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Synopsis

Food – A Resource and Waste, from Ecological and Social Aspects

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Abstract. The purpose of this synopsis is to trace the important issue of food as a resource and waste from an ecology point of view and their interconnection with social ecology, to present important contemporary aspects in understanding this issue and to identify approaches in creating ecological and social attitude toward food. This research focuses on the processes of food waste reduction. Apart from the purely quantitative (material) aspects, it draws our attention to the immaterial side of waste, which has to do with our value system.

Key words: Ecology, food, waste, values, attitudes, sociology.

Introduction

Mankind has rarely managed to achieve balance among adequate food production and food distribution, because of the fact, noted by STUART (2009) that in some countries there are 200 % more food than the country needs. It is necessary to create safe financial mechanisms, market access and equal opportunities for the agricultural production, to meet world food needs (QUINN & BENCKO, 2013). Nowadays, there is an ever-growing private sector looking for an impact on the public sphere.

Food has always been essential to the human population throughout the ages, and procuring it is a socially determined process. Although it is one of the most important ecological factors, food reproduction, processing, consumption and transformation are socially mediated (DIMITROV, 1983). In his work, VERNADSKII (1967) expresses his view on food having a tendency of transforming people from socially heterotrophic beings to socially autotrophic ones.

In 1927, ELTON (1927) states that: "Food is the main factor in an animal community and its complete structure and the activities of this community depend mainly on the available food". In the course of various life processes, food performs a complex flexing, structuring and shaping role.

According to the classical ecology, life depends on the physical environment and the continuous exchange of substances and energy in the natural ecosystems. ODUM (1971) defines the ecosystem as "any unity between living organisms in a particular level and their interactions with the physical environment, causing energy flow to create a

precisely defined trophic structure, species diversity, and recycling of minerals"; the ecosystem is the main functional unit in nature. The author explains that in the processes of the transformation of food resources, a large number of complex chemical, physical and biochemical transformations are performed, causing potential energy to be released and converted into thermal, mechanical and partially into electric energy, later used by the body for its motor and labor activities, to maintain body temperature and for the normal functioning of cells, tissues, organs and systems, in all living organisms.

Various interactions perform biochemical transformations and energy transfer from one organism to another precisely through the processes of feeding (BOGOEV & KENAROVA, 2009). From a functional point of view, the natural ecosystem consists of: energy flow, food webs, the structure of its components, recycling of minerals, development and evolution, as well as their management. Nature has developed a number of strategies to get rid of the unnecessary quantities, and it does not produce "waste" but ensures their conversion into new inert material, as noted by LEIMGRUBER (2015).

Throughout human history and its accompanying civilization processes, different types of waste have been created. Parallel to the increase in volume, their variety, complexity, toxicity and the associated difficulties and costs of disposal are increasing. Traditional methods and technologies, such as landfilling or incineration, are expensive, inefficient, unsustainable, and quite often dangerous to human health. From the anthropocentric point of view, waste is a material (solid, liquid or gaseous) that is no longer wanted or cannot be used (UNSD, 1997). People develop behavior in the "not-in-my-yard" style, because of which they perform uncontrolled polluting activities.

In the 20th century, with the advancement of the economy, surpluses of food products treated as waste were emerging. Food waste was found to form and to be a major component of solid waste in municipal landfills (STEPTOE, 1995; SCHEIBEHENNE *et al.*, 2007). This is not just an ethical issue, it is clear that the loss of edible food leads to negative economic, environmental and social consequences (TOBLER *et al.*, 2011).

Material and Methods

The available research on the problem under consideration and the legislation in force in Europe and Bulgaria are the basis on which this article was prepared. The relationship between two independent sciences - ecology and sociology is considered in order to enhance any preventive activity, environmental culture and education for food waste reduction. A worldwide legal framework has been established to regulate the production, consumption, packaging, transport, classification, and grading of food and food products. Legislative acts with a number of rules and regulations have been developed and adopted for each of the Member States of the European Union. However, the literature does not clarify the general definition of the term "Food waste" and does not provide consistent data on the amount of waste generated during the different phases of the so-called "Food Supply Chain" (GARRONE *et al.*, 2014; MOLLER *et al.*, 2014; FALASCONI *et al.*, 2015). There is a general consensus that in the developed countries most of the food waste is produced down the chain (FAO, 2011; LIPINSKI *et al.*, 2013; ÖSTERGREN *et al.*, 2014; GARRONE *et al.*, 2014) and that on the territory of Europe thousands of tons of usable food is thrown away.

The article uses the terms "waste" and "food" whose interpretation is given according to current regulations.

In the Ordinance № 2 of 23.07.2014 on the classification of waste, promulgated, SG, no. 66 of 08.08.2014 specifies the conditions and the order of classification according to

types and properties that can ensure ecological management in compliance with the Waste Management Act – WMA (Ordinance № 2, 2014). It applies to substances, objects or parts of objects corresponding to the definition of waste within the meaning of § 1 (17) of the Additional WMA Provisions, according to which "Waste" is any substance or object which the holder has released or intends to release, or is required to release.

In the European Union Regulation, the term "Food" and the embedded meaning in it are described in Regulation (EC) No 178/2002 of the European Parliament and of the Council of 28th January 2002 laying down the general principles and requirements of food law, establishing the European Food Safety Authority and laying down procedures in matters of food safety (EC, 2002). An analogue interpretation has been carried out in our current Food Law in Bulgaria, with the latest amendment in State Gazette, issue 92 from 17th November 2017; it set out the general principles and requirements of food law, as well as the establishment of a European Safety Authority and the introduction of procedures relating to them (FOODS LAW, 1999-2017). Article 2 and the two legislative acts state the following:

- For the purposes of this Regulation, *"Food"* (or *"Food Product"*) means any substance or product, whether processed, partially processed or raw, which is intended for or reasonably expected to be suitable for human consumption. The term "Food" includes beverages, chewing gums, and any substances, including water, which are intentionally incorporated into food in the process of manufacturing, preparation or treatment. It also includes water after the point of compliance, in accordance to Article 6 of Council Directive 98/83/EC and without prejudice to the requirements of Directive 98/83 and EC Directive 80/778/EEC (EC, 1998).
- The term '*Food*' does not include:
  * fodder;
  * livestock, unless prepared to be placed on the market for human consumption;
  * plants before harvesting;
  * medicinal products within the meaning of Council Directives 65/65/EEC (EC, 1965) and 92/73/EEC (EC, 1992);
  * cosmetics within the meaning of COUNCIL DIRECTIVE 76/768 /EEC (EC, 1976);
  * tobacco and tobacco products within the meaning of Council Directive 89/622/EEC (EC, 1989);
  * narcotic or psychotropic substances, within the meaning of the "Single convention on narcotic drugs of 1961", amended by the 1972 protocol amending the "Single convention on drugs of 1961" (UNTC, 1972) and the 1971 "United nations convention on psychotropic substances" (UN, 1971);
  * residues and pollutants.

Social Ecology – Present and future

The human population, as a complex of the global macro-system and biosphere, as well as of the regional and local ecosystems, and through food and metabolism, the flows of energy, is in constant interdependence and relationship to its structure and functioning, which was examined by DAZHO (1975). By consuming food produced by the producers and by a number of consumers of I, II and III level, the human appears as a consumer who can occupy a different trophic level (OWEN, 1981).

Modern society, characterised by increasing globalisation and high-tech industrialisation, is moving further away from nature and from nature's naturally occurring processes (MANTAROVA, 2010). The environmental problems of the present are not only severe but also multilateral (VLADIMIROV, 2009). Climate change is real and already happening. Consumers' behaviour of a part of the mankind generates significant amounts of waste, including food waste. Food waste decompositions lead to the release of methane, as a strong "greenhouse effect causing" gas is 21 times

stronger than carbon dioxide and its accumulation leads to the loss of many non-renewable resources.

Overproduction and consumer policy lead to over-accumulation, which has increasingly strong and negative effect and becomes a real problem relayed to food supply to mankind. Food wasted by some, while others die of hunger reported by FAO (2014) is common. Worldwide, between 30 and 50% of all food intended for human consumption is lost (LUNDQVIST *et al.*, 2008), creating the astonishing 1.3 billion tons of waste per year (GUSTAVSSON *et al.*, 2011). In fact, almost a billion people could be saved from malnutrition with less than a quarter of the food that is lost (FUSIONS, 2015).

This situation requires a new environmental policy and culture, as well as a different attitude and behaviour of consumers in their environment (DIMOV & MANTAROVA, 2010).

The person is a social being and is actively involved in the Food Safety (FAO, 2002). DIMITROV (1983) points out the issue of emerging of new environments; these are in fact the first artificial ecosystems or the so-called "agro-ecosystems", in which necessary conditions are created to meet the food and food needs of the human society. The agro-ecosystems are manageable and the interference in them is continuous and aims to maximise production and achieve population satisfaction with food. As a result of this, the fine balance in the distribution of a number of important elements such as C, N, P, S is disturbed, which affects and changes the natural recycling of minerals and the basic functions of natural ecosystems.

According to DIMITROV (1983), the high intensity of the substance exchange processes in the agro-ecosystems is associated with a significant accumulation of organic production as biomass that could be used for different purposes by us, human beings.

The success in the field of agriculture and forestry are largely related to the huge energy flows that are imported artificially, in comparison to the natural ecosystems where the processes are self-regulating (ODUM, 1971). At harvesting, 15% of the biomass remains in the form of plant residues that are included in the biotic cycle (DIMITROV, 1983).

Recently, there has been an increasingly close relationship between ecology and the sciences related to the development of human society. As a result of the mutual intertwining of issues from two independent sciences, today we can talk about the emerging of a new science, so-called *Socioecology*; its main subject is the relationship between society and nature, the demographic processes and their projection on macro and micro levels, the density of populated areas and the pressure they put on ecosystems. Food is a relevant issue in socio-economics only in the context of questions that refer to the different behaviours in choosing food and food products and their sensible consumption, and with solutions for their management, effective practices for their use, and specific proposals for reducing food waste.

According to VLACHOV (2011), ecologists are increasingly aware of the need to convince the society that human abuse on the environment is pushing the planet and humanity toward degradation; as a result, a separate science has been developed, called Environmental Sociology. This science is a specific paradigm in sociology that emphasize the issues of nature and society, and it studies the principles, relations, norms, methods of optimization and harmonization of the noosphere interactions (BONEVA, 2011). It also could be described as a science that focuses on the system of society and nature, based on the methodological and theoretical sociological reflection on them. It is important to emphasise that socio-ecology is not limited to empirical studies of ecological problems but also to their theoretical understanding as phenomena of social importance (SMOLNIKOV, 2011).

As SAHLINS (1964) insists, unquestionably the most important ecological object is

the human being, and as such, they need a favourable surrounding environment, cared for adequately, and maintained through a dialogue between cultures and the environment. That is why, most of the ecological problems are also social (BONEVA, 2011).

In the context of these issues, different adaptive strategies are established, drawing attention to the relations among people, human societies and their natural social and artificially created environments (DIMOV & MANTAREVA, 2010), and placing emphasis on the welfare of individuals, families, communities. It is assumed that the welfare could be achieved through well-developed models in education for the different age groups (PANAYOTOVA & VAKLEVA, 2011), and by imposing strict preventive measures and by adopting a person's right to choose and manage their own fate. SERAFIMOVA (2013) pointed out that measures and norms for "a good living" have been developed as a result of people's attempts to rethink qualitatively the importance of these interactions. It is of great importance to develop further knowledge and introduce our students to the environmental protection cause, by including wider environmental issues into the curriculum content, by organising and stimulating participation in pro-environmental campaigns, by conveying and disseminating pro-environmental models of thinking and behaviour, related to food and food consumption.

All that shows explicitly that it is necessary for ecology to be perceived as a socio-cultural practice of the future.

Factors influencing decision-making on the use of food

Consumer's perception of food is a phenomenon influenced by a wide range of characteristics. It could give us better knowledge of how to deal with wasteful behaviour and allow us to design effective prevention of food waste.

In order to understand how the behaviour, mindset, and culture of the individual affect the choice of usable food products to be disposed of, several different factors are considered, and according to CONTENTO (2010), they could be divided into 4 main categories:

- biological predispositions – taste, hunger, satiety mechanisms, sensory-specific satiety;
- sensory-affective factors – past experience associations with food, on physiological and social level, related to determinants - beliefs, norms, mindset, and skills that we have developed throughout our lives;
- social determinants - building a relationship through the cultural, economic and informational environment in which we currently live (e.g. availability of food, public policy, time, cost and media);
- economic factors - food price, time, resource.

Generating waste is a natural consequence of our human lives and day-to-day activities. Food Sale Services are in a very convenient position to focus on the research of the causes of food waste generation, but there is not much literature about them. Their research is mainly on food waste. It focuses on measuring the ratio between served and unconsumed food, as well as overproduction of prepared and unused food (VAN BIRGELEN *et al.*, 2009).

The reasons behind food being turned into waste have not been studied well enough yet. As HERNANDEZ-CARRION (2014) points out that the role of the consumer for the market significance of a particular product is very important. Research in this field shows that sensory factors, food attractiveness, consumer health, convenience and price are the most important factors for choosing a product, as well as the factors related to the product itself (i.e. its internal and external properties).

The motivation behind the choice of food can be influenced by consumer's interest in general health, their awareness in personal health care, the appearance and pleasure the food product delivers, the ideological reasons, the price of the product

and the eating habits of an individual (JOHANSON *et al.*, 2011).

Undoubtedly, it influences the consumer's purchasing decisions (YADAVALI & JONES, 2014). Consumers rely on the mass media for a lot of the information about the various products; the media is an endless source for creating incentives for the purchase of new quantities and types of goods. They often present controversial information about food, nutrition, and health, as well as the introduction of different beliefs and mindset in a healthy lifestyle and eating (JOHANSON *et al.*, 2011). Advertising is also an important factor influencing the reallocating of costs and the decision of making certain purchases, but it is not always in the consumer's interest (YADAVALI & JONES, 2014).

The growing economic parameters is decisive and improves the standard of living for one part of the population for the expense of another part of it; that is reflected in the increase in consumption and the growth of waste generated by industries and households (GRAZHDANI, 2016). On the other hand, the income of the consumer has a significant connection to their purchase choices and is an important factor in shaping their consumer's behaviour, related to the generation of food waste. It is noticed to impact not only the food choices but also affect their subsequent behaviour in the generating of household food waste (COX & DOWNING, 2007).

Income dynamics predetermine also the impact on decision-making related to the quantity, quality, and safety of food products choice, which changes in the face of economic crises. The relationship between the personal income of an individual consumer and the household waste from food products they generate is not yet well studied.

Many studies observe that improved living conditions and rise in the income lead to a reduction in the negative effects of human consumption on the environment, but ANDREONI & LEVINSON (2001) and PLASSMANN & KHANNA (2006) do not share this theory and point out a significant number of conflicting situations. According to LEVINSON (2002) and STERN (2004), the "Poverty impacting the environment" hypothesis is not based on easily summarised assumptions. The obtained model "income - natural recourses" often reveals a very simple "cause-and – effect" relationship (GALEOTTI, 2007; CHOUMERT *et al.*, 2013). That leads to the important research question that needs to be addressed: how the environmental food waste policies interfere with people's lives and how they influence the forming of specific consumer attitude to food waste.

Factors influencing the sustainable choice

Geopolitical instability, human conflicts, economy and markets manipulations can cause significant food security problems as pointed out by (QUINN & BENCO, 2013). The ecologic integrity reflects the sustainability of the environment. The sustainable lifestyle adopted by man is related to the use of natural and personal resources, with the aim to improve their relations and actions with the surrounding environment as well as the cultural processes and their driving factors.

By eliminating the social gap between rich and poor and embracing food management as a resource rather than waste, the negative impact on the environment will be reduced. This requires active efforts to change. For billions of people on Earth, poverty is inversely proportional to food security; in unstable and poor countries – members of the EU, the institutions derive wealth and health instead of providing it (QUINN & BENCKO, 2013). Excessive consumption in both developed and developing countries is a leading factor.

The World Summit on Environment and Development in Rio de Janeiro in 1992 provides a great opportunity to define the conditions for sustainable development and food safety. "Food safety is guaranteed when all people have the physical and average

economic opportunity to obtain food at all times, in safe and sufficient quantities, to meet their dietary needs and to allow them to lead an active, complete and healthy lifestyle" (GOLLIN *et al.*, 2005).

Food safety is a fundamental human right that is achieved through availability, accessibility and use of a sufficient quantity of healthy, suitable and nutritious food. Food extended life means preserving to a certain degree the prosperity of all, which should be constant in time.

The Concept for Sustainable Development helps to integrate specific limitations in the balanced management (TILMAN *et al.*, 2002). The safety objectives are numerous. The most important ones, according to VEREIJKEN (1992) are:

1. Support of organizations and communities in their development, as well as of organizations dedicated to education and raising people's awareness, related to improving the living conditions of the human population;
2. Implementation and management of food production programmes, food distribution, and food access;
3. Development of tools and methods for food safety management and environmental protection.

Food is considered as an integral part of the human right to life. Considering the interrelations with the socio-cultural and management processes, the process of balancing economic growth, social development and nature conservation must be regarded. The most recent sustainability studies emphasise mainly on the concentrated efforts in the areas related to sustainable energy and water consumption or the resources consumption (BRYNJARSDÓTTIR *et al.*, 2012). The United Nations Environment Programme (UNEP) aims to raise people's awareness about food value and its impact on the environment, as well as to redirect food consumption models to foods requiring fewer resources and as a consequence to trigger a change in the behaviour of their use.

Unfortunately, good intentions are not always reflected in everyday practices (VERMEIR & VERBEKE, 2008). It is generally known that the individual mindset and behaviour are the most difficult to change. In order to achieve a change of behaviour it is important to turn to important factors as personality traits, eating habits and the effectiveness of consumer practices (VERMEIR & VERBEKE, 2008), rating the knowledge, the level of education, the general beliefs and the environmental concerns (MILFONT *et al.*, 2006; LAIDLY, 2011).

That is how we face the problems of the individual attitude and behaviours, the way the change of common values would affect the public attitude toward protecting nature and food as a resource.

In order to make the relation "Values-Context-Behaviour" work, two types of behaviour could be differentiated:

- Enforcing those values that can be achieved and underestimating those that could be blocked;
- Prioritising values that are blocked could leave to an increase in their subjective significance, due to the inability to achieve them.

People often have different values. Very often, mass culture and media create wrong models of personal growth and prosperity. Communities with lower social standing copy those models, but it is more likely their behaviour to have modified values, and according to PAUNOV (2010), the value priorities influence behaviour. They must be activated by accessible and meaningful goals for the person, which should be manifested in a particular motivated behaviour in everyday life. Turning value into a motif under the influence of various factors, beliefs, expectations, mindset will affect the consumer's specific day-to-day actions and behaviour. Knowledge, beliefs, mindset and relationship to food are the results of cultural origin and eating habits established from childhood, but also of the constant flow of information related to food that surrounds us every day (JOHANSON *et al.*, 2011).

Undoubtedly, variables such as household income, number of children, gender, and age structure affect not only the individual risk perception and their attitude toward risk (VARELA & FISZMAN, 2013), but also individual behaviour and choice, related to food and food waste generation.

There is a growing interest in science, focusing on the research of technologies that could improve the awareness and efficiency in obtaining foods resources and could prevent food loss by consumers in everyday life. Researchers report that as the development of technology and technological processes advance increased consumer interest has been noticed toward those associated with safe food production (ERGONUL, 2013), followed by tendencies in increasing consumer requirements (CARDELLO *et al.*, 2007).

A number of studies reveal that women achieve a higher degree of concern and openness in sustainable behaviour (LUCHS & MOORADIAN, 2011). That could also be observed in families that share a positive attitude toward sustainable behaviour (GANGLBAUER *et al.*, 2013), which also depends on the social class (LAIDLEY, 2011).

In this respect, we maintain that the social inequalities in the society determine the differences in the distribution of the environmental risks benefits and damages, in relation to food waste in their identification, assessment, and response; these risks create new inequalities which top the already existing ones and reinforce them.

Factors influencing our behaviour on forming food waste

There are studies on the relevant factors that influence the generation of food waste and the development of various preventive measures and strategies against it. Knowing them well and turning them into a specifically motivated behaviour would have a significant impact on the amount of waste generated. Causes for food waste are found at every stage on the way of the food resources and ready-made food.

COHEN (2008) describes that smell and observation of delicious food activate the neurons that release dopamine, a neurotransmitter that promotes appetite. Hunger can lead a person to over-replenishing, by consuming large amounts of food. The food excess automatically becomes food waste. In this sense, inaccurate perception is the reason for food waste generation. In the world, twice as much food is still produced than it is required for individual needs (FOX & FIMECHE, 2013). Approximately half of the food waste in developed countries is generated by consumers, and in particular by households. Menawhile 60% of the food losses could be avoided and that 20% of the discarded foods are due to date errors on the labels of the products.

The physical and mental development in early childhood is remarkable. "Likes and Dislikes" are formed as part of the developing sense of self-love and taste (SAKAMOTO, 2001). The earliest childhood is the most important time to establish eating habits. YAMAMOTO (2008) suggests that tastes are acquired through child experience and learning, although they are given by nature. OGAWA (2003) describe how taste appraisals are generally not present in children but can be learned over time by being introduced to dishes designed to enhance their taste. ANDO (2003) describes how childhood tastes evolve very similar to the way speech does, in other words, the greater the variety of foods experienced during their childhood, the wider the tastes of the child.

Some researchers show interdependence between the opinions and food preferences of parents and their children (BIRCH, 1980; ROZIN, 1984). The hypothesis is that the food preferences of mothers are related to the liking and dislike of certain foods of their children; in its support, PLINER & PELCHAT (1986) report that children inherit the preferences of their parents. Younger people seem to be less aware and concerned about their health than older people are, according to a study by JOHANSON *et al.* (2011).

Food losses occur at all stages of the food supply chain and the food losses generated are around 40% of the total food production (GUSTAVSSON *et al.*, 2011; BERETTA *et al.*, 2013). Calculations accumulated since 1974 to date show a 50% increase in edible food losses across all food supply chain units. The poor logistics cannot be justified ethically and ecologically when it comes to delivering food to the different food serving establishments: restaurants, canteens, schools and nurseries, hospitals, nursing homes, etc.

In each of the sectors, there is consumer behaviour leading to the disposal of entirely edible food. EU data show that 30% of fruit and vegetables are not reaching the shelves of hypermarkets because of their unattractive appearance and because of their "unsellable with regard to the consumer preferences" due to their shape and colour.

There is also a similar practice seen in harvesting and food processing, as losses for Europe alone are estimated at 4 billion Euros per year. Food losses are generated in the agricultural and commercial sector because of improper storage, labelling errors, expired shelf life, damaged packaging, non-marketable appearance, and poor consumer habits when purchasing, storing and using the food products. Store and consumer food losses are estimated at 179 kg per inhabitant annually in Europe.

A recent FAO (2011) report on food losses and food waste on a global level shows that North Americans waste 95 to 115 kg food per person annually; Africans, south of the Sahara, - 6 to 11 kg; that is in a relation to 925 million people in the world living with a risk of malnutrition. The US Department of Agriculture claims that 27% of the food produced or imported in the country is disposed in landfills, directly or as waste.

The European Commission estimates the annual food waste in the 27 EU Member States altogether to be at 89 million tones or 179 kg per single person; that is without taking into consideration the losses at the agricultural and fisheries activities level, as per the report on "How to avoid food waste: strategies for a more efficient food chain in the EU" (2011/2175 (INI), Committee on Agriculture and Rural Regions Development (EP, 2011). In their study, GANGLBAUER *et al.* (2013) trace how the economic factor could help the attempts to reduce food waste, resulting in the daily cost reduction. With the help of such publications and the increase of information provided, it is expected that the percentage of households, influenced to recycle, will increase; and it is essential, in the process of reducing food losses and achieving better recycling and less landfilling. The knowledge and skills related to the use of appropriate refrigeration equipment and the proper storage of food and food products, as well as meal planning and the preparation of shopping lists can greatly reduce the amount of food discharged.

Suggested and current solutions for reducing food waste

Preventing generation of waste means avoiding waste by not manufacturing products which then must be recycled or disposed of safely in accordance to the Waste Prevention Policy laid down by the European legislation. A significant impact on the efficiency of specific coordinated strategies to reduce food waste could be achieved by carefully researching the food waste generation process at each stage and sector, which participate in a different way in the food supply chain, and by using shorter logistics routes between the different stages of food production management. In the EU acts a Retail Market Forum, in direct relation to sustainability, which includes the European Round Table on Sustainable Food Production and Consumption, the High-Level Forum for a better functioning food supply chain in Europe, an informal network of Member States "Friends of Sustainable Food", Consumer Goods Forum and many others. The exchange of good practices in the European Union and the use of global

experience could have an impact on the efficiency.

As set out in EU legislation, it is necessary to reduce and minimize the waste resulting from the use of inappropriate and problematic methods of post-harvest agricultural production and management; to provide high-tech and infrastructure improvements in processing and packaging. By reducing the price of fresh food below its cost before its expiry, it will enable lower-income consumers to buy higher-quality goods at lower prices.

In order to avoid unnecessary waste, it is essential to update the already established rules for waste control, as well as the classifications and the standards for their appearance, shape, and size of fresh fruit and vegetables, because in many cases they are the cause of food disposal and food waste; it is also important to optimize the most suitable storage temperature.

It is important to emphasize the importance of including traders in food redistribution programs, targeting low-income citizens and food sector manufacturers, related to the supply of different pack sizes, and even to rethink the benefits of single item sales for single - person households; it would be extremely useful to tolerate public procurement that would help and guarantee free reallocation of unsold food products in the shops to those malnourished people in the society who cannot afford them.

The National Waste legislation of all Member States should be tuned to the EU Waste Management legislation, in order to define the responsibilities of all beneficial countries. All EU Member States have to achieve the same objectives, although the differences in their industry indicators vary in different countries.

The state and the municipalities with the relevant municipal councils, the economic and scientific structures, the non-governmental organizations and households, all participate in the waste generation. In many eastern European countries, waste accumulation control and levels of recycling are still insufficient. Ecological modernization is slowed down by the lack of resources (social, administrative, etc.), and the environmental culture can be identified as a post-modern phenomenon, which is an important part of the socio-culture and play a different role, depending on the social development, as DULOV (2010) notes.

Introducing households from different social groups and different cultures in the waste distribution requires individual efforts (KARIM GHANI *et al.*, 2013).

Four types of measures should be used when motivating citizens to pursue pro-environmental behaviour:

- administrative measures (legal obligations);
- economic measures (fees and taxes);
- physical measures (e.g. recycling bins and frequent waste collection);
- information (campaigns and guidelines).

The different instruments mentioned above should be applied combined, however, a number of studies show that they could be inefficient in waste management practice at national, regional and local levels. It is noted that different peculiarities at individual levels may prevent participation in the recycling collection – that will be the purpose of our forthcoming research in particular.

By improving consumers' perceptions (i.e. perceived efficiency) and widening their knowledge (sales dates, use of refrigerators, meal planning, shopping lists and visibility of food costs), the individual consumer can be influenced. According to GRISKEVICIUS et al. (2012), in order for the impact strategies to have an optimal effect, they have to work *with* and not *against* developed trends. They should trigger unconscious and impulsive attraction associations and to influence quickly. KINASZ *et al.* (2015) sets the task of developing a list of good management practices that have a positive impact on the elimination or minimisation of food waste.

The most commonly used approaches are awareness raising at schools or public campaigns where consumers are informed about topics such as food purchase, storage, preparation or actual shelf life. Higher education has a positive correlation with healthy patterns (BUS & WORSLEY, 2003). Women are those who have a higher awareness of possible nutritional threats, similar to those with higher education and high incomes (STOBELAAR *et al.*, 2006; SHAFIE & RENNIE, 2012). Groups with a higher economic status are more motivated to adopt certain food and nutrition ideologies, while those with a lower status focus on convenience, price and product knowledge.

Conclusions

Food waste is not the main cause of hunger in the world, but its generation is a global problem and is becoming the source of a number of environmental, economic, moral and ethical issues. Human society and its accompanying civilization processes face a real challenge, whose solution could be found through the methods and programmes of education. The development of pro-ecologic attitude and behaviour should begin with examples in homes and families that will find their natural continuation in the areas of further education and work. It is behind the necessity for the development of specialized programs designed for the various stages of school-age education, which aim to create a sustainable attitude towards the environment and shape healthy pro-environmental behaviour that will become a priority value in their everyday activities, related to environmental protection. It is necessary and imperative to promote scientific and civic culture and awareness of the causes of waste and the consequences it brings. It is desirable and useful to exchange good practices at European and international level by the principles of sustainable development and solidarity, to improve the preservation, and the "non-marketable" goods to be put into food banks, public kitchens and charitable aid.

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