor they have ever had suspicion of the volumes of foodstuffs wasted all the world over.

Czech Republic legislation permits the shopping chains to liquidate foodstuffs free of charge while they have to pay 15 % tax of foodstuffs donated. It is a disadvantage to the suppliers and merchants in the area of food wastage, and more than half (52 %) of the respondents again have had no suspicion of this problem. The goods not consumed could be utilized, e.g., by asylum houses instead of throwing it away. The surplus foodstuffs can also be delivered to foodstuffs bank who then distributes it to charity organizations. The bank secures basic foodstuffs delivery to about ten thousand people. Practically, if some goods are donated by the shopping chains to charity, then the donator chain has to prepare the donation contract and pay 15 % donation tax. On the other hand, if they decide to destroy the foodsuffs, there is no tax to be paid. This situation is exceptional since none of the neighbouring countries has such a rule.

It is true that lack of data on foodstuffs wastage in the Czech Republic is a big problem. People know of it at global level but hard data on our Country is missing.

3.10 Analysis of relationships between variables

Question combinations in contingency tables for the relationships analysis have been selected according tological consideration. Results of the analyses are given in Table 1.

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Table 1. Assessment of relationships between variables

Relation	χ^2-test criterion	p-value	C	V
Household net income and weekly food expenses	20.99576	0.00184	0.360	0.273
Respondent´s gender and interest in passing information on wastage	20.10678	0.00004	0.353	0.378
Place of living and utilization of food refuse	5.30692	0.15065	0.190	0.194
Place of living and domestic food production	9.67514	0.00793	0.253	0.262
Age and knowledge of 15 % donation tax by the merchant	13.91024	0.00303	0.300	0.314

Source: Questionnaire survey

3.11 Relative risk and ratio of chances

In order to measure the Czech Republic population´s behaviour in food wastage area, the ratio of chances has been stated for some relationships. Results of evaluations are given in Table 2.

Table 2. Relative risk and ratio of chances between categories

Relation	RR1	RR2	OR
Gender (male, female) and knowledge of durability marking	0.900	1.347	0.668
Place of living (town, village) and knowledge of the 15 % donation tax	1.030	0.973	1.059

Source: Questionnaire survey

Males´ chance of paying attention to differences in durability is lower than the same with women, since the odd ratio is 0.668 only. While, for the second relationship the ratio is 1.059 which shows that the level of knowledge as concerns taxes connected with foodstuffs handling is higher rather with town-dwellers than with villagers.

4 CONCLUSION

Based on the basic measures derived from the data set it has been found that the foodstuffs thrown away most often in Czech households are the remnants of cooked food, pastry and cereal products and milk products, too. The reason for wasting the foodstuffs most frequently is their debasement. Next it was found that the respondents most often spend on shopping 500 to 1,000 Crowns weekly, and the amount grew together with higher household incomes and with more numerous families. Also, an interesting discovery showed that town-dwellers more often produce their own foodstuffs at home than villagers and this can be caused by broader choice of the so-called „kitchen aids" such as bakeries, driers and various robots, and by sort of „fashion" with the young housewives. As far as utilization of the food remnants is concerned, most often the hard pastry is turned to breadcrumbs or the remnants fed to domestic animals. The price of foodstuffs wasted in their households was estimated most often up to 50 Crowns weekly, however, the real life amount is different within most households, it is much higher. Another estimate was concerned with the uselessly wasted foodstuffs quantity per person per year, where almost one half of the respondents came close to reality which is 100 kilos per person at an average. A positive discovery also was the circumstance that most respondents knew the difference between minimum durability and the date of consumption, which is needed for correct foodstuffs handling and often this knowledge can prevent useless foodstuffs wastage. The lacking informedness of Czech citizens about this topic was a less positive discovery.

Based on more advanced analyses it was found that there was a relationship between household incomes and shopping expenses. Another relationship was discovered with the variables ´accomodation´ and ´domestic production of foodstuffs´ where, as it has already been stated, the number of persons making their own foodstuffs is growing just in town households. Any relationship has not been confirmed between ´accomodation´ and ´utilization of foodstuffs remnants´ which means, other factors affect this. A relationship

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has been confirmed for the age of respondents which affects their knowledge of the 15 % donation tax paid by shopping chains in case, they donate foodstuffs. It could be said that this knowledge is felt with people of productive age, i.e., people within the 20-60 years age span.

Based on the conclusions from the analyses and all the sources mentioned (ČSÚ, Czech statistical office 2013; FAO, 2011) several general conclusions can be stated:

About 729,000 tons of wasted foodstuffs are produced in the Czech Republic annually,

about 89,000,000 tons of foodstuffs annually are wasted in the European Union, namely at household level (43 %) and within food industry (39 %),

the losses of food in Europe and North America count 280-300 kilos and in sub-Saharan Africa and in south- and southeast Asia 120-170 kilos per person per year,

in the developing countries are the losses during processing 40 %, in developed countries 40 % are lost by retailers and households,

in the developed countries one throws away 95-115 kilos of foodstuffs as an average, while in the developing countries this is 6-11 kilos. Based on the survey done, respondents estimate the annual quantity of unused food in their households at up to 80 kilos per person per year,

every year 222,000,000 tons of foodstuffs is thrown away in developed countries, which is about the same quantity as that produced in sub-Saharan Africa (230,000,000 tons),

300,000,000 tons of foodstuffs are liquidated annually at the stage when they are still consumable, which is more than the quantity of food produced in sub-Saharan Africa,

the most often wasted is fruit, vegetables, edible roots and bulbs.

From the global viewpoint, it is needed to define unified definitions of the concepts concerning food wastage in order to find an efficient solution of the problem of food wastage, and then to unify the methods of data collection on food wastage. Priority should be given to the introduction of definitions for concepts such as „food remnants" and „food losses" and to accurate categorization of foodstuffs groups and foodstuffs remnants. Another global problem is the food dysbalance. Socio-economic aspects affect the global food consumption, differing strongly in different parts of the world. In the poorer countries it is mostly the accessibility of foodstuffs affecting their consumption, in the advanced countries there are other parameters. In the Czech Republic, it is the price of foodstuffs which applies the strongest influence upon consumption. It is given by the prices of energies, seeds, fodders, fertilizers, products for animal and plant care, but also by purchase capacity and income development of the population.

Behind the foodstuffs wastage in the developed countries we can see the behaviour of consumers and unsatisfactory communication in the suppliers chain. A big shortage on the part of these companies can be seen in the unsatisfactory consumer information and in the education to careful handling of foodstuffs whole society across. More should be taught to future cooks about wastage and their knowledge of various aspects of food wastage reduction, such as supply and stocks management, refuse handling, potential financial inputs, or customer orientation. The packaging design courses should contain also concepts how to make clever packing reducing foodstuffs debasement and preserving longer durability of these (EU, sekce Zeměděšlství, rozvoj venkova a životní prostředí k tématu. The Section for Agriculture, Rural Development and Environment on the topic, 2013). Information on wastage but also on foodstuffs consumption in general, should be supplied at the level of primary education already. In the developing countries, backward technologies and unsufficient storing and transporting infrastructure are the principal problem.

5 ACKNOWLEDGMENT

REFERENCE LIST

Czech Republic.Zákon č. 110/2007 Sb. o potravinách a tabákových výrobcích a o změně a doplnění některých souvisejících zákonů, v platném znění k 1. 1. 2011. (Act No. 110/2007 Coll. on foodstuffs and tobacco products and on amendments to certain related acts, as amended on 1 first 2011).

Czech statistical office. Český statıstıcký úřad /ČSÚ/ (2013). [Online], Available: https://www.czso.cz/ [24

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June 2014].

European Commission (2011). Health and consumers: Food and feed safety: Food waste.[Online] Available: http://ec.europa.eu/food/food/sustainability/index_en.ht. [23 June 2014].

European Parliament (2012).Jak zastavit plýtvání potravinami: Strategie pro zlepšení účinnosti potravinového řetězce v EU, 2011/2175(INI). (How to stop food wastage: Strategies for improving the efficiency of the food chain in the EU).[Online] Available: http://www.europarl.europa.eu/sides/getDoc.do?type=REPORT&reference=A7-2011-0430&language=CS. [24 June 2014].

European Union (2013). Návrh stanoviska specializované sekce Zemědělství, rozvoj venkova, životní prostředí k tématu. Příspěvek občanské společnosti ke strategii pro prevenci a omezování potravinových ztrát a plýtvání potravinami,(The Section for Agriculture, Rural Development and Environment on the topic. Civil society's contribution to the strategy for the prevention and reduction of food losses and food waste) Document. Česká republika. Čl. 29 odst. 2 jednacího řádu. Brusel, 22. 1 2013.

Eurostat (2012) Municipal waste statistics: Guidance on municipal waste data collection. Eurostat In: European commiision. [Online], Available: http://epp.eurostat.ec.europa.eu/statistics_explained/index.php/Municipal_waste_statistics [24 June 2014].

Food and Agriculture Organization (2011). Cutting food waste to feed the world: Over a billion tonnes squandered each year. Food and Agriculture Organization of the United Nations. [Online],Available: http://www.fao.org/news/story/en/item/74192/icode/ [28 June 2014].

Gustavsson, J. (2011). Global food losses and food waste. Food and Agriculture Organization of the United Nations.

Institution of Mechanical Engineers (2012). Global food: Waste not, want not. [Online], Available: http://www.imeche.org/Libraries/Reports/Global_Food_Report.sflb.ashx. [28 June 2014].

Kearney, J.(2010). Food consumption trends and drivers. *Philosophical Transactions of the Royal Society B: Biological Sciences.* vol. 365 (1554), pp. 2793-2807. [Online], Available: http://rstb.royalsocietypublishing.org/cgi/doi/10.1098/rstb. [24 June 2014].

Krautová, Z. and Librová, H. (2009). Spotřeba domácností a proces individualizace v environmentální perspektivě. *Sociální studia*, Brno: FSS MU, vol. 6 (3), pp. 31-55. ISSN 1214-813X. (Household consumption and the process of individuation in the environmental perspective)