

FOOD WASTE A MAJOR PROBLEM IN THE EUROPEAN UNION

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Abstract: *This paper assesses the impact of food waste at the European Union level. Food waste has raised real concerns in recent years, occupying the first place on the agenda of meetings organized at European and international level. While in the developed countries there is an excess of consumption which, paradoxically, involves huge losses, in other countries conflicts, economic or meteorological conditions generate food crises. The fight against food waste at the level of the European Union, implies the application of measures of responsibility and mobilization of producers, suppliers and sellers, consumers and associations, throughout the agri-food chain, thus maximizing the resources of edible foods. The importance of this topic will continue to grow, especially given the need to feed a growing global population.*

Key words: *food waste, reducing food wast, food loss, food and agriculture organization.*

INTRODUCTION

Food waste is a topic of real interest to the leaders of the world, both from the perspective of the impact it has from a financial point of view, as well as regarding the impact on environmental factors, caused by the high number of resources involved in food production and procurement. Currently 8% of the greenhouse gases are due to food waste.

Food waste has raised real concerns in recent years, occupying the first place on the agenda of meetings organized at European and international level. While in the developed countries there is an excess of consumption which, paradoxically, involves huge losses, in other countries conflicts, economic or meteorological conditions generate food crises.

The world's population will reach 8 billion over the next 6 years, according to a UN report. The phenomenon of population growth will soon generate a global food crisis. The increased demand for food will, over time, exceed the reduced amount of food that is not affected by the phenomenon of waste.

In developing countries, waste is mainly produced during the production process, and in rich countries food waste is mainly caused by suppliers and consumers, who throw away food because they have bought too much or because they do not meet aesthetic standards.

But the causes of food waste are not always the same. They differ depending on the stage of the food supply chain, the type of product and where the food is wasted. If the food chain is divided into five sectors (agricultural production, management and storage, processing, distribution and consumption), it can be observed how different behaviors in each sector lead to the elimination of perfectly edible foods, starting with the losses recorded during harvesting and harvesting, storage, until transport in unsafe conditions, labeling errors and inadequate food behaviors of final consumers when buying and using food.

People need to understand better the concepts of food waste and its causes. The expiration date labels are not well understood, this confusion increasing the rate of food waste. At the same time, almost six out of ten europeans say they always check the labels "to be consumed, preferably before" and "deadline for consumption".

To combat food waste, the European Commission launched, in 2016, the Stop Food Waste campaign, which encourages the entire population to make a minimal effort to stop food waste. Some of the most important actions are the following:

- Plan your purchases to purchase only the products you need.
- Check the terms of validity.
- Calculating the budget you have, because wasting food means wasting money.

The lack of awareness among the society is a factor that contributes to the quantity of food wasted daily, and the conclusion of the specialized studies is simple: food waste is one of the most pressing problems both at European and global level.

MATERIALS AND METHODS

Food waste is a global problem that has become increasingly important in recent years. The importance of this topic will continue to grow, especially given the need to feed a growing population.

Food waste is not just a sociological problem. It is also a massive source of pollution, producing greenhouse gas emissions, soil erosion, water pollution, biodiversity loss, and the list of negative effects can continue.

Food waste is a problem that most people do not realize their size. Statistics tell us that almost one third of the amount of food produced worldwide reaches waste or is wasted in one way or another. In figures, that means 1.3 billion tons of food annually. Moreover, studies show that things are getting worse from year to year, estimating that by 2030, 2.1 billion tons of food will be thrown or lost, the equivalent of 66 tons per second. The figures of the waste will take the highest proportions in the developing countries, with growing population, eager to buy more diverse foods, which are not produced locally [1].

Recent studies show that around 22 million tons of food are wasted at EU level per year, while 925 million people worldwide are at risk of malnutrition.

In the chain of processes through which food products pass before reaching the consumer, of course, a very important role plays, of course, the producer and retailers, including in the problem of food waste. Therefore, the authorities emphasize the need to develop better processes for harvesting, storing and processing, but also for transporting and marketing food. Thus, for example, poor timing, but also inadequate techniques and equipment can lead to food waste still in the harvesting phase. Also, the lack of an infrastructure for transport, storage, cooling, but also marketing leads to alteration of food products.

What influences negatively at all levels, however, is the discrepancy between supply and demand. This is present both on the food market, leading to the situation where farmers cannot sell their products, but also in the homes of families, where too many dishes are cooked, or too large quantities that the family cannot consume.

Thus, the authorities insist on educating producers and consumers alike on responsible consumption practices and habits. For example, consumers can think of menus at the beginning of the week for the whole week, so they know exactly what foods to buy, how to store them and how to prepare them. In addition, they can buy fruits and vegetables that look unsightly but not altered, preferably in the same quantities as the most demanding ones, but also to check the proper functioning of the fridges and to freeze the foods that allow this, if any a surplus of these [2].

To the considerable diminution of the negative effects produced by the food waste both on the economy and on the environment, all those involved in the life of a product can contribute, from the producer to the consumer. In this sense, a very important role plays the access to correct information, but also the understanding of the current situation. The European Union is trying to reduce food waste through population awareness and

information programs in order to significantly reduce waste from the retail segment, which generates the largest amount of waste as well as the final consumer.

RESEARCH RESULTS

Increasingly, both globally and at European level, attention is drawn to the fact that population growth and socio-economic changes could increase global food demand by 50% -70% by 2050. In this context forecasts, global agri-food production should increase by about 60%, just to keep up.

This represents a massive challenge, which will require a variety of solutions, from agronomic, technical and even logistical, social and political. In the broad range of challenges, reducing food waste and waste is an approach worth considering, as it can provide a real way to improve the efficiency and sustainability of agricultural and food production systems.

According to the FAO, about one third of the world's food products are lost every year, which is about 1.3 billion tonnes. There are losses of food intended for human consumption, at all stages of the food system, from agricultural production, management and storage, processing, distribution and consumption [3].

In developed countries, a significant amount of food is wasted in the consumption phase, which means that it is discarded even if it is still suitable for human consumption. In developing countries, food products are largely lost at the end of the agricultural producer of the food supply chain, much less food is wasted at the consumer level. Most of the food waste in developed countries is produced by households and is mainly linked to urbanization, changes in dietary composition and large-scale mass distribution.

Food losses and waste have negative impacts on the environment and economics, and their existence raises questions for society. In general, on a per capita basis, much more food is wasted in the industrialized world than in developing countries.

The production and disposal of these food wastes, in turn, results in the emission of 170 million tonnes of CO₂ and consumes 261 million tonnes of resources. The EU contributes to reducing food waste mainly by its commitment to halve the elimination of edible food in the EU by 2020 [4].

In June 2016, EU agriculture ministers adopted conclusions in which they pledged to improve data collection and awareness of food waste and waste. In addition, they called on the European Commission to remove legal and practical barriers, so that it becomes easier to donate food.

Among the solutions recommended by the European Union for reducing food waste without compromising food safety are:

- food donation to food banks;
- shortening the supply chain;
- recycling of food waste by obtaining biomass energy.

Against the backdrop of the solutions recommended by the European Union, it started a population awareness campaign, regarding the food waste, a campaign entitled: "Stop the food waste"

An example of a campaign against food waste can be seen in the UK. Where the phenomenon has grown ever larger, statistics say that 40% of British food goes to waste, more precisely, no less than 15 million tons of waste every year. Based on these statistics, measures were taken at national level as well as at the level of mayors or retailers to combat food waste. One of these measures is also to collect food waste from all economic agents as well as from private persons to be used in the production of energy, heat or nutrients in agriculture [6].

Countries such as Italy or France, legally require supermarkets to donate their edible waste. More and more large cities are introducing selective food waste collection. Milan, Paris have made this activity a habit, and Rotterdam takes it even further, turning more and more quantities into biogas and compost.

Developed countries are trying to find different solutions to stop this phenomenon that has been increasing in recent years. After France removed the food waste out of the law, Denmark opened the first supermarket where only the surplus of food is sold.

With the opening of the WeFood store, Copenhagen becomes the first city in Denmark and the world where only products destined for garbage are sold, but which are still good for consumption, although the shelf life has passed. WeFood is not only intended for low-income people, but is also a way to combat food waste in this country. The store offers a variety of products. From bread, fruits and vegetables, to frozen meat and products, which would have been thrown away because the expiration time was approaching or because their packaging no longer had the standard appearance. WeFood administrators hope to attract customers who care about the environment, but also those who are in need, who have financial problems and cannot afford to pay the prices of products in time [7].

Also, the European Commission has launched a new platform to fight against food waste, a platform that brings together 70 organizations and is focused on preventing waste on the food value chain, on cross-sectoral cooperation and on promoting good practices, reports the EFE Agency. Member States, the Committee of the Regions, the European Economic and Social Committee, the Food and Agriculture Organization (FAO), the Organization for Economic Cooperation and Development (OECD), the United Nations Environment Program and 37 selected organizations will be part of this platform. These organizations include the European Consumer Organization, the European Milk Association (EDA), cooperatives such as COPA - Cogeca, the European Federation of Food Banks (FEBA). These organizations were selected for the experience in waste prevention, the ability to influence interest groups and the development of activities related to the food value chain. The objective of this platform is to achieve one of the goals of sustainable development set by the United Nations, namely the one focused on the fight against food waste, to stimulate responsible consumption and production [8].

In most cases, food waste is due to several factors, but the most important are:

- lack of time - the company is increasingly busy, most often actually preferring to go less rarely to shopping and storing food;
- the variety of products on the market - we live in a company where the image of the product sells and on the background of curiosity we prefer to buy the same product from different brands only under the pretext of trying it;
- promotional offers - we meet more and more often the so-called promotional products, quite tempting the right ones, of the type of 2×1 that urges us to buy a larger number of products.

All those involved in the food chain have a role in preventing and reducing food waste, starting with those who produce and process food (farmers, food producers and processors), those who market food on the market (the hospital sector, retailers) and in those after all, the final consumer [9].

The sectors where the biggest food waste occurs are households, with over 46.5 million tons, and processing, with 16.9 million tons. These two sectors together account for 72% of the amount of food waste in the European Union. The remaining 28% is divided between the hospital sector 10.5 million tons, production 9.1 million tons and retail 4.6 million tons.

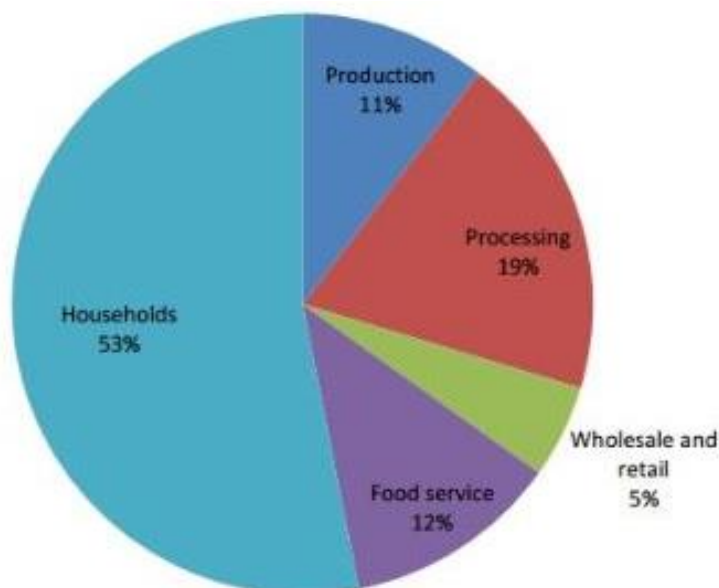


Figure 1. The sectors in which the food waste is registered.

Source: ****<http://foodwaste.ro>, year2017

In 2012, the costs associated with food waste in the EU were estimated at around 143 billion euros. Two thirds of these costs are associated with food waste from households (about 98 billion euros) [10].

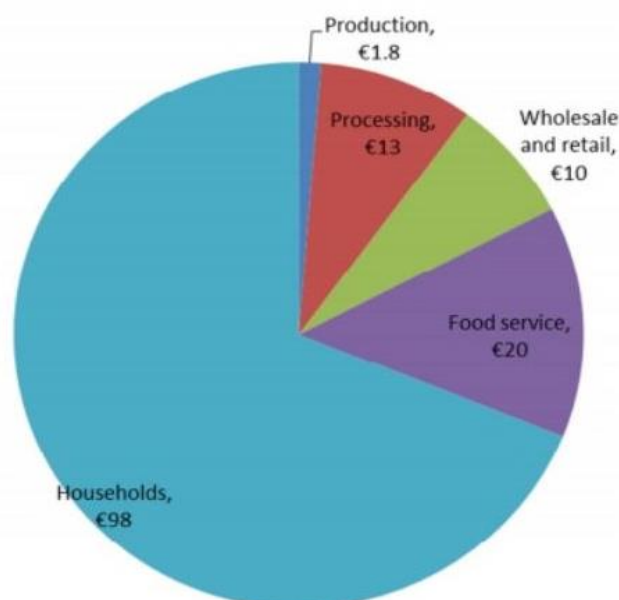


Figure 2. The costs associated with the food waste in each sector.

Source: ****<http://foodwaste.ro>, year2017

The factors that cause food waste are different and vary depending on the stage at which the food is in the food chain: from agricultural losses caused by natural phenomena to poor management of resources by the seller or final consumer.

An inhabitant of Europe throws an average of 95-115 kg of food a year, an amount that translates not only to financial losses, but also to environmental damage.

The tendency is present especially in urban centers, where food suitable for consumption becomes discarded due to the low cost, high standards regarding the appearance and shape of the products, as well as a lack of understanding about the process

by which they are obtained. Urban dwellers generally have higher incomes than those in rural areas, buy more food from supermarkets that impose high standards on the appearance of food and live further from the place where food is produced and processed [11].

At the same time, there are many initiatives that fight against food waste, led by NGOs, food companies, but also local governments or other public institutions. Milan is one of the cities that initiated the fight against food waste by adopting a clear public policy in the field of food (Milan Food Policy, 2015) that comes to set ambitious goals regarding the reduction of food waste and promoting a healthy and sustainable lifestyle for all its inhabitants. This act encourages donations of food to underprivileged persons, public information actions on how to conserve and prepare food, as well as local actions for the recovery of food and their use in other forms (for example, fruits that are about to spoil they are transformed into natural juices, jams).

Moreover, such an initiative was carried out in Aiud with the support of the association the Society for Responsible Consumption and won the competition "Refresh Food Waste Solution" organized by the European Commission. The volunteers from Aiud collected about 800 kilograms of vegetables, which benefited over 50 people. Most of the time, this type of action comes to compensate for the market failures, especially in countries where there is no functional food bank at national level [12].

The global movement that promotes the consumption of "nasty foods", which usually get dumped due to strict standards imposed by major food chains, has taken root throughout Europe.

Supermarkets such as Intermarché (France) or Asda (United Kingdom) have run national campaigns selling fruits and vegetables with "defects" at low prices, reactivating in the public space the discussion about the need to apply food-related standards and not necessarily of their quality or nutritional value.

The Frutta Brutta ("bad fruit") project in Milan saved over 50 tons of "imperfect" apples, allowing farmers to sell their products at a lower price than the market (0.80 euros / kg compared to 2, 50 euros / kg, the price with which the "normal" apples are sold). Also, for every kilogram of apples sold on the market, farmers donated another kilogram to local charities [13].

Solutions for reducing food waste can be extremely simple and effective. For example, there are various local organizations that deal with the redistribution of food left on traders' stalls after the markets close. In the cities have formed teams of volunteers who collect the unwanted products, being a contact point between the sellers and the centers of redistribution of the food, canteens or other institutions that offer help for the people in a precarious material situation.

Technology also plays a very important role in reducing food waste. Mobile applications display stores / markets / bakeries that offer products close to the expiration date that would otherwise have reached the garbage, giving users the chance to purchase them at lower prices than normal ones, and sometimes even for free [14].

Such an application launched in a milanese district has gathered over 10,000 users (most aged between 25 and 34) and 23 local supermarkets, to extend this model to more than 500 supermarkets in northern Italy until the end of this year.

But food waste is a global problem that requires a serious approach and continuous involvement of everyone in the food system, from farmers to consumers.

In economic terms, WRAP (Waste Resources and Action Program) calculated food waste costs at over 400 \$ billion annually, which is a strong indication for private companies to take the necessary measures to reduce their losses. At the same time, there is a need for a sustainable partnership between the private and public sectors to achieve the

goal of halving food waste per capita at retail and consumer level by 2030, one of the Sustainable Development Goals proposed by The United Nations to be adopted globally.

In this context, cities have the chance to play an indispensable role in reducing food waste, in order to provide food for billions of people with lower carbon emissions and a lower impact on the planet's natural resources [15].

General objectives to reduce food waste are:

- increasing the level of information of the general population on food waste, ways to combat it and measures essential for food safety;
- raising the level of awareness of the general public about the fact that food waste is a major social problem. While millions of people are living on the edge of poverty, the food industry is facing difficulties managing tons of food waste;
- improving the level of knowledge about food waste and awareness of policy makers.

As part of its policy of promoting the circular economy, the European Commission undertakes, inter alia, actions to prevent and combat food waste. As food waste is a problem with social, economic, ecological and political implications, its prevention has been identified as a priority area in the EU.

The Commission has set up a platform dedicated to the prevention of food waste, its purpose aiming to support all actors involved in the food chain, by defining the necessary measures to avoid food waste, by exchanging best practices and evaluating the progress made over time.

Through the circular economy package, the Commission intends to amend and supplement the legislation on waste (amending the EU Environmental Directive 98/2008), by introducing the notion of food waste. The platform is based on the activity of expert groups and is established by the European Union. It can provide advice on actions to prevent waste and reduce food waste, as well as facilitate the exchange of best practices. In order to develop a voluntary guide, the European Commission has launched a draft of materials on food waste monitoring at EU level.

A study conducted at European level, which analyzes the attitude of consumers towards food waste, confirms that almost one third of Europeans waste on average more than 4 kg of food per month. Consumers invoke the lack of time and the hectic lifestyle. However, the same study reveals that 90% of them are concerned about the amount of food they waste [16].

The global respectfood.com platform includes information and tips on adopting a sustainable lifestyle, as well as cooking recipes that help consumers reduce food waste.

Other information from the study: Europeans said that the most commonly wasted foods are fruits and vegetables. Other wasted foods are bread and dairy products. The sweets are at the opposite pole, being the least respited.

According to the study, Europeans choose whether or not to throw a food based on its appearance but not on the shelf life, also 61% of Europeans try to consume food near expiration date, 36% of Europeans think they waste too much food, but only 56% of them are concerned about the amount they waste and 84% of Europeans agree that it is important to convey to children the importance of a sustainable lifestyle, with an emphasis on the need to minimize food waste.

At European level, in November 2016, the Commission communication to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions was published, entitled: "The next steps towards a sustainable European future. The European Action for Sustainability, which provides for" Measures on sustainable food systems and food waste prevention (Objective 12) will be taken through

the EU Platform on Food Loss and Waste, to support the UN's goal of reducing half wasted food per capita worldwide by 2030 [17].

In June 2017, the Council of the European Union adopted the document "A sustainable future of Europe: The European Union's response to the 2030 Agenda", which confirms that the EU and the Member States are firmly committed to the implementation of the 2030 Agenda, in a complete way, coherent, comprehensive, integrated and efficient and in close cooperation with partners and other stakeholders, including subnational authorities, civil society, the private sector, social partners and the academic environment" and "Solocita Commission, while respecting the principle of subsidiarity, to continue to manage the EU policy framework to ensure that current and new EU policies are in line with the SDGs and their objectives."

Concrete preventive measures to reduce food waste that can be taken by economic operators in the agri-food sector whose primary food production purpose are:

- planning or other economic tools that promote the efficient use of resources;
- measures to minimize losses before harvesting, as well as recovery measures after harvesting, through donation, marketing, conversion into compost, biogas;
- adaptation to the effects of climate change;
- research, innovation, technologization / re-technologization - creation of drought-resistant varieties and hybrids, diseases and pests, the realization of high-performance systems of agricultural machines and machines intended for harvesting, sorting, storage and packaging, which aim to reduce production losses;
- adapting the production to the market conditions - demand-supply, ensuring traceability - culture plan according to the sales market;
- education and information measures regarding the prevention of the waste of agri-food products, the quantification of the food waste;
- measures to redistribute / use the surplus.

In the case of processing and processing, economic operators may impose the following measures:

- measures for planning, reuse of by-products or other economic instruments that promote the efficient use of resources;
- research-development-innovation measures;
- technological / retechnological, automation / digitization measures of the production / processing / processing process in order to minimize losses;
- innovative methods of food processing;
- adapting the production to market conditions, demand-supply;
- ensuring traceability;
- measures regarding the donation of food to the receiving operators and final consumers;
- establishing the plan for reducing food waste;
- achieving at least one annual internal communication with the employees regarding the objective of reducing food waste.

For storage, distribution, marketing, economic operators may take the following measures:

- development and monitoring of a FIFO system "first in - first out" for cargo stocks;
- informing / educating consumers about the optimal conditions of use and storage of food;
- Collaboration with consumers and understanding their needs;
- achieving at least one annual internal communication with employees regarding the objective of reducing food waste.

For the hotel industry and public catering services, economic operators can undertake:

- planning measures or other economic instruments that promote the efficient use of resources;
- achieving at least one annual internal communication with employees regarding the objective of reducing food waste;
- realization of a FIFO monitoring system "first in - first out" of goods / raw materials stocks;
- measures for separate collection of food waste, by categories, for recycling / recovery / disposal according to the waste hierarchy and the specific legislation in force.

The measures to be taken by economic operators, respecting the hierarchy of prevention of the generation of food waste, refer to:

- measures of responsibility for the diminution of the food waste on the agro-food chain, starting with the production, processing, storage, distribution, marketing, reaching the final consumer, including in the hotel industry and food services;
- measures regarding the sale with reduced price of the products near the expiration of the deadline of consumption;
- measures regarding the transfer of food by donation or sponsorship, for human consumption, but close to the expiry of the consumption deadline, to entities, which have become operators in the agri-food sector, with the obligation to comply with legal provisions regarding hygiene conditions, including temperature requirements during storage and transport, as well as the proper labeling;
- measures for directing by-products not intended for human consumption according to Regulation (EC) no. 1.774 / 2002 of the European Parliament and of the Council of 3 October 2002 establishing the sanitary norms regarding the animal by-products that are not destined for human consumption, the third category for the consumption of certain categories of animals;
- measures for directing agri-food products that have become unfit for human or animal consumption by transforming them into compost;
- measures for directing agri-food products that have become unfit for human or animal consumption in order to make their use by transforming them into biogas;
- measures regarding the directing to an authorized unit for neutralizing the remaining products after completing the above steps.

The EU invests over 4 billion euros in research and innovation to achieve a European bioeconomy in which our renewable biological resources are used to the maximum. Agriculture is an essential sector that ensures food production and sustainable management of natural resources and that supports the development of rural areas.

The EU is the source of 18% of global food exports, worth 76 billion euros. But in the EU and elsewhere, agricultural waste burdens the activity of farmers and costs European taxpayers between 55 and 99 euros per ton.

Worldwide, more than half of development aid comes from the EU and Member States budget, making the EU the largest global aid donor. The European Development Fund (EDF) is the EU's instrument of cooperation established since 1957 under the Treaty of Rome. It aims to cooperate with the developing countries of Africa, the Caribbean and the Pacific (ACP) and with the overseas countries and territories (OCTs), with the long-term goal being to eradicate poverty [18].

In this context, institutions responsible for food safety and population health, such as the European Food Safety Authority (EFSA), the European Commission or FAO are drawing directions through which food waste can be reduced as much as possible, and its

effects will be less likely. felt the presence both at economic and social level, as well as ecologically.

CONCLUSIONS

In conclusion, stopping this phenomenon by minor behavioral changes means food for the entire population, a less polluted environment and last but not least the protection of the natural resources we need so much.

The conclusion is simple and full of certainties: the population is constantly growing, as well as the demand and diversification of food. Climate change influences the development of food crops, and no resource will last forever. Therefore, there will always be the risk of confrontation at some point with the lack of food and maybe even water, hunger and so on. Precisely for these reasons, the solutions are in us, in our conscience, in the social will and in our disciplinary perspectives regarding the improvement and prevention of an unfavorable situation, which we can still manage.

The fight against food waste involves the application of measures to empower and mobilize producers, suppliers and sellers, consumers and associations, throughout the agri-food chain, thus maximizing the resources of edible food.

The reduction of the food waste, a waste generating factor of all the resources used in the production of food, will have the effect of protecting the natural resources: earth, water, energy, raw materials and the environment, contributing to the reduction of CO₂ emissions and pollution.

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