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с международным участием,
посвященной 100-летию высшего аграрного образования
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В настоящем сборнике представлены материалы Всероссийской научно-практической конференции с международным участием «Агротехнологии XXI века». Статьи посвящены основным проблемам и перспективам развития сельского хозяйства, анализу и обобщению современного состояния АПК, а также результатам научных исследований российских и зарубежных ученых.

Представленные материалы будут интересны для ученых, аспирантов, преподавателей сельскохозяйственных вузов, студентов и специалистов АПК.

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Земледелие, растениеводство, переработка сельскохозяйственной продукции; почвоведение, агрохимия и экология; лесное хозяйство; зоотехния и ветеринарная медицина; механизация сельского хозяйства, технический сервис в АПК и техноферная безопасность.

Часть 2

Экономика, финансы, коммерция, менеджмент, бухгалтерский учет, товароведение, прикладная информатика; управление земельными ресурсами, архитектура и строительство; гуманитарные науки; физико-математические науки.

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HOUSEHOLDS FOOD WASTE IN SOUTH EASTERN BOSNIA AND HERZEGOVINA

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Abstract. One of the existential needs of people is the need for food. It is projected that the world's population will grow up to 9 billion people by 2050 and sufficient food should be provided. This study aimed at determining the habits and attitudes of food consumers in south-eastern Bosnia and Herzegovina related to food waste. This research encompassed extended literature review and primary data collected through a face-to-face survey questionnaire with 50 respondents from 9 municipalities of south-eastern Bosnia in October 2018. The results showed that the amount and value of food waste were rather small compared to others countries. A large number of consumers are willing to reduce food waste in households. This indicates the need for better educating of consumers about how to store, prepare and alternative food use.

Key words: food waste, household, nutrition, Bosnia and Herzegovina.

INTRODUCTION

The rapid growth of the world's population, global income and consumption of meat in recent decades have affected the increase in food demand. There are four ways to meet this challenge, ie ensuring sufficient amounts of food for the rising world population, (the European Group on Ethics in Science and New Technologies: (i) to increase the cultivated area, which exerts additional pressure on the land, including marginal areas and forests; (ii) to increase the productivity of the land currently being cultivated; (iii) to rationalize the distribution of agricultural products to ensure they are in the right place at the right time; (iv) to modify consumer habits [1]. The production of food that will never reach the table represents an unnecessary disturbance to the health of the planet. At a time when nearly 1 billion people still die of malnutrition or must be satisfied with inadequate nutrition, it is completely unnecessary that more than one third of world food remains abandoned in the fields or end up in waste [2]. Loss and throwing of food occurs between the moment of readiness to harvest, i.e. harvest and moment of consumption ie. removing the food from the food supply chain. The term "food degradation" refers to the reduction in the amount of edible food in the food supply

chain for human consumption [3]. Food losses occur during production, after harvest, and during food processing. Losses that occur at the end of the food chain "sales and consumption" are called "throwing foods". This study aimed in determining habits and attitudes of food consumers in south-eastern Bosnia and Herzegovina related to food waste.

MATERIALS AND METHODS

This research encompassed extended literature review and primary data collected through face-to-face survey questionnaire with 50 respondents in October 2018 from 9 municipalities: Vlasenica (16), Sokolac (11), Milici (7), Foca (4), Bratunac (4), Han Pijesak (3), Srebrenica (2) Rogatica (2) and Pale (1). The questionnaire consisted of 25 questions grouped into five groups: (1) socio-economic characteristics of households; (2) place, value and habit of purchasing food; (3) the method of storage / preparation of food and the relation to the shelf life; (4) quantity, value, type and reason for food waste; (5) concern about food waste. All questions were closed, with a series of typical, descriptive responses in the form of statements.

RESULTS AND DISCUSSIONS

Today, around 4 billion tons of food is produced worldwide. However, due to bad habits in the food chain (harvesting, storage, transport) and waste in markets and in consumers, it is estimated that around 1.2-2 billion tons of food do not reach human stomach [4]. In fact, it is believed that from farm to plate the loss is about 30-50% of food [5], [6], [7], [8], [9]. Global quantitative losses and food waste annually amount to about 30% for cereals, 40-50% for root crops, fruits and vegetables, about 20% for oil seeds, meat and dairy products [10]. Also, over 40% of seafood is cast as bycatch [11]. According to the World Food Program, nearly 1 billion people have difficulty in finding the next meal, while a joint study by FAO, IFAD and WFP (2013) points out that 795 million people, mostly in Africa and Asia, are underfed.

This paper is dedicated to food waste problem, with emphasis on the habits of buying, using and throwing food in the territory of south-eastern Bosnia and Herzegovina (BiH), in which almost no research was undertaken on this subject. The BiH Bureau of Statistics records the estimated amount of waste per municipality, but does not classify it by type, so that data on food waste cannot be found there. Both entities of BiH have waste management strategies that treat organic waste as municipal waste.

Profile of respondents: Out of 50 respondents, there were 23 males (46%) and 27 females (54%). Most household respondents were older population (42%), followed by (22%) in middle age, while (28%) were younger population. There were few people over age of 55. More than half of the respondents (62%) completed secondary school, 30% graduated at the faculty, while there were low number of those with completed elementary school. As far as the working situation is concerned, about half of the

respondents (54%) were employed, while the smaller number was unemployed (20%), or performed some of the household tasks. Also, we found a small number of those who have been still educating or retired. The age of the respondents was the main reason why more than a half of respondents were in the marital community (58%), fewer number lived with their parents, partner or independently. Three respondents said that their household had two members. The number of household members is related to the amount of food used in that household. The more members, the greater the need for food. The results of the survey showed that families with more members were dominant. The majority of households consisted of 4 members (36%), and there was a fewer number of those whose household consisted of 3 members (24%).

The habits of buying food: The survey showed that a negligible number of consumers directly purchased food from farmers (2%). Food was mainly bought through trade shops, and most of all in large supermarkets. This is the consequence of the expansion of supermarket chains in BiH in recent years, which has led to a sharp drop in the number of small shops. Most often, food was bought daily (24 subjects or 48%), and the frequency of purchase decreased with increasing number of days. Most respondents stated that they used an already prepared list when buying food, while a smaller number did not use the list. This was confirmed and answered by 62% of consumers who answered that they paid special attention to discounts when buying food, while a smaller number was not interested in buying such food. As a reason they mentioned doubts about the correctness or quality of that food. The amount spent by surveyed households on food per month showed that most of them chose the highest interval at the offered level (more than 300 BAM). Taking into account the average salary in BiH during the research period (838 BAM) (ASBiH, 2018), it can be seen that almost half of the households spent more than 35% of the average salary on food.

Knowledge of information on food labels: The surveyed food consumers were rather rigorous regarding the date "best use before" marked on food packs, as 78% of respondents believed that that food should be eaten by that date or thrown after that date. At the same time 18% of respondents considered that food was still edible after that date, unless it was damaged or broken, while two respondents considered that food had to be sold at a discount after the mentioned date. If it is recommended that food has to be best used up to a certain date, "usable up to date", almost all respondents (92%) thought that food should be discarded after that date, while 8% of respondents considered that food was still edible. The answers to both of these questions indicated that consumers were disciplined and that their habits largely depended on the shelf-life of food products designated and reported by producers.

Attitudes regarding the throwing of food: About 72% of the respondents were worried about throwing food trying to avoid it, while 18% of respondents were aware of the problem, but did not take certain measures. Less than 10% of respondents did not consider throwing of food to be a major problem. The conditions and way of life in BiH

influenced the answer to the question: "What are you doing with uneaten food?" The largest number of respondents (56%) give uneaten food to their pets such as cats and dogs, while a small number of 20 respondents (40%) thrown away food in the garbage (municipal waste). The number of those who made compost or donated food was negligible.

It is important to note that, due to the standard of living and tradition, most households in Bosnia and Herzegovina prepare and eat the main meal (lunch) and dinner at home. Meeting food needs in restaurants is still a rare case and is associated with certain celebrations or business lunches. Based on the data obtained from the survey, households (20%) prepared the main meal from fresh ingredients 3-6 times a week, adapting the amount of food to daily needs. Of course, due to the modern way of life, there were a large number of those who prepared the main meal was less than twice a week. It is not surprising that many households ate more than twice a week meal from the previous day. In the absence of cooking time, a large number of warm meals were replaced by cold ones (sandwich types), but they were not connected with the question on the frequency of fast food preparation because they were linked to preparation of frozen foods. As the main reasons contributing to the disposal of food, the respondents stated the following: (i) food expired (36%); (ii) food does not look good/edible (24%); (iii) the food is moldy or there is no pleasant smell and taste (16%); (iv) the food was in the refrigerator for a long time (10%); (v) improper food storage (8%); (vi) residues (6%).

The extent of household food throwing: When asked how much edible food was discarded weekly, 36% of respondents answered that they never thrown away food that was still edible. On the basis of the data, on average 250-500 g of food was thrown in households. Food waste was mainly associated with bakery and dairy products, then fruits and vegetables. A very small number of households discarded meat and meat products.

The economic value of thrown food in the household: Twenty-six respondents (52%) believed that the value of food waste from their household (on a monthly level) was between 10-50 BAM. A smaller number of respondents estimated that the value of the food waste in the household was less than 10 BAM per month.

Readiness and necessary information to reduce food throwing: Respondents believed that they would have had lesser food waste if they were more informed about the negative impact of food waste on environment and economy, when food packaging would be more convenient for them and when labels on food were more understandable. In order to reduce food throwing, the respondents stated that it would be necessary to have: (i) these recipes for meal preparation with food residues (36%); (ii) tips on how to keep food properly (30%); (iii) organizations and initiatives dealing with prevention and reduction of food waste (e.g. food banks) (22%); (v) more information about the freshness of the product (12%).

CONCLUSION

The conducted research showed that households in south-eastern Bosnia and Herzegovina and the municipalities concerned would have less food throwing if they were more informed about the negative impact of food waste on the environment and on the economy, and if the food packages were more convenient. The results showed that consumers in the study area spent a lot of money on food, having in mind their total income. Probably because of this, they were quite rational in terms of planning, the manner of preparation, and the frequency and quantity of waste consisting of food. Moreover, the amount and value of waste in food is quite small in comparison with other countries. Most respondents considered that food should be thrown after the date expiry, but there was a certain percentage of those who thought that the food was still edible after the expiration of the recommended shelf life. A large number of consumers was concerned about food and they were ready for certain steps that could reduce food waste in households. This indicates the need for better education of consumers about how to store, prepare and alternative food use. The conducted research had a pioneering character in the territory of southeast Bosnia and Herzegovina, and its results could certainly be used to plan specific actions towards reducing food waste. It also sets the basis for research activities on food consumption in households in BiH that will be undertaken in the future.

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ПИЩЕВЫЕ ОТХОДЫ ХОЗЯЙСТВ В ЮГО-ВОСТОЧНОЙ БОСНИИ И ГЕРЦЕГОВИНЕ

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Аннотация. Потребность в пище является одной из жизненно важных потребностей человека. Предполагается, что к 2050 году мировое население увеличится до 9 миллионов, поэтому оно должно быть обеспечено необходимым количеством продовольствия. Целью настоящего исследования является определение привычек и взглядов потребителей пищевых продуктов в юго-восточной Боснии и Герцеговине в отношении пищевых отходов. Настоящее исследование содержит расширенный обзор литературных источников, а также первичные данные, собранные на основе очного опроса 50 респондентов из 9 муниципалитетов в юго-восточной Боснии и Герцеговине в октябре 2018 года. Результаты исследования показали, что количество и объем пищевых отходов были относительно небольшими по сравнению с другими странами. Многие потребители выразили желание сократить количество пищевых отходов на территории своих хозяйств, что указывает на необходимость более качественного информирования потребителей о способах хранения, приготовления и альтернативного использования пищевых продуктов.

Ключевые слова: пищевые отходы, домашнее хозяйство, питание, Босния и Герцеговина.