

Framework for the assessment of food waste prevention actions

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**The European Commission's
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Joint Research Centre

Content

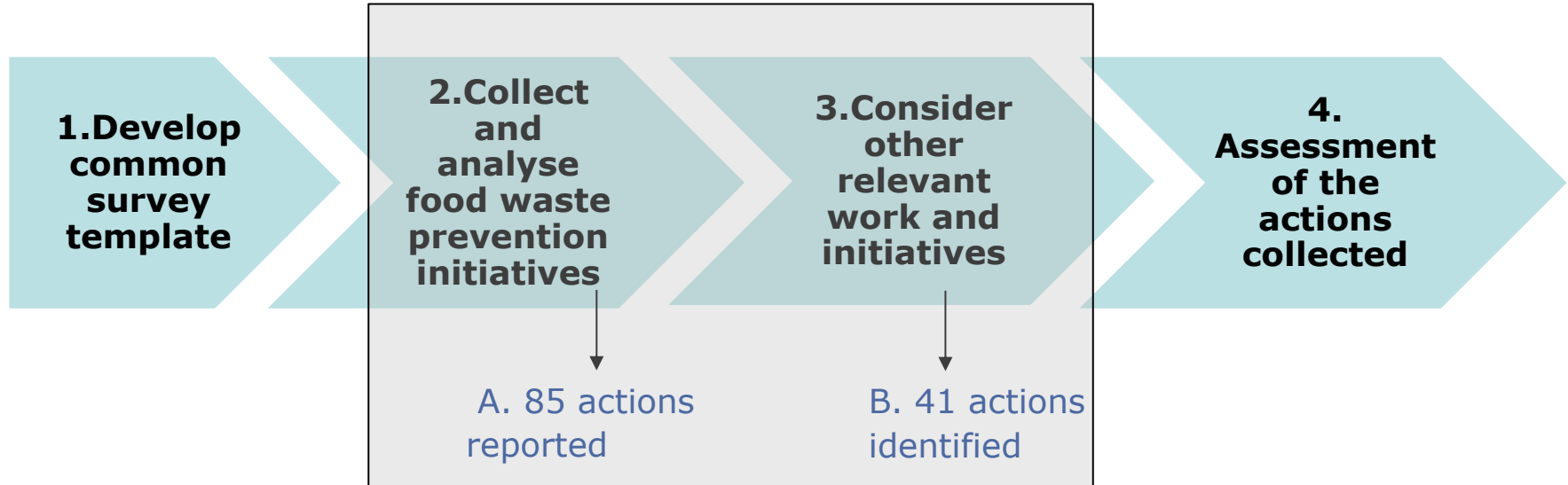
1. Overview of the food waste prevention actions reported

2. Discussion of the evaluation framework

- Classification of the actions
- Choice of indicators
- Proposal for evaluation
- Reporting on results

1. Overview of the food waste prevention actions reported

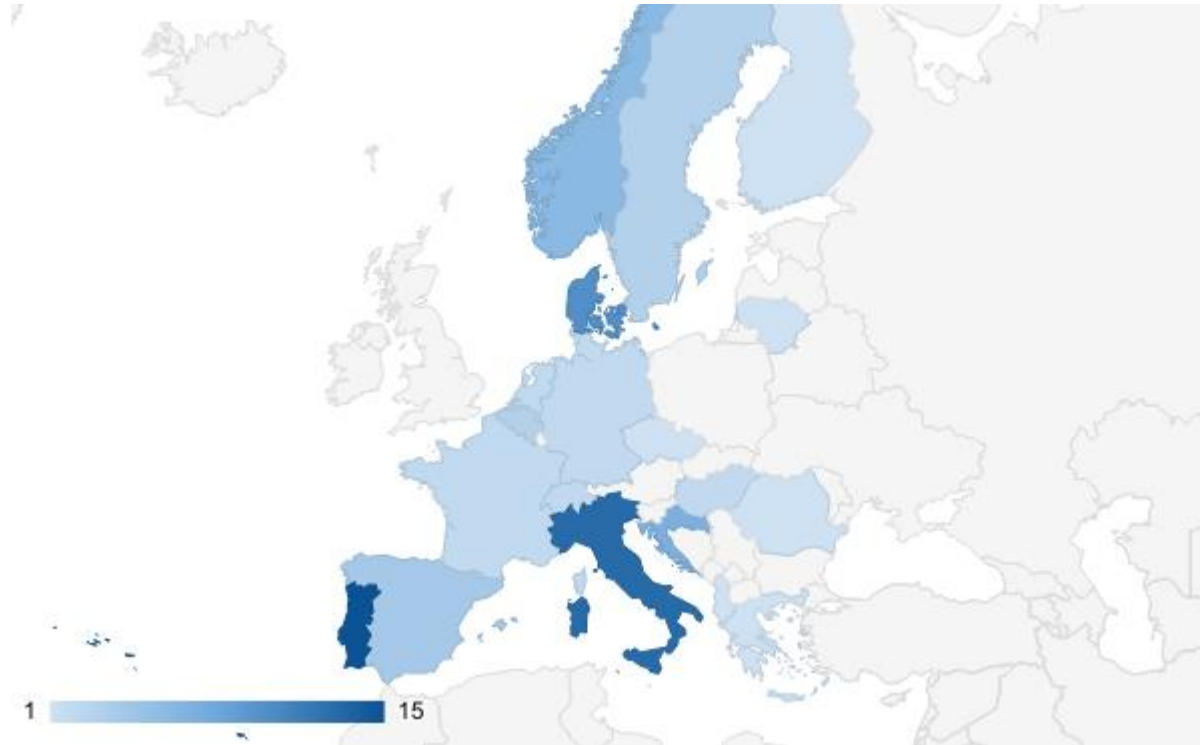
Overview of the activities (pilot process)



To be assessed using the evaluation framework under development

1. Overview of the food waste prevention actions reported

Food waste prevention actions reported



<i>Country</i>	<i>Reported actions</i>
Albania	1
Belgium	3
Croatia	7
Czech Republic	1
Denmark	10
Finland	1
France	2
Germany	2
Greece	1
Hungary	2
Italy	13
Lithuania	1
Netherlands	2
Norway	6
Portugal	15
Romania	1
Spain	4
Sweden	3
Switzerland	2
International	7
Total	85

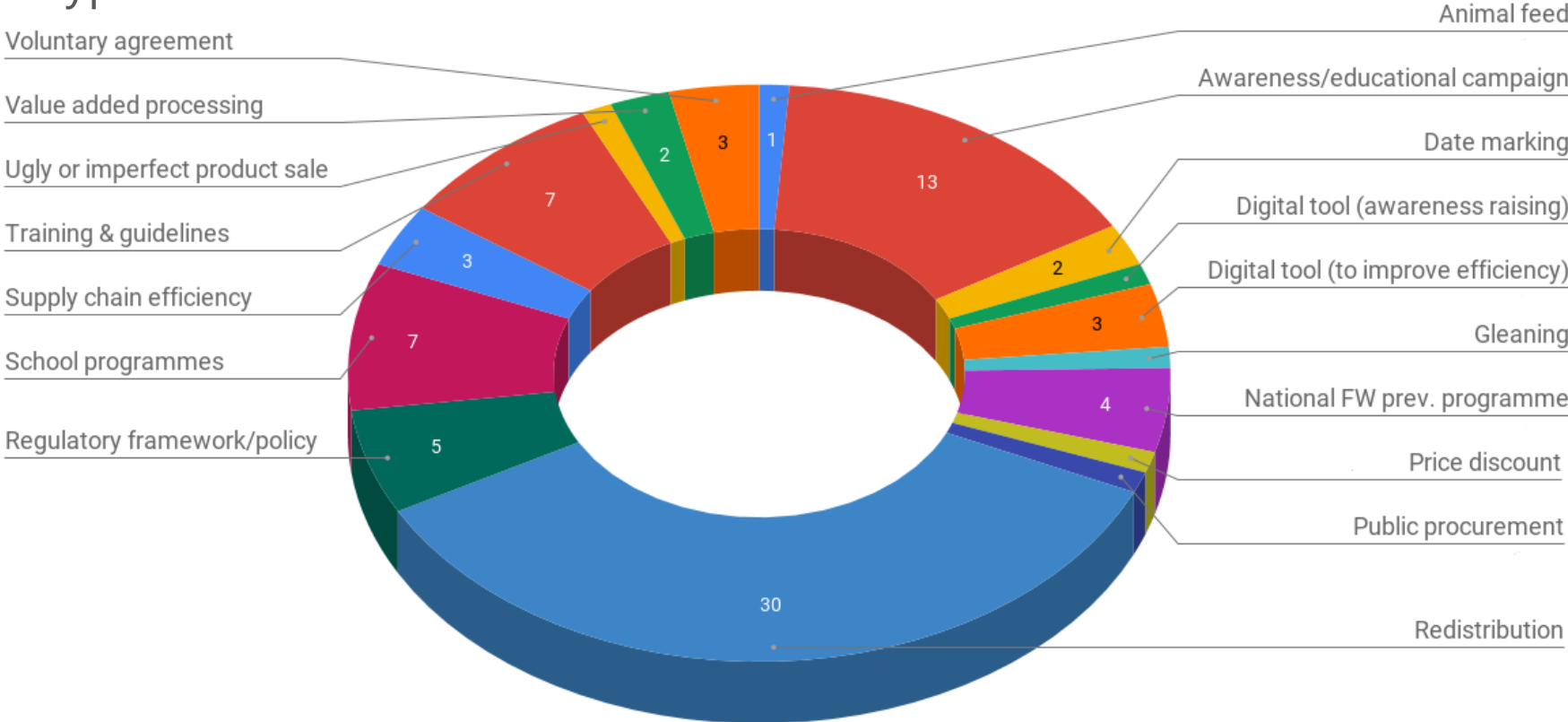
1. Overview of the food waste prevention actions reported

A. Food waste prevention actions reported through the survey

Supply chain stage Action type	Primary production	Manufacturing	Distribution and retail	Food service	Households
Awareness/educational campaign				5	8
Date marking					2
Digital tool (awareness raising)					1
School programmes					7
Packaging, product innovation					
Awards, certification					
Animal feed			1		
Gleaning	1				
Price discount for products close to expiry date			1		
Redistribution	6	9	26	8	3
Ugly or imperfect product sale	1				1
Value added processing	1		1		
Digital tools (to improve supply chain efficiency)				3	
Public procurement				1	
Supply chain efficiency		2		1	
Training & guidelines		1	1	6	
National food waste prevention programme	2	2	2	3	4
Regulatory framework/policy	2	2	5	2	
Voluntary agreement	2	2	2	2	2
Fiscal incentives					

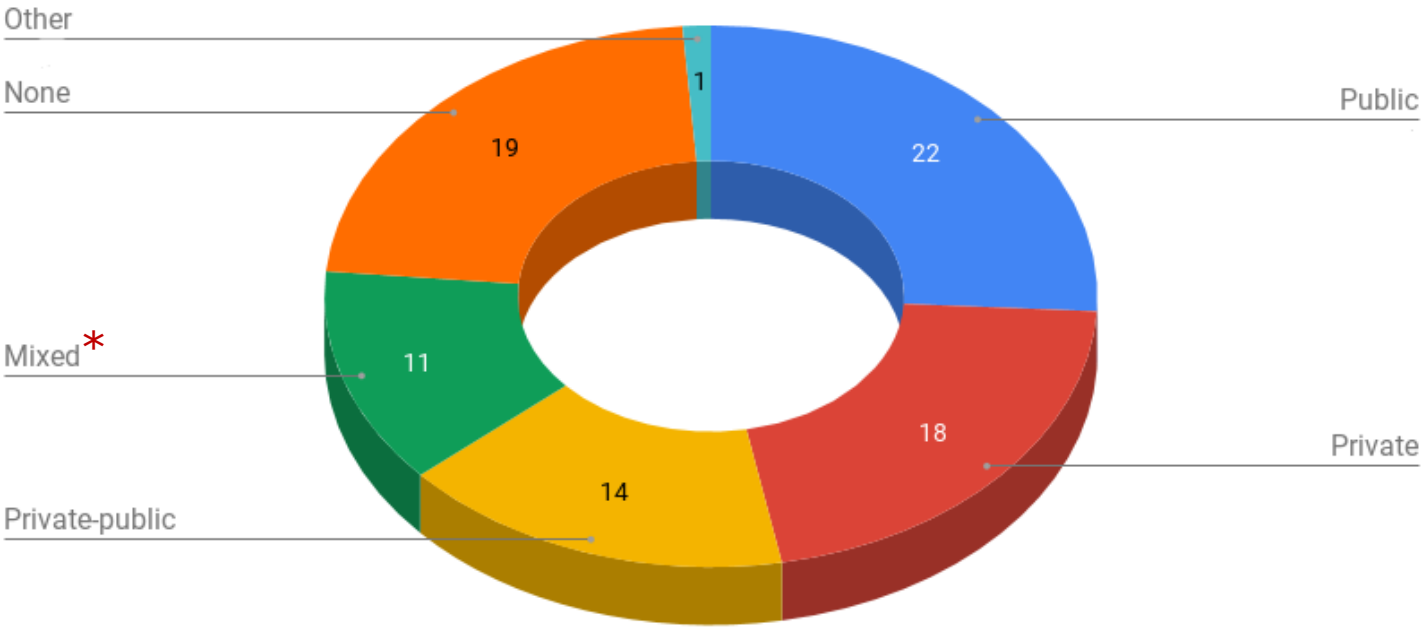
1. Overview of the food waste prevention actions reported

Types of actions



1. Overview of the food waste prevention actions reported

Types of funding



* Mixed funding means a combination of two or more of the options except private + public



2. Discussion of the evaluation framework

Classification of actions

- Action type and subtype
- Tier 1: Reporting food waste prevented (FW quant/ FW not quant)
- Tier 2: Complexity (single action, combined, multiple)
- Tier 3: Frequency (isolated, isolated long lasting, recurring)

Classification of the actions

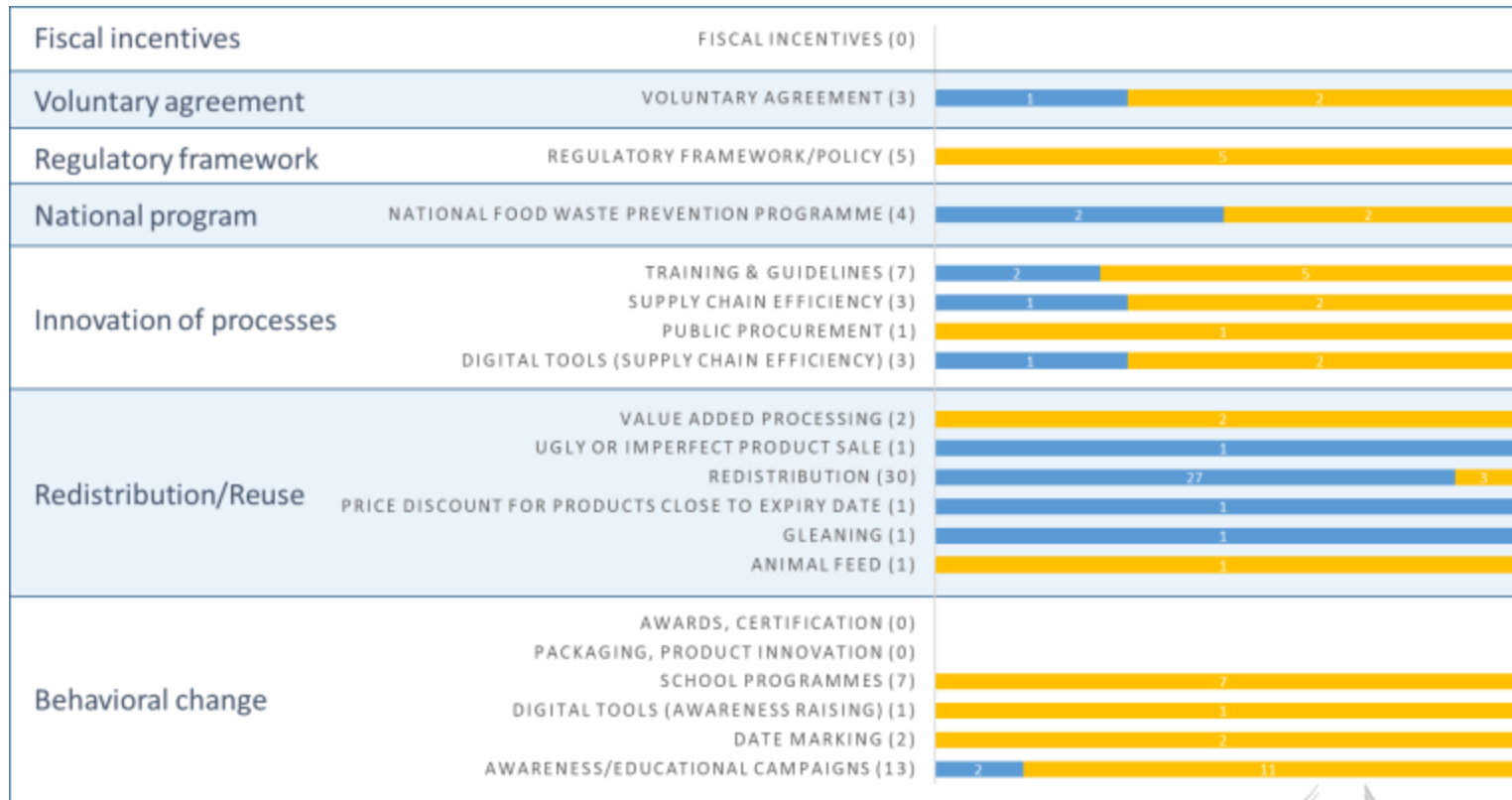
Subtype (based on the mean)

Fiscal incentives	FISCAL INCENTIVES (0)
Voluntary agreement	VOLUNTARY AGREEMENT (3)
Regulatory framework	REGULATORY FRAMEWORK/POLICY (5)
National program	NATIONAL FOOD WASTE PREVENTION PROGRAMME (4)
Innovation of processes	TRAINING & GUIDELINES (7) SUPPLY CHAIN EFFICIENCY (3) PUBLIC PROCUREMENT (1) DIGITAL TOOLS (SUPPLY CHAIN EFFICIENCY) (3)
Redistribution/Reuse	VALUE ADDED PROCESSING (2) UGLY OR IMPERFECT PRODUCT SALE (1) REDISTRIBUTION (30) PRICE DISCOUNT FOR PRODUCTS CLOSE TO EXPIRY DATE (1) GLEANING (1) ANIMAL FEED (1)
Behavioral change	AWARDS, CERTIFICATION (0) PACKAGING, PRODUCT INNOVATION (0) SCHOOL PROGRAMMES (7) DIGITAL TOOLS (AWARENESS RAISING) (1) DATE MARKING (2) AWARENESS/EDUCATIONAL CAMPAIGNS (13)

Type
(based on the aim of the action)

Classification of the actions

Amount of Food waste prevented: FW quantified/ FW not quantified

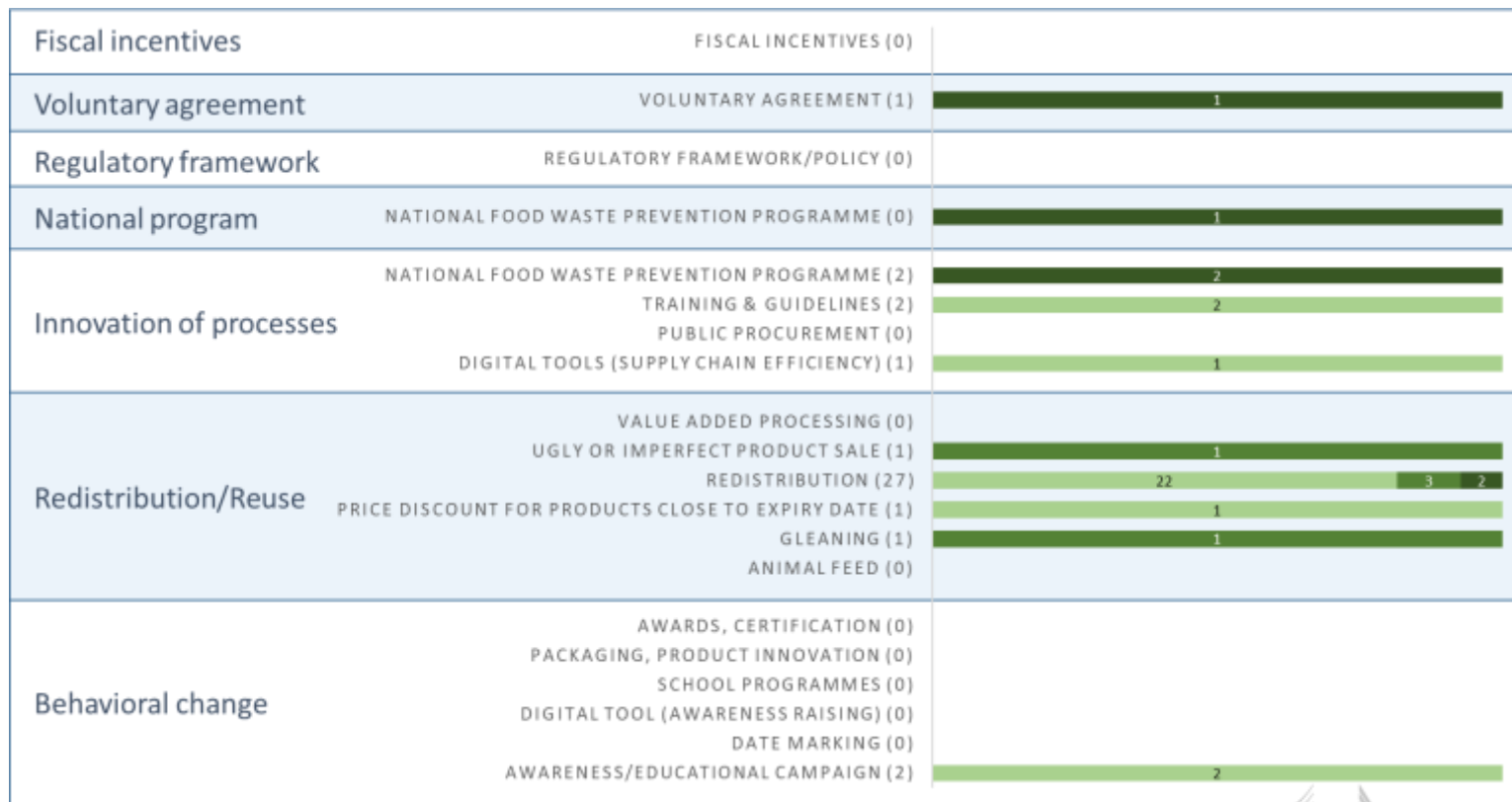


■ Quantifying amount prevented

■ Not quantifying amount prevented

Classification of the actions

FW quantified, complexity



■ Single action type

■ Combined action types

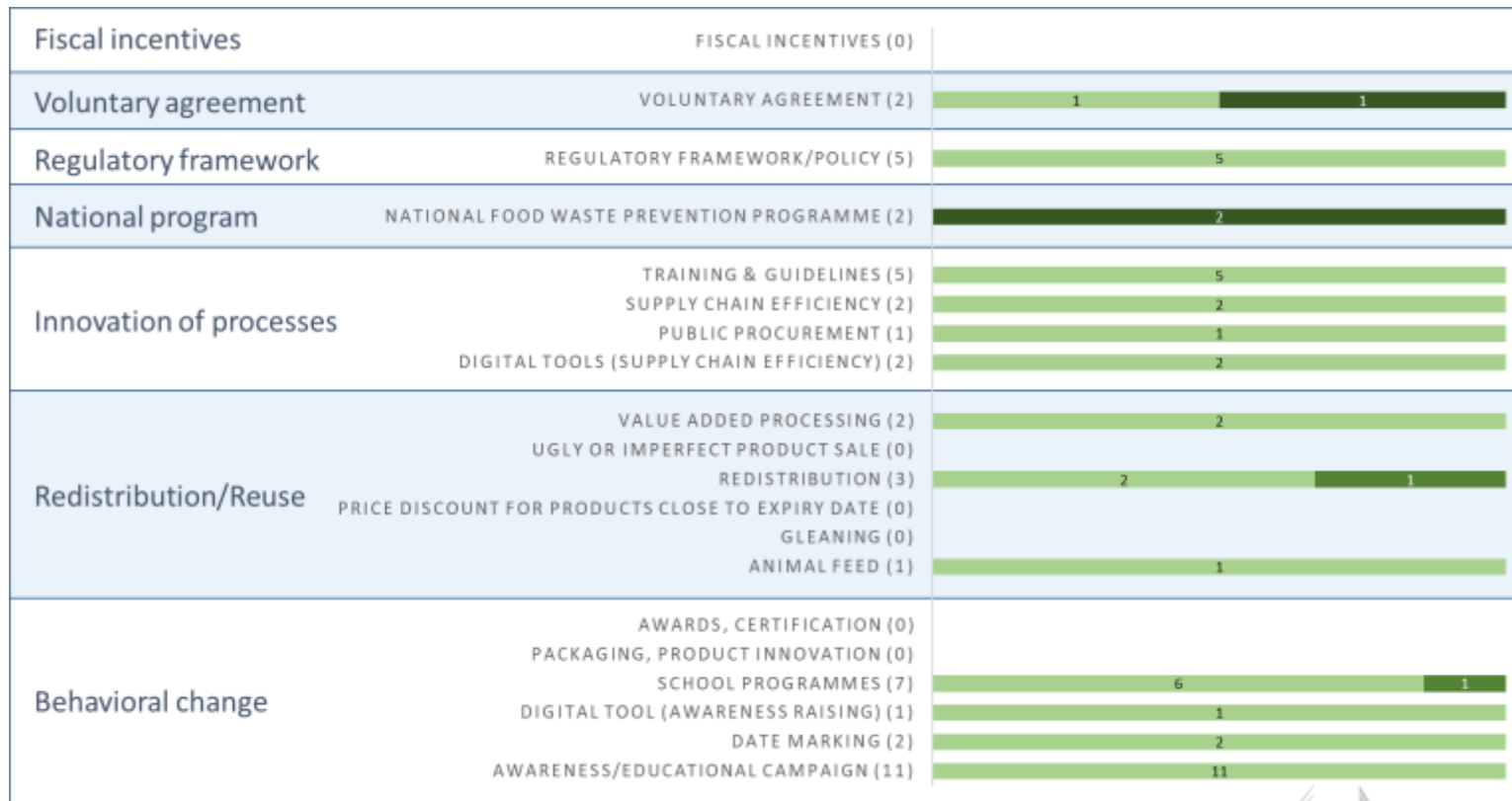
■ Multiple action types



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Classification of the actions

FW not quantified, complexity



■ Single action type

■ Combined action types

■ Multiple action types



European Commission

Classification of the actions

FW quantified, frequency

Fiscal incentives	FISCAL INCENTIVES (0)	
Voluntary agreement	VOLUNTARY AGREEMENT (1)	1
Regulatory framework	REGULATORY FRAMEWORK/POLICY (0)	
National program	NATIONAL FOOD WASTE PREVENTION PROGRAMME (2)	2
Innovation of processes	TRAINING & GUIDELINES (2)	2
	SUPPLY CHAIN EFFICIENCY (1)	1
	PUBLIC PROCUREMENT (0)	
	DIGITAL TOOLS (SUPPLY CHAIN EFFICIENCY) (1)	1
Redistribution/Reuse	VALUE ADDED PROCESSING (0)	
	UGLY OR IMPERFECT PRODUCT SALE (0)	1
	REDISTRIBUTION (27)	26
	PRICE DISCOUNT FOR PRODUCTS CLOSE TO EXPIRY DATE (1)	1
	GLEANING (1)	1
	ANIMAL FEED (0)	
Behavioral change	AWARDS, CERTIFICATION (0)	
	PACKAGING, PRODUCT INNOVATION (0)	
	SCHOOL PROGRAMMES (0)	
	DIGITAL TOOL (AWARENESS RAISING) (0)	
	DATE MARKING (0)	
	AWARENESS/EDUCATIONAL CAMPAIGN (2)	2

■ Recurring action

■ Isolated event - lasting effect

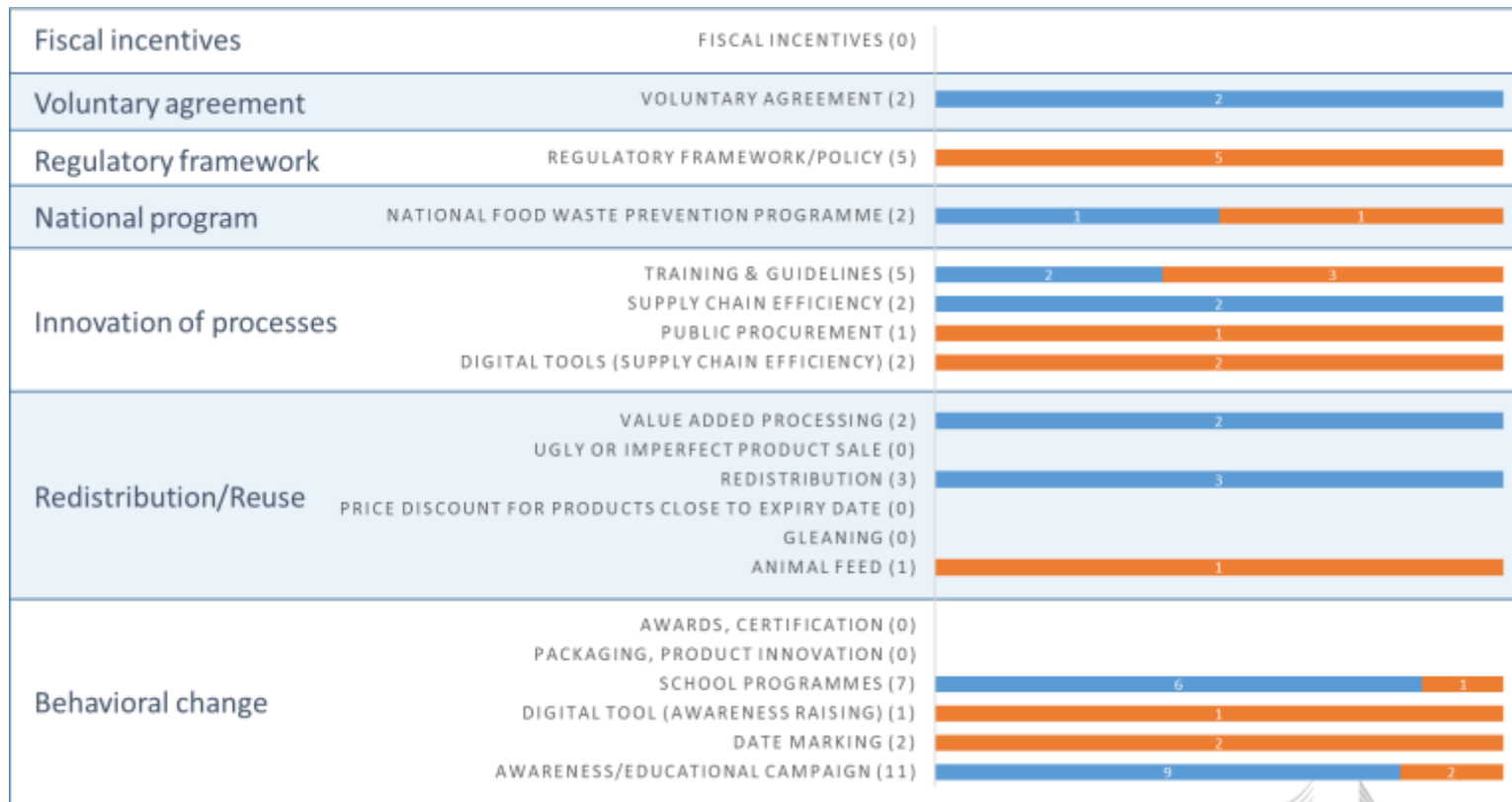
■ Isolated event



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Classification of the actions

FW not quantified, frequency



■ Recurring action

■ Isolated event - lasting effect

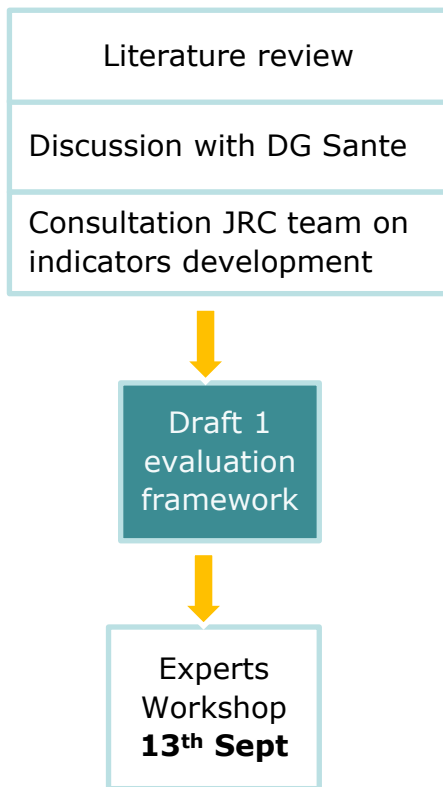
■ Isolated event



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2. Discussion of the evaluation framework

Choice of indicators and evaluation



WORKSHOP PARTICIPANTS

- Hilke Bos-Brouwers, Wageningen UR
- Richard Swannell, WRAP
- Hector Barco, Universidad de Deusto
- Morvarid Bagherzadeh, OECD
- Alba Canovas, Espigoladors
- Aina Stensgård, Østfold Research
- Fabio De Menna, University of Bologna

The goal of the WS was to discuss a draft of the evaluation framework

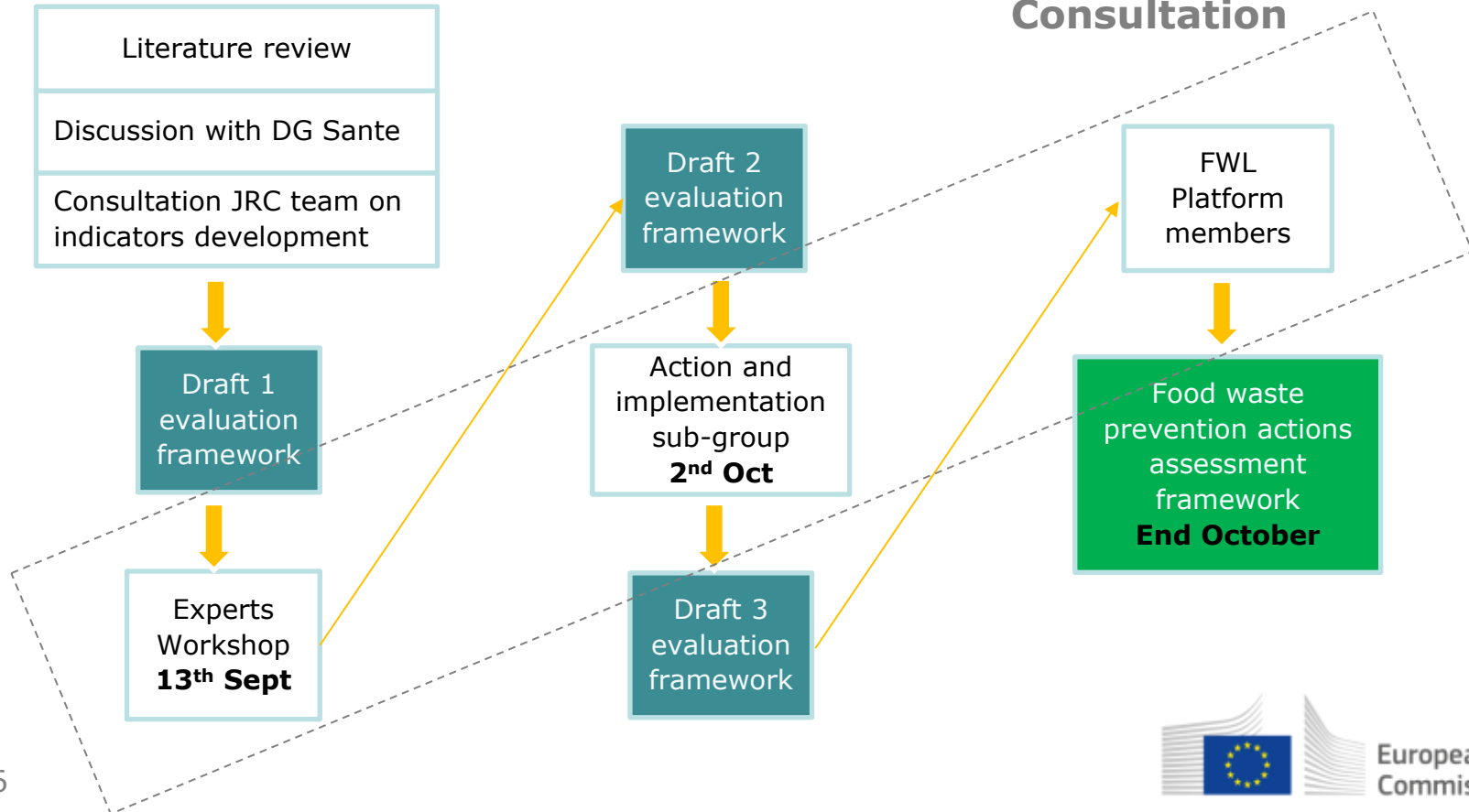
Main points raised:

- Ranking of the actions
- Innovation as indicators
- Transferability/scalability
- Outreach vs behavioural change

2. Discussion of the evaluation framework

Choice of indicators and evaluation

Consultation



Choice of indicators and evaluation

Core indicators

1. Technical Quality
2. Effectiveness
3. Efficiency

Additional indicators

4. Sustainability
5. Transferability & Scalability
6. Inter-sectorial cooperation

Choice of indicators and evaluation

Technical Quality

Overall technical design of the prevention action, reflecting to which extent the prevention action was well planned.

Consideration of the following elements:

- identification of the problem
- definition of the objectives
- design of a strategy based on evidence to achieve those objectives
- definition of an implementation plan
- monitoring system

Choice of indicators and evaluation

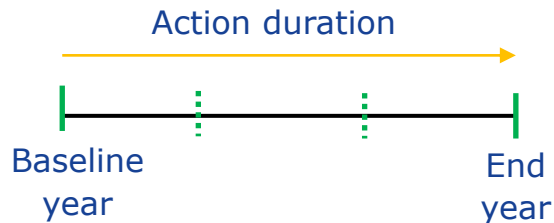
Effectiveness

The degree to which something is successful in producing a desired result; success.

What is the desired result of a food waste prevention action?



Ideally there should be a measurement of food waste against a baseline...



Choice of indicators and evaluation

Effectiveness

- The action is "impossible to quantify" as it is an indirect action
- The action is quantifiable, though the organization has not monitored the amounts of food saved yet (explain why)
- The action has been quantified, though the organization has no ability to estimate or access to data about their baseline (explain such barrier, and report amount of food waste saved, with time and region boundaries explained)
- The effectiveness of the action has been quantified (report % with time and geographic boundaries)

Choice of indicators and evaluation

Efficiency

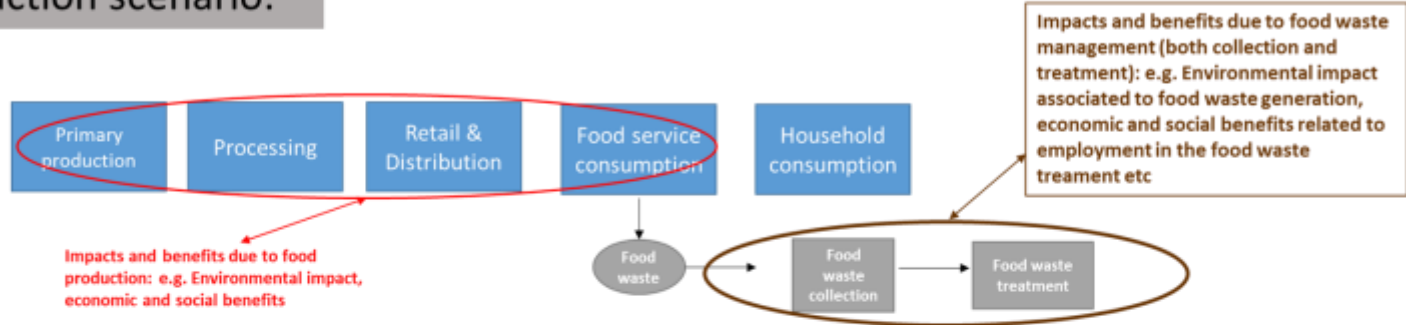
Achieving maximum productivity with minimum wasted effort or expense

$$\text{FW Effic} = \frac{\text{Food waste saved}}{\text{Cost of action}}$$

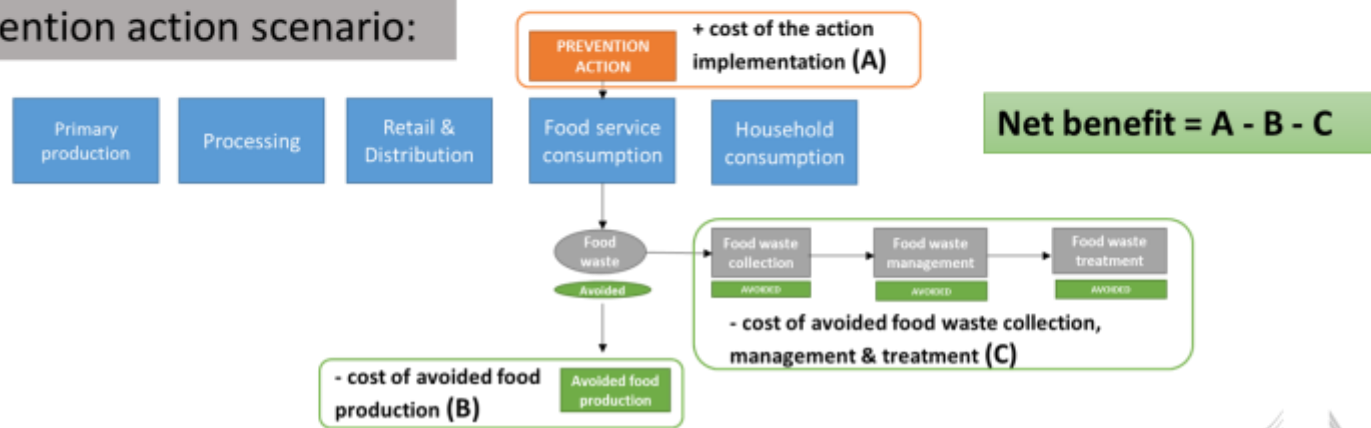
$$\text{Econom Effic} = \frac{\text{Net Benefit}}{\text{Cost of action}}$$

Cost/Environmental Impacts of Food Waste Prevention Action

No action scenario:



Prevention action scenario:



Choice of indicators and evaluation

Efficiency

Achieving maximum productivity with minimum wasted effort or expense

$$\text{FW Effic} = \frac{\text{Food waste saved}}{\text{Cost of action}}$$

$$\text{Econom Effic} = \frac{\text{Net Benefit}}{\text{Cost of action}}$$

$$\text{EI Effic} = \frac{\text{Environmental Impact}}{\text{Cost of action}}$$

$$\text{GHG Effic} = \frac{\text{GHG}}{\text{Cost of action}}$$

Calculator for costs/environmental impacts calculation

Food waste prevention calculator

Action name:
 Country:
 Action type:
 Stage of the supply chain:
 Action cost in €:
 Waste treatment option:

Food waste prevented

Type	Amount
apples	10
bread	10

Select Unit ^{*}

Kg
 Tonnes
 Mega Tonnes

^{*} for liquids assume 1 litre = 1 kg

Action resources

Paper used (leaflets, letters) Approximate number

Transport distances Km

Electricity use kWh

Cost benefit analysis

Cost of action	-1000 €
Savings from avoided treatment	3860 €
Savings from avoided food production	31882 €
Total net savings	34742 €

Environmental savings

Climate Change

Climate Change

Impact of action	-7.54E+02	kg CO2 eq
Impact of avoided treatment	9.20E+03	kg CO2 eq
Impact of saved food	3.10E+04	kg CO2 eq
Total	3.94E+04	kg CO2 eq

Calculator for costs/environmental impacts calculation

Food waste prevention calculator

Action name: Action1 | Country: Sweden | Action type: Food redistribution/donations | Stage of the supply chain: Restaurants | Action cost in €: 1000 | Waste treatment option: Anaerobic Digestion

GO | RESET | [Printer icon] | [Share icon] | [Help icon]

Food waste prevented

Type	Amount	Select Unit
apples	10	<input type="radio"/> Kg
bread	10	<input checked="" type="radio"/> Tonnes
		<input type="radio"/> Mega Tonnes

* for liquids assume 1 litre = 1 kg

Action resources

Paper used (leaflets, letters)	1000	Approximate number
Transport distances	1000	Km
Electricity use	5000	kWh

Cost benefit analysis

Category	Value
saved food	31882
avoided waste treatment	3880
action	-1000

Environmental savings

Single Point

Category	Impact (Pt)
saved food	8.15E-08
avoided waste treatment	2.85E-08
action	-1.55E-09

Single Point

Category	Impact (Pt)
Impact of action	-1.55E-09
Impact of avoided treatment	2.85E-08
Impact of saved food	8.15E-08
Total	1.07E-07

Cost benefit analysis Table

Cost of action	-1000 €
Savings from avoided treatment	3880 €
Savings from avoided food production	31882 €
Total net savings	34742 €

Food costs taken from EUROSTAT (country and stage of FSC specific)

Waste treatment costs taken from Manfredi & Cristobal (2016)

Impacts of food & impacts of waste treatment: Basket of Products (Castellani et al. 2017)

Impacts of actions modelled based on ecoinvent processes

Choice of indicators and evaluation

Efficiency

Achieving maximum productivity with minimum wasted effort or expense

$$\text{FW Effic} = \frac{\text{Food waste saved}}{\text{Cost of action}}$$

$$\text{Econom Effic} = \frac{\text{Net Benefit}}{\text{Cost of action}}$$

$$\text{EI Effic} = \frac{\text{Environmental Impact}}{\text{Cost of action}}$$

$$\text{GHG Effic} = \frac{\text{GHG}}{\text{Cost of action}}$$

$$\text{Social Effic} = \frac{\text{Number of meals}}{\text{Cost of action}}$$

$$\text{Social Effic2} = \frac{\text{Number of Jobs}}{\text{Cost of action}}$$

$$\begin{aligned} &\text{Outreach/Awar/Behavioural change Effic} \\ &= \frac{\text{Number of people}}{\text{Cost of action}} \end{aligned}$$

Choice of indicators and evaluation

Sustainability of the action over time

The ability to be maintained at a certain rate or level.

Does the action have institutional support, an organizational and technological structure and stable human resources?

Is the action economically sustainable?

Does the action provide training of staff in terms of knowledge, techniques and approaches in order to sustain it?

Has a long term strategic plan been developed?

Choice of indicators and evaluation

Transferability and scalability

Able to be transferred or moved from one place or situation to another.

Able to grow or to be made larger.

Transferability



Scalability



Choice of indicators and evaluation

Transferability and scalability

Assess to which extent to which transferability/ scalability has been considered.

Neither transferability nor scalability has not been considered.

Transferability and/or scalability has been considered. The practice has been implemented on local/regional/national level and transferability and/or scalability has been considered but not yet done

The practice has been transferred and/or upscaled

Choice of indicators and evaluation

Inter-sectorial cooperation

Has the action been carried out jointly by several sectors?

Are there specific objectives set related to the actions of partners involved?

Is there a multidisciplinary approach supported by the appropriate stakeholders (e.g. professional associations, public institutions, education)?

Does the action promote increased awareness/behavioral change through the coordination between the public and private sector (e.g. food manufacturing, retailers, HoReCa)?

2. Discussion of the evaluation framework

Reporting on results

FACTSHEET per action including the following information:

Name

Type

Short description (with reference to innovation?)

Stage(s) of the supply chain

Actors

Frequency

Indicators evaluation

Key success factors

Barriers

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