



**USE YOUR PRODUCE
ON FIELD AND FARM TO
#REDUCEFOODWASTE**

**GUIDELINE FOR THE PRIMARY PRODUCTION SECTOR
2019**



Title: Improve your loss ratio and #reducefoodwaste – Guideline for Primary Production sector 2019

Editors: Gudrun Obersteiner, University of Natural Resources and Life Sciences, Vienna; Claudia Sacher, Waste Management Association Mid-Tyrol; Lesana Urbanova, Glopolis

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TAKING **COOPERATION** FORWARD

ABOUT THE PROJECT

STREFOWA – Strategies to Reduce and Manage Food Waste in Central Europe is a three-year project in Central Europe to find and design new ideas dealing with food waste. Our aim is to reduce food waste or to treat it in a better, more useful way, along the whole supply chain.

>>> reducefoodwaste.eu

FOREWORD

It is important to me that my 8 grandchildren also have a chance to live an enjoyable life on Earth and that my generation does not exploit the globe to the brim. We put energy, effort and love in every product – it is irresponsible to dispose of food, because our Earth only has enough for everyone if we use the resources carefully.

Gerhard Zoubek / Adamah / Austria



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ABOUT THIS GUIDELINE

The lifecycle of food ideally follows a continuous circle. Food gets produced, harvested, processed, marketed, distributed, purchased, consumed and managed as waste. This entire lifecycle is also called the food supply chain, with each step in the chain represented by a separate sector: primary production, food processing & marketing, retail, food service, consumers and waste management.



Figure 1: Food Supply Chain

Along the entire food supply chain – in each step and each sector – food is wasted, e.g. on the field during harvest, broken or spilled in the processing, left over in retail and food service and not consumed by final consumers. Food waste is therefore not a problem of one single sector; it is rather the cumulative effect of interlinked conditions. As the sectors often work hand in hand and interact in many ways there is a high potential to tackle the problem of food waste. Solutions encompassing several sectors or even across the entire food supply chain should be considered. Food, which might not be able to be used in one sector, could be an interesting resource for another one. This cross-sectoral cooperation is a core aspect of this guideline.

The guideline points out the aspects of individual responsibility and possible adaptation among one's own business. It shows internal and external reasons and problems in a defined sector causing food waste. Benefits, which are not exclusive for one specific sector, are collected. All presented ideas, sector specific and cross-sectoral ones, represent possible solutions how food can be used and treated instead of being wasted.

This guideline deals with all kind of fruits and vegetables, including all sizes and structures of farms and production. Other agricultural products are different in many ways and have to be dealt with separately.

THIS GUIDELINE AIMS:

- to raise awareness and a better understanding of the quality of produced food
- to show problems and reasons why food waste is happening
- to provide various solutions helping to reduce food waste

BENEFITS OF TAKING ACTION AGAINST FOOD WASTE AS FARMERS

- Regional value creation
- Consumer education / awareness raising
- Food sovereignty
- Higher cost-efficiency in whole production
- Ecological benefits
- Climate protection
- Renewable energy production



ABOUT FOOD WASTE

WHAT IS FOOD WASTE?

Food is defined as any substance — whether processed, semi-processed, or raw — that is intended for human consumption including any substances that have been used in the manufacture, preparation, or treatment of food, excluding drinks.

Inedible parts = unavoidable food waste refers to components associated with a food that in a particular food supply chain are not intended to be consumed by humans. This is food thrown away that has not been edible under normal circumstances for most of the inhabitants. Examples could include bones, rinds, or pits/stones. On the contrary, avoidable food waste comes from originally edible parts.

Food waste (including food loss) refers to food, as well as associated inedible parts, removed from the food supply chain. That means they are not used for normal human consumption.

Inedible parts (Bones, skins...)

Preparation residues (skins, ...)

Consumption residues

Partially consumed food

Entirely uneaten food (as purchased, whole, unopened)

Non-avoidable

Non-avoidable

Avoidable

Avoidable

Avoidable

WHERE DOES THE FOOD WASTE OCCUR?

Food waste occurs along the entire supply chain; wherever food is produced, processed, traded or used.

WHAT AMOUNTS ARE WE SPEAKING ABOUT?

Exact amounts of food waste are not known, as reliable data is scarce, due to data collection difficulties. Estimates range from 20–30% loss of our total food production. Some countries waste up to nearly 50% of the food production. Despite the inconsistent data situation, food waste is present in all areas of the food supply chain, with visible impacts.

WHAT ARE THE CONSEQUENCES OF FOOD WASTE?

Food waste accounts for 3.3 gigatons of CO₂ emissions (cf. FAO, 2011). Huge quantities of water in production and processing are wasted on unconsumed food; moreover, food production uses large areas of agricultural land. Consequently, this causes negative impacts on biodiversity, soil, ground water and much more. From an economic point of view, both the direct and indirect costs of discarded food must be considered, e.g., caused by superfluous transport, infrastructure etc.

WHAT IS BEING DONE ABOUT IT?

Every nation has individual legal acts which directly or indirectly lead to as well as prevent the generation of avoidable food waste. While hygiene guidelines, packaging standards, and market norms will often lead to increasing food waste amounts, food donation regulations can help to decrease the amount wasted. In addition, public and private food waste prevention and management activities aim to reduce food waste via practical implementations or educational purposes, covering different areas, target groups or food types.

Despite these efforts, the food waste problem still exists, and further steps need to be taken - in all sectors. In the first step the, problem needs to be considered in detail and ideas and approaches must be developed.

Individuals as well as groups can become active in their working environments and their communities. This guideline does not represent a general viewpoint but addresses parts of the supply chain to high-light practical approaches.



FACTS & FIGURES OF FOOD WASTE

Quantifying the exact amount of discarded food originating from primary production is not possible based on current knowledge. Recent assumptions can range from 25 % to 30 % of the total food production (FAO, 2013) or from 10 % to 50 % of the production of one specific food item (Mutter Erde, 2017). A significant part of this waste would have been appropriate for human consumption – this part is categorised as avoidable food waste and important for the further discussion.

The discarded crops have different levels of quality, including class I and class II crops, crops which don't meet marketing standard because of size, shape or colour, and crops affected by pests or diseases. On the farm level the number of discarded crops varies significantly and can range from “hardly any” to almost 100 % of the crop yield. The predominant cause for this variability is the unpredictability of surplus crops, influenced by variables which can be only partially controlled, such as the seasonality of weather, outbreaks of pests and diseases, market constraints, etc.

CONSEQUENCES AND PROBLEMS

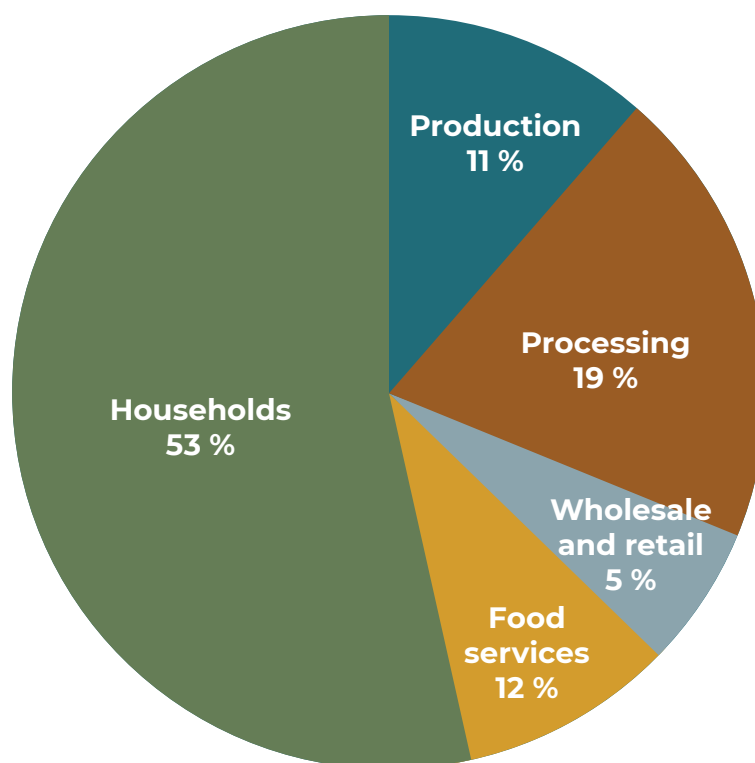


Figure 2: Split of EU-28 food waste in 2012 by sector (Fusion, 2016)

Based on new studies the primary production is responsible for about 10 % of all food waste in the EU 28 (Fusion, 2016). Looking more closely at this sector worldwide, it becomes clear that most of it is cereals, roots & tubers, and fruits & vegetables (FAO, 2011).

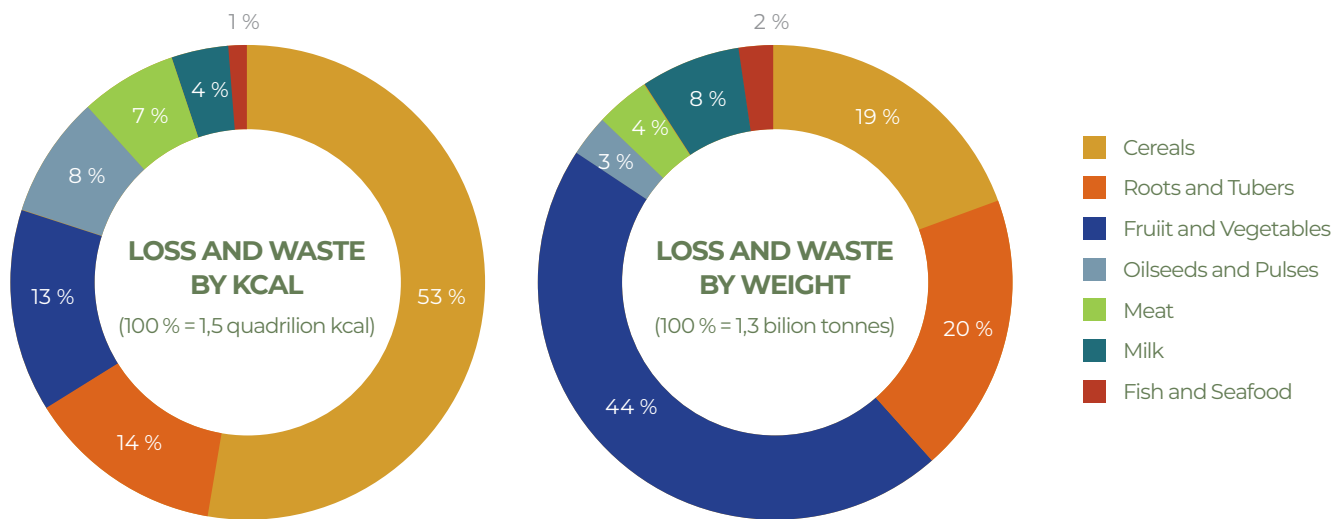


Figure 3: Global food losses and waste (FAO, 2011)

Up until the turn of the millennium, food waste from primary production was mainly fed to livestock, largely to pigs and poultry. With the enforced feed ban of animal products in 2001, this has been restricted and the import of soya has increased significantly. In the best-case scenario, the discarded vegetable products still can be used as animal feed. If that is not impossible, it should be used for biogas generation or compost. It is only possible to leave a surplus of vegetables on the field and plough them under, as this can cause over-fertilization, create too much biomass in the soil and can lead to rot or large amounts of spores and funguses can enter the soil.

Discarding high quality products fit for human consumption causes not only an ethical but a social dilemma. Considering both ecological and economic consequences these ways to dispose of discarded agricultural products is highly unsustainable and a waste of valuable resources.

REASONS “WHY PART OF THE PRODUCE IN FIELDS AND ON FARMS DOES NOT GET USED FOR HUMAN CONSUMPTION”

PRODUCE DOESN'T GET FULLY HARVESTED

- **A complete harvest is not attractive because of economic aspects:**
 - no purchaser will buy the products, because of a saturated market
 - market prices are not cost-covering:
 - Sales prices of products are lower than the total costs that occur (e.g. at orchard meadows)
 - Sales prices of products only cover the total costs if a defined minimum-amount can be harvested (e.g. pumpkins and zucchini)
- **A complete harvest cannot be carried out, due to:**
 - Mechanical reasons the machine is not able to harvest the entire crop
 - Unpredictable weather events that can lead to unfavourable soil conditions

PRODUCE IS DAMAGED

From field to packaging, food products are damaged because of different reasons. The higher the number of stations which must be passed, the higher the amount of avoidable as well as unavoidable food waste.

Produces can be damaged:

- **On the field** due to weather conditions, pests or mechanical reasons.
- **During harvest** due to mechanical, manual reasons or soil condition.
- **During packaging and further treatment** due to mechanical or manual reasons.

MARKET IS SATURATED BECAUSE OF OVERPRODUCTION

A distinction is made between **intentional and unintentional overproduction**.

Intentional overproduction occurs because of the risk of short-term losses as well as damages through environmental effects and the need to deliver a certain quantity at the same time.

Unintentional overproduction takes place because of unpredictable market developments and short-term market decisions (like termination of contracts or rejected goods) or favourable weather conditions and growth-related harvest-amounts.

PRODUCE DOESN'T MEET QUALITY CRITERIA OF MARKETING AND HYGIENIC STANDARDS

General marketing standards exist – with some exceptions – for all fruit and vegetable varieties and are defined by the **EU Regulation 1221/2008** (modified 543/2011). **Specific marketing** standards currently exist for ten fruit and vegetable groups (apples, citrus fruit, kiwifruit, lettuce, peaches and nectarines, pears, strawberries, sweet peppers, table grapes and tomatoes). These standards need to be met otherwise the products won't be sellable to cooperation partners.

Minimum requirements:

- Whole, healthy, clean
- Free of pests and damage caused by pests
- Free from abnormal external moisture
- Free from foreign smell / taste
- Satisfactory condition
- Developed and mature enough
- Not overdeveloped or overripe
- 0 % tolerance *, of which max. 2 % spoilage
- Information about origin and sender

Furthermore, **voluntary standards** such as **UNECE norms** and **OECD standards** exist. Additionally, standards defined by retail partners or defined standards of retailers in cooperation with farmers can exist.

PRODUCE DOESN'T FIT CONSUMER'S REQUESTS

High expectations and **subjective evaluations** of consumers lead to corresponding measures and offers from the producers and sellers. The increased concerns about food security and quality lead to the generation of avoidable food waste.



SOLUTIONS

To support the idea that every sector dealing and using food is connected, the solutions are shown in their context:

WHAT I CAN DO TO REDUCE FOOD WASTE:

Improve your production/processing methods and infrastructure

Control your processing for potential savings of food waste

Assess your processes at your farm. Possibly appraise your waste generation, e.g. volume of wastes, where (place and during which process steps) are they generated, reasons for discarding. Based on this you can identify which wastes could be avoided and define fields of action.

Modernize equipment and machinery to state-of-the-art standards

When you have a regular preventative maintenance, and are familiar with your machinery and material – there is no need to buy new equipment. Well-maintained equipment can be as efficient as newer products. Nevertheless, be open to new ideas and technologies and keep yourself updated.

Stay informed about cultivation and harvesting techniques

Reduce damaged crops by staying informed and up-to-date about latest cultivation and harvesting techniques, for example, regarding soil cultivation, crop protection and pest management, harvesting technologies and techniques. Be inquisitive and interested!

Establish new marketing channels to sell your produce

Establish new marketing channels for your non-marketable produce, e.g., not market conforming / wonky vegetables, without processing beforehand.

Sell your produce directly to restaurants and other gastronomy businesses.

Create your own label and declare the “defect”.

Be creative and use the growing awareness of consumers.

Develop new products by processing your not-sellable produce

Start processing on your farm as a new source of income

Develop and produce your new products directly at your farmyard and use your own well-established marketing channels or create new ones. This way you keep the economic output at your farm.

Establish a community processing infrastructure

Cooperate with other farmers and set up a joint infrastructure to process your crops. This will help to share costs and duties, and to optimize and better use existing capacities. If possible, you can establish shared marketing channels for your new products.

Establish a farmer-platform as distribution cooperation and/or experience exchange

Cooperate with several other farmers to establish joint sales channels, for example, a farmer-platform to sell your produce. Use this cooperation also to exchange experiences and knowledge

Adapt your range of products, respond to customer demand

Be aware of current developments and trends. Get feedback from your customers and retailers, pick up ideas and if possible, respond to them. Maybe you can come up with some ideas by yourself. Simple modifications according to customer demand could be mixing in new or other vegetables in veggie boxes, supplying receipts for unfamiliar vegetables, or adapting your cultivation plan to customers' requests.

Make produce available at your own facility for consumption or distribution to employees

Use the produce which is not fit for sale on your own, in your enterprise, for example, hand it out for free to your workers.

Communicate the value of food to your consumers

Your customers are the most important purchasers of your non-conforming vegetables. Make your customers aware of the value of this particular produce, so they want to buy it and a regular demand can be established. Compile and distribute information to get your customers familiar with your produce and know about its quality. Explain the reasons why these crops are good for consumption and detail the environmental consequences if they are not sold and consumed.



WHAT CAN I DO WITH FOOD I CAN'T USE:

Let people glean your not-harvested produce

In case it's not economic or profitable to harvest your entire crops, make your fields accessible for other people to gather and glean the left-over crops. You could specifically invite social associations or people in need to re-harvest your fields for free. You could also give access to private people and ask for remuneration.

Develop new products by processing your not-sellable produce

Find a partner company who takes over your produce

In case it's not possible to process your crops at your farm, try to find a cooperation partner who can take over processing or refining the food. The cooperating partner could be either a part of your business or independent.

Get in contact with local foodbanks or social initiatives

Before your produce which is not fit for sale goes off, pass it on to social institutions. Find out about local food banks or social markets and get in touch with them. Many states have guidelines regarding legal aspect available

HOW CAN I HELP OTHERS TO AVOID FOOD BECOMING WASTE:

Utilize unused produce as animal feed

Get in cooperation with partners to use unused produce as animal feed

If non-animal origin food waste (=plant based) is collected separately it is still possible to use it as animal feed. Get in touch with farmers or other cooperation partners that will use your products if they cannot be sold to retail partners or consumers. Please observe the existing regulations on animal feed from the European Union such as:

- Regulation (EC) No 178/2002
- Regulation (EC) No 882/2004
- Regulation (EC) No 183/2005
- Commission Regulation (EC) No 669/2009

Prepare and use compost

Start a self-composting at your farm

Instead of leaving residues on the fields, build up a composting plant on your farm and keep the nutrients on your farm. It will also reduce the risk and spread of diseases, over-fertilization, unwanted fermentation and decomposition processes as well as odour nuisance.

Additional you may benefit from the sale of your specially produced compost!

Get in cooperation with a composting plant

If the available space at your farm is not enough – think about outsourcing the composting and get in contact with other farmers or companies (e.g. landfill operators).

Use the produced compost as fertiliser

Benefit from targeted production and spreading of compost as a fertilizer in accordance with crop rotation. Don't miss the opportunity of using the high-quality compost of your own products.

Transform biogenic food waste to usable biogas

Get in cooperation with biogas plant

For large amounts of waste and no adequate composting possibility, cooperate with a biogas plant and provide them your raw materials.

Use the produced energy

It is possible to use the energy produced by the biogas on your own farm!



LINKS & REFERENCES

#REDUCEFOODWASTE - TOOL

Use the #reducefoodwaste –Tool to find out what is going on and help reduce food waste along the food supply chain in your area! This tool will introduce you to a lot of important stakeholders in Europe and besides that you can find tips & tricks to prevent food waste, educational materials or information on start-ups, initiatives and other ideas.

<https://tool.reducefoodwaste.eu/>

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ABOUT STREFOWA

>>> reducefoodwaste.eu >>> interreg-central.eu/STREFOWA

Strefowa (Strategies to Reduce and Manage Food Waste in Central Europa) is a three-year project implemented in the Central Europe region funded by the Interreg CENTRAL EUROPE Programme that encourages cooperation shared challenges in central Europe. Therefore nine partners in five different Central Europe Countries (Austria, Hungary, Poland, Czech Republic, Italy) are working together. The aim is to reduce food waste or to treat it in a better, more useful way as well as to connect relevant actors in order to achieve a reduction of environmental impacts (e.g. GHG emissions) along the whole supply chain.

The most relevant outputs of this project are:

Food waste prevention support – Tool (<https://tool.reducefoodwaste.eu/#/>)

Based on best practice examples and project outcomes, a tailor-made web based software tool provides specific information for different stakeholder groups to prevent and treat food waste.

Implementation of Pilot and Demonstration Action

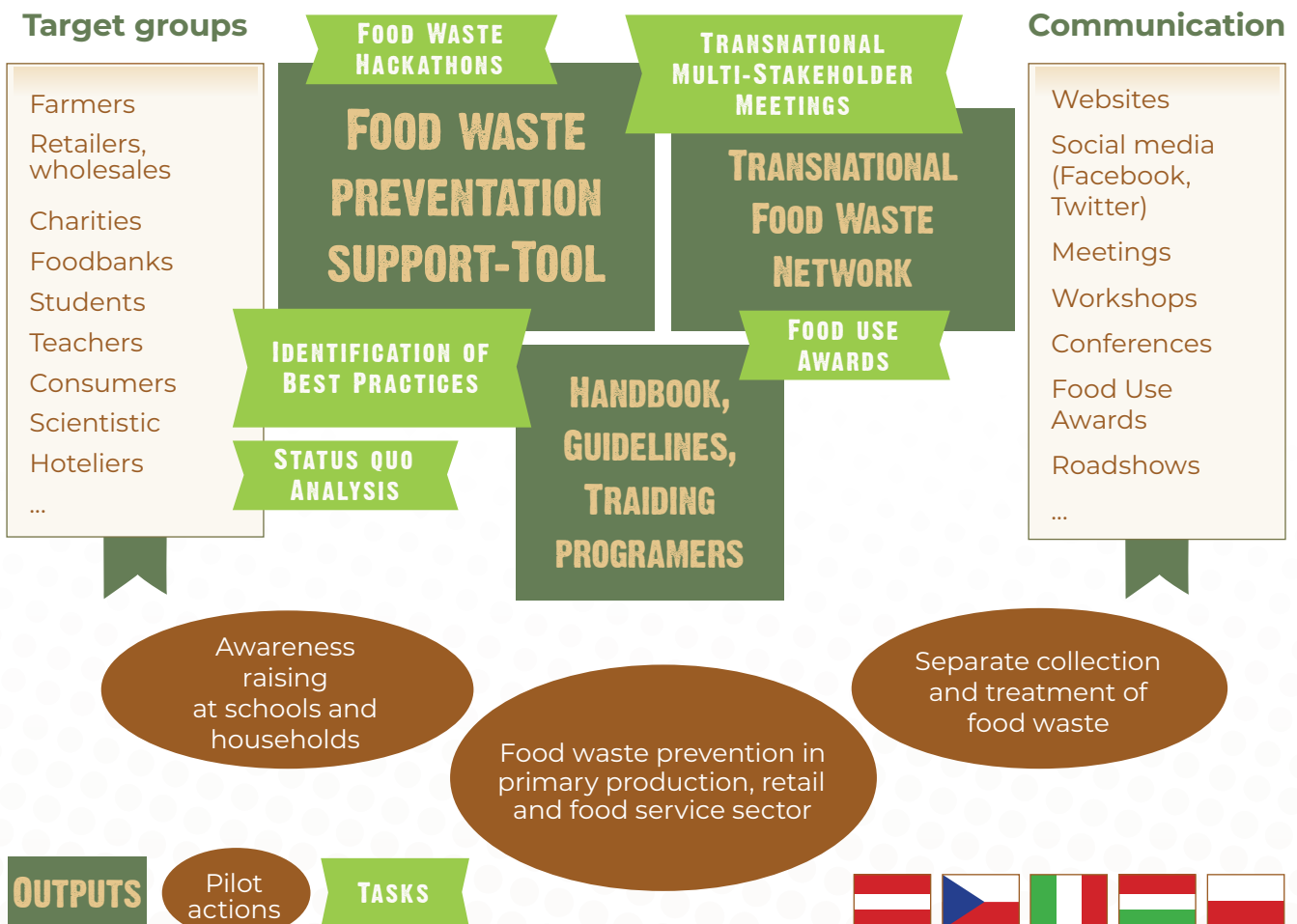
Food waste prevention measures as well as the feasibility of food waste separation and separate collection have been tested and evaluated within 16 pilot actions taking place in different partner countries. Newly acquired knowledge will now be accessible for others.

Establishment of an appropriate Transnational Stakeholder Platform

Stakeholders that are willing to work together are identified and connected through a Transnational Stakeholder Platform.

Best Practice Guidelines and Training Programmes

Guidelines and training programmes in regard to prevention, reduction and treatment of food waste have been developed and tested for relevant stakeholder groups along the food supply chain. They are based on current scientific findings and best practice examples.



USE YOUR PRODUCE ON FIELD AND FARM TO #REDUCEFOODWASTE

FOR VEGETABLE & FRUIT FARMERS

REASONS

WHY PARTS OF PRODUCE ON FIELD AND FARM GET NOT USED FOR HUMAN CONSUMPTION



PRODUCE DOESN'T MEET QUALITY CRITERIA OF MARKETING AND HYGIENIC STANDARDS OR COSTUMER'S REQUESTS



MARKET IS SATURATED BECAUSE OF OVERPRODUCTION OR NEW FOOD TRENDS



PRODUCE IS DAMAGED ON THE FIELD, DURING TRANSPORT, PROCESSING AND STORAGE



PRODUCE DOESN'T GET FULLY HARVESTED DUE TO INEFFICIENT HARVEST OR ECONOMIC REASON

FOOD SUPPLY CHAIN



SOLUTIONS

#1

Primary Production



HOW TO USE MORE OF ALL PRODUCE FROM FIELD AND FARM

CHECK YOUR PRODUCTION, PROCESSING, HARVESTING AND STORAGE METHODS IN ORDER TO AVOID DAMAGE OR LOSSES AT FIELD AND FARM

ESTABLISH NEW MARKETING CHANNELS TO SELL YOUR PRODUCE

DEVELOP NEW PRODUCTS BY PROCESSING YOUR UN-SELLABLE PRODUCE
either on your farm or in cooperation (farmers' association)

ESTABLISH A FARMER-PLATFORM AS DISTRIBUTION COOPERATION AND/OR EXPERIENCE EXCHANGE

ADAPT YOUR RANGE OF PRODUCTS, RESPOND WITH CUSTOMER DEMAND

MAKE PRODUCE AVAILABLE AT YOUR OWN FACILITY FOR CONSUMPTION OR DISTRIBUTION TO EMPLOYEES

DONATE YOUR UNUSED PRODUCE TO LOCAL FOODBANKS OR SOCIAL INITIATIVES

LET PEOPLE GLEAN YOUR NOT-HARVESTED PRODUCE

RAISE AWARENESS ABOUT THE TOPIC BY COMMUNICATING THE VALUE OF FOOD TO YOUR CONSUMERS AND/OR EXPERIENCE EXCHANGE

HOW TO USE FOOD THAT CAN'T BE AVOIDED FROM BEING WASTE:

UTILIZE UNUSED PRODUCE AS ANIMAL FEED
e.g. by getting in cooperation with other farmers that use unused produce as animal feed

PREPARE AND USE COMPOST
at your farm or in cooperation with other farmers to produce high value fertilizer

USE FOOD WASTE AS SUBSTRATE FOR BIOGAS PRODUCTION AT BIOGAS PLANTS
in order to produce fertilizer, power, heat and/or fuel

BENEFITS

CREATE REGIONAL VALUE!

EDUCATE YOUR CONSUMERS!

RAISE AWARENESS ON THE VALUE OF FOOD AND FOOD SOVEREIGNTY!

GET HIGHER COST-EFFICIENCY IN WHOLE PRODUCTION!

INSPIRE OTHERS - BECOME A ROLE MODEL!

CONTRIBUTE TO ENVIRONMENTAL AND CLIMATE PROTECTION!



<https://www.interreg-central.eu/STREFOWA>

