

Tender specifications



TENDER SPECIFICATIONS

Reference: OC/EFSA/BIOHAW/2023/01

Subject: Role of water used in the growing, handling and processing of fruits, vegetables and herbs on the spread of antimicrobial resistance (AMR)

Procurement procedure: Open call (Article 164(1) (a) of the Financial Regulation)

Project/Process code: EPA04.01.04

Budget Line: 3210-RASC

Tender specifications purpose:

1. specify what EFSA will buy under the contract resulting from this procurement procedure;
2. announce the criteria which EFSA will use to identify the successful contractor;
3. guide tenderers in the preparation and sending of their offer;
4. form annex 1 of the contract resulting from this procurement procedure and be binding for contract implementation.

Additional guidance:

Please read the [EFSA Guidance for tenderers](#) available on the EFSA website, designed to assist potential tenderers in their understanding of EFSA procurement procedures.

Provide EFSA with feedback:

If you considered applying to this call for tenders but finally decided not to, please provide EFSAProcurement@efsa.europa.eu with your feedback on the call and reasons for not applying. Feedback will be treated confidentially and will only be used for improving future EFSA procurement calls.



PROCEDURE TIMETABLE

Milestone	Date ¹	Comments
Launch date	15/05/2023	Date Contract Notice is sent to Official Journal
Online webinar	19/06/2023 at 15:00 (CEST)	In order to attend the webinar, potential tenderers must register via the link HERE before 15/06/2023 at 12:00 CEST
Deadline for sending request for clarification to EFSA	10/08/2023 at 14:30 (CEST)	Requests for clarification may only be submitted through the e-Tendering website as described in the Invitation Letter. EFSA is not obliged to reply to clarifications received less than 6 working days before the deadline for submission of offers.
Deadline for EFSA to reply to clarification questions	14/08/2023	
“Receipt Time Limit” - Closing date and time for receipt of offers	21/08/2023 at 14:30 (CEST)	Refer to the Invitation letter and part 3 of these tender specifications regarding how to submit your offer.
Opening session	22/08/2023 at 14:30 (CET/CEST)	Requests to attend the virtual opening session must be made not later than 3 hours in advance of the opening session. Refer to Invitation letter for details.
Notification of evaluation results	Estimated OCTOBER/NOVEMBER 2023	The outcome of the procurement procedure will be communicated to all tenderers exclusively using the e-mail address indicated in their offer. Please check regularly the inbox in question.
Contract signature	Estimated NOVEMBER 2023	

¹ All times are in the time zone of Italy, the country in which EFSA is based.



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PART 1 TECHNICAL SPECIFICATIONS - WHAT DOES EFSA NEED TO BUY THROUGH THIS PROCUREMENT PROCEDURE?

1.1 BACKGROUND

Water used during growing, harvesting and processing of fruits, vegetables and herbs (FVH) has been identified as an important risk factor for contamination of these products. Water reclamation and water reuse is also a top priority area in FVH agricultural production as well as water recirculation, recycling and reuse in industrial processing facilities, and several actions have been proposed for the substantial reduction of water needs. In a recent EFSA opinion of the BIOHAZ Panel on the "role played by the environment in the emergence and spread of antimicrobial resistance (AMR)"² (referred as the AMR Environment Opinion throughout), surface water and potentially wastewater used for irrigation were reported as important sources of AMR, including antimicrobials, antimicrobial resistant bacteria (ARB), and antimicrobial resistance genes (ARGs).

The European Commission (EC) promotes an integrated water management approach, in which **reclaimed water from urban wastewater treatment plants (UWWTPs) represents an alternative water source to alleviate the demand for irrigation water** and is considered a priority innovation and an important topic for the circular sustainable economy³. Expected changes to the water availability in parts of Europe, mainly owing to climate change, clearly point to the risk that in some areas there may be very limited water available for irrigation/washing without considering re-use⁴. Regulation (EU) 2020/741 of the European Parliament and of the Council on minimum requirements for water reuse (Water Reuse Regulation, applicable from 26 June 2023 EC; Commission Notice 2022/C 298/01 Guidelines)^{5, 6} seeks to facilitate and encourage the practice of reusing water for irrigation in agriculture, a sector that can be particularly vulnerable to scarce or intermittent water resources, making the EU food system more sustainable and resilient, while protecting public health and the environment^{6, 7}. Additionally, and based on the current legislation on the hygiene of foodstuffs^{8, 9} **it is also possible to recycle water in the food processing environment** (e.g. using this "recycled" water to wash different lots of foods with the same water), as long as "recycled water used in processing or as an ingredient does not present a risk of contamination". In general, this recycled processing water should be of the same standard as potable water, unless the competent authority is satisfied that the quality of the water cannot affect the wholesomeness of the foodstuff in

² EFSA BIOHAZ Panel, 2021: Role played by the environment in the emergence and spread of antimicrobial resistance (AMR) through the food chain.

<https://efsa.onlinelibrary.wiley.com/doi/epdf/10.2903/j.efsa.2021.6651>

³https://ec.europa.eu/environment/strategy/circular-economy-action-plan_en#:~:text=The%20EU's%20transition%20to%20a,entire%20life%20cycle%20of%20products

⁴ [EEA water resources across Europe](https://www.eea.europa.eu/publications/water-resources-across-europe-confronting). European Environment Agency, 2021.

<https://www.eea.europa.eu/publications/water-resources-across-europe-confronting>

⁵ REGULATION (EU) 2020/741 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL

of 25 May 2020 on minimum requirements for water reuse <https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32020R0741&from=EN>

⁶ COMMISSION NOTICE Guidelines to support the application of Regulation 2020/741 on minimum requirements for water Reuse (2022/C 298/01). [https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52022XC0805\(01\)&from=EN](https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52022XC0805(01)&from=EN)

⁷ Maffettone R., Gawlik B.M., Technical Guidance - Water Reuse Risk Management for Agricultural Irrigation Schemes in Europe, Publications Office of the European Union, Luxembourg, 2022, doi:10.2760/590804, JRC129596.

<https://op.europa.eu/en/publication-detail/-/publication/456e3510-6c74-11ed-9887-01aa75ed71a1/language-en>

⁸ Regulation (EC) No 852/2004 of the European Parliament and of the Council of 29 April 2004 on the hygiene of foodstuffs <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex%3A32004R0852>

⁹ Consolidated text 2021/03/24: <https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:02004R0852-20210324&from=EN>



its finished form". "If water is contaminated during washing and then reused, it can be a vehicle for cross-contamination. Therefore, good practices ensuring and maintaining adequate water quality (e.g., by applying water treatments and controlled use of water disinfectant agents) should be followed"¹⁰.

However, as indicated above, irrigation of crops with reclaimed wastewater effluents and water reuse/recycling in food industry (ARB/ARGs could be accumulated in process water) may pose a risk of contamination of fresh FVH with ARB and/or ARGs^{2,11}. ARB/ARGs in wastewater can originate from both hospital and municipal wastewater, indicating that transfer of ARB of human origin from wastewater, sewage sludge, or reclaimed water to fresh produce is a potential route of transmission back to humans. Bacteria resistant to high priority critical important antibiotics have been identified in reclaimed water used for irrigation² but the number of studies focusing on the presence of these ARB/ARGs in the irrigation and processing water, as well as on the FVH produced and/or processed in the EU are, despite increase, still quite scarce^{12,13}.

Due to selection pressures and microbial interactions favored in the UWWTPs/reclamation facilities and through the process water reconditioning strategies, there is a potential risk of emergence and spread of ARB and their associated ARGs. The concern on spread of ARB/ARGs in FVH through irrigation with reclaimed water and use of recirculated/recycled water in the food processing (to simplify, we will just use reused processing water¹⁴ throughout the document) is important also knowing that prolonged exposure to sublethal concentrations of antimicrobials potentially present in the reclaimed water and biocides frequently used in the food industry, may lead to the selection of bacteria with increased resistance to antimicrobials. However, there is still a lack of information on the efficacy of the most commonly used water reclamation and reconditioning treatments for the mitigation of the spread of ARB and ARGs.² To avoid any potential risk linked to water reuse, safe water reclamation and reconditioning strategies have to be implemented and monitored. The Annex II of the Water Reuse Regulation (EU) 2020/741 refers to the risk management measures in relation to reclaimed water quality and monitoring and includes AMR among the additional requirements that could be considered ((Annex II, (B) 6(a))^{5,6}.

Although monitoring and surveillance activities for ARB and/or ARGs are not mitigation options as such, conducting monitoring studies targeting AMR in the environment of specific production sectors (e.g., targeting irrigation water at pre-harvest and process water at post-harvest) can generate relevant data to prioritise future preventive actions. To do this surveillance, there would be a need to optimise suitable, sensitive and readily standardized culturomics/genomics-based detection methods for currently important and emerging ARB/ARGs². This is relevant considering that many of those ARB/ARGs could be in low levels in these types of samples.

This call intends to generate data that can help to fulfill data gaps identified in the EFSA AMR Environment Opinion², further discussed at the "tackling AMR in the food-producing environment" session of the ONE – Health, Environment, Society – Conference 2022¹⁵. It will also complement an ongoing tender (OC/EFSA/BIOCONTAM/2021/02: "Microbiological

¹⁰ Commission notice on guidance document on addressing microbiological risks in fresh fruits and vegetables at primary production through good hygiene. [https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52017XC0523\(03\)](https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52017XC0523(03))

¹¹ EFSA supporting publication, 2017: <https://efsa.onlinelibrary.wiley.com/doi/epdf/10.2903/sp.efsa.2017.EN-1151>

¹² Slobodiuk et al., 2021. Int. J. Environ. Res. Public Health. doi.org/10.3390/ijerph182111046

¹³ Brunn et al., 2022. Front. Sustain. Food Syst. doi.org/10.3389/fsufs.2022.824714

¹⁴ Safety and Quality of Water Used in Food Production and Processing <https://www.fao.org/3/ca6062en/ca6062en.pdf>

¹⁵ <https://www.one2022.eu/programme/one-life/tackling-antimicrobial-resistance-in-food-producing-environments>



hazards associated with the use of water in the post-harvest handling and processing operations of fresh and frozen fruits, vegetables and herbs (ffFVH)¹⁶ focused on gaining insights on the characteristics of the water and practices followed by the industry to maintain water quality used during the post-harvest handling and processing operations for fresh and frozen FVH.

This call is based on EFSA Founding regulation¹⁷ and EFSA's 2023 Draft Work Programme for grants and operational procurements as presented in Annex XII of the Programming Document 2023 – 2025, available on the EFSA's website¹⁸.

1.2 OBJECTIVES

The aim of this procurement procedure is to conclude a direct contract for the execution of specific tasks over a clearly defined period (36 months) as defined in these tender specifications.

The **overall objective** of the contract resulting from this procurement procedure is to gain insights on the occurrence/variety of ARB and resistance determinants (referred to as ARGs in this document, covering resistance genes, plasmids and/or total resistome) both of **reclaimed and reused processing water** used during the preharvest and post-harvest handling and processing operations for FVH, as well as of the **food products** themselves, in order to help to assess the role of this water in the spread of ARB and ARGs to FVH in different European regions.

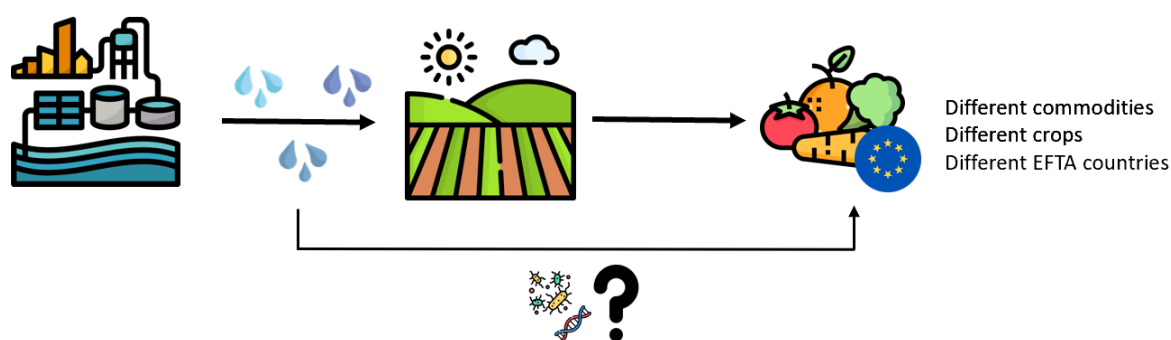
The expected outcomes of the studies should help to identify different potential links between:

- a) the occurrence of ARB/ARGs (e.g. load, variety) present in the **reclaimed water used for irrigation** of FVH in the fields (including water subjected to different treatments in the UWWTPs/reclamation facilities), and accordingly the ARB/ARGs present in the FVH (different commodities representing, different types of crops, as explained below, see Table 1) irrigated with the reclaimed water in different EFTA countries. **The studies should be set up in a way that they could help to answer the following questions: Is there spread of ARB/ARGs through reclaimed water used for irrigation? Are there differences depending on the UWWTPs/ reclamation treatments used?, depending the load of the incoming effluents at the UWWTPs/reclamation providing the water?, depending on the types of commodities/types of crops/irrigation methods, regions, etc.?**

¹⁶ <https://etendering.ted.europa.eu/cft/cft-display.html?cftId=9577>

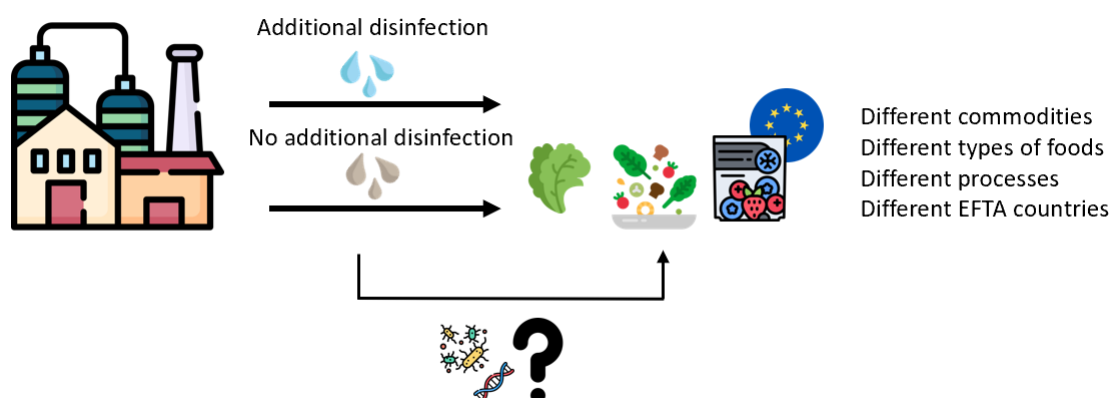
¹⁷ Regulation (EC) 178/2002 of the European Parliament of the Council of 28 January 2002 laying down the general principles and requirements of food law, establishing the European Food Safety Authority and laying down procedures in matters of food safety, as amended by Regulation (EU) 2019/1381 of the European Parliament and of the Council of 20 June 2019 on the transparency and sustainability of the EU risk assessment in the food chain.

¹⁸ <https://www.efsa.europa.eu/sites/default/files/2022-01/amp2325.pdf>



(icons source, <https://www.flaticon.com/>)

- b)** the occurrence of ARB/ARGS (e.g., load, variety) in the **reused processing water** used for the handling and/or processing of FVH in the food processing plants (e.g., washing, washing, rinsing, freezing, etc.) and accordingly the ARB/ARGS present in the FVH (different commodities, different type of foods, different processes as explained below, see Table 1) processed with this recycled water in different EU/EFTA countries, considering both, if the reused water has been or not subjected to disinfectant treatments. **The studies should be set up in a way that they could help to answer the following questions: Is there spread of ARB/ARGS through re-using/recycling water for handling and/or processing of the FVH? Are there differences between disinfection treatments used?, FVH processing plants and their sizes?, FVH processing operations?, types of commodities/types of foods, regions, etc.?**



(icons source, <https://www.flaticon.com/>)

To achieve this, **three specific objectives were defined:**

Objective 1. Optimization of suitable sensitive and readily standardised culturomics/genomics-based detection methods for ARB/ARGS in the FVH production sector at pre- and post-harvest including analysis of samples of reclaimed/reused processing water and the food products themselves.

This objective is in line with the recommendations provided in the EFSA AMR Environment Scientific Opinion² to inform future **EU research priorities** in order



to fill identified data gaps influencing the assessment of the food chain-related AMR risks posed by the environment:

- **“Comprehensive, integrated studies, linked to One Health initiatives and harmonised environmental AMR monitoring strategies by means of specific focal environmental monitoring or surveillance points are needed to establish the relevance of environmental sources for the introduction of AMR in food producing systems. Priority sectors would include plants-based food and aquaculture sector, due to the paucity of available studies”.**

And within this topic area, one of the immediate priorities recognized, was:

- **“to optimise suitable sensitive and readily standardised culturomics/genomics-based detection methods for currently important and emerging ARB/ARGs”.**

Objective 2. Generation of new data on the **occurrence and potential spread of ARB and ARGs in FVH** as a potential result of the **use of reclaimed water for irrigation** in pre-harvest and other activities at primary production (e.g. during harvest) in the EU/EFTA zone.

Objective 3. Generation of new data on the **occurrence and potential spread of ARB and ARGs in FVH** as a potential result of the use of **reused processing water** in post-harvest processing activities in the EU/EFTA zone.

Both **Objectives 2 and 3** are in line with the recommendations done in the EFSA AMR Environment Scientific Opinion²: to inform future **EU research priorities** mentioned above:

- **“Comprehensive, integrated studies, linked to One Health initiatives and harmonised environmental AMR monitoring strategies by means of specific focal environmental monitoring or surveillance points are needed to establish the relevance of environmental sources for the introduction of AMR in food producing systems. Priority sectors would include plants-based food and aquaculture sector, due to the paucity of available studies”.**
- **“Long term longitudinal cohort studies on emerging and more widely established high priority ARB/ARGs, using advanced but standardised quantitative microbiology and genomic/metagenomic based epidemiological methodologies in different representative countries within the EU, as well as studies involving environmental exposure of food animals in order to assess the biological relevance of different aspects of environmental contamination.**
 - **Within this topic area, the most urgent priority is to focus on case studies on the occurrence and dissemination of emerging bacteria with highest priority ARGs (e.g., relating to**



carbapenems, tigecycline, isoxazolidinones, colistin) within food production environments and their dissemination into the wider/natural environment via waste, run-off, etc.

Within both Objectives 2 and 3, it will be relevant also to assess which would be the effect of different water treatments (eg. on reduction of ARB/ARGs load, variety of ARB/ARGs) during the reclamation processes and along the FVH processing lines, in order to identify, if possible, the most suitable **water disinfection/decontamination technologies to diminish/eliminate the AMR hazards** (ARB/ARGs) in reclaimed water intended for irrigation and other harvest-related activities (Objective 2) and reused processing water used in the post-harvest handling and/or processing of FVH (Objective 3). This is in line with the recommendations done in the EFSA AMR Environment Scientific Opinion²: to inform future **EU research priorities** as mentioned above:

- **“Effective and practical mitigation methods should be investigated...”**
 - *Immediate priorities within this work should be assessing and developing validated methods for **disinfection/decontamination aimed at highest priority ARB in the production environment, treatment of wastewater used for fertilisation/irrigation or processing crops.***

The specific objectives, subobjectives and their related tasks are thoroughly described in subsections 1.2.1-1.2.4. below.

For different objectives/subobjectives/tasks, different variables need to be considered. Some of these variables and the nomenclature chosen to refer to them along the current document are described below:

Table 1: Variables to be considered for different objectives

Variables	
Countries:	<ul style="list-style-type: none"> • EU/EFTA countries
ARB/ARGs:	<ul style="list-style-type: none"> • ARB/ARGs of public health importance: focusing mainly on those of highest priority and others (e.g included in on-going monitoring) as indicated in Objective 1, section 1.2.1.1.
Samples:	<ul style="list-style-type: none"> • Fruits, vegetables, herbs (FVH) <ul style="list-style-type: none"> ◦ irrigated with reclaimed water ◦ handled/processed with reused processing water • Water: <ul style="list-style-type: none"> ◦ water collected during different steps along the UWWTPs/reclamation process; ◦ reclaimed wastewater intended for irrigation or other primary activities (e.g. washing during harvest) collected at the fields; ◦ processing water reused in the FVH handling and/or processing food industry (eg. recirculated and/or recycled water⁴, continuously used in the processing for a defined period of time - used several times to wash different loads of products). This water could be subjected to different disinfection treatments.
Compartments:	<ul style="list-style-type: none"> • UWWTPs/reclamation facilities, growing fields, handling/processing plants.



Crop types:	<ul style="list-style-type: none"> • Root crops, low-ground leaves crops (e.g. <25 cm or >25 cm above low-ground crops), above-ground high-growing crops (fruit trees, if considered that they can be in contact with the reused water);
Commodities:	<ul style="list-style-type: none"> • e.g., lettuce, strawberries, tomatoes, melons, etc.;
Type of food:	<ul style="list-style-type: none"> • whole fresh, fresh cut, frozen;
Processing operations:	<ul style="list-style-type: none"> • Washing, washing, rinsing, freezing, etc.
Water treatments in UWWTPs/reclamation facilities:	<ul style="list-style-type: none"> • E.g., secondary treatment/tertiary treatment; membrane filtration, disinfection, UV-radiation, ozonisation, combinations of different treatments, etc.;
Water treatments in FVH processing plants:	<ul style="list-style-type: none"> • Water treatments processing plants: e.g., disinfection with chlorine, peroxyacetic acid, chlorine dioxide, UV-light, filtration, combinations of different treatments, etc.;
Detection methods:	<ul style="list-style-type: none"> • Culture-based combined with antimicrobial susceptibility testing (AST) and/or whole genome sequencing (WGS), PCR-based, metagenomics, others see Objective 1 (section 1.2.1.).
Sampling points:	<ul style="list-style-type: none"> • Selected points along the processes (reclamation steps, points of irrigation, different parts of the field, different steps during the food processing, etc.).
Sampling times:	<ul style="list-style-type: none"> • Different days (e.g. to detect stational differences), different times of the day, etc.

The description of the study design made by the tenderer(s) in their offer to achieve the Objectives 1-3 described below will be discussed at the kick-off meeting of the project in order to fine tune it. Accordingly, Task 1 should be performed:

- **Task 1: To fine tune the study design** (e.g. detection methods to be tested, target bacteria/genes, countries, compartments-UWWTPs/reclamation facilities, fields, handling/processing plants, commodities, types of crops and foods, water treatments, number of samples, sampling points, sampling times, commodities, etc.) proposed by the tenderers in their offer after discussion at the kick-off meeting of the project, justifying the rationale behind the selections.

1.2.1 Objective 1

Objective 1. Optimization of suitable sensitive and readily standardised culturomics/genomics-based detection methods for ARB/ARGs in the FVH production sector at pre- and post-harvest including analysis of samples of reclaimed/reused processing water and the food products themselves.

This objective is needed to be able to perform the field studies proposed in Objective 2 and 3. The **methods to be applied**, selected among those available or new developed, **should be previously optimised to be able to detect, in the type of samples under study, important and emerging ARB/ARGs** (see 1.2.1.1.) that could be of low prevalence in the reclaimed wastewater/reused processing water and FVH samples to be analysed (**Task 2-4** cited below).

The description of the study design made by the tenderer in their offer to achieve Objective 1 (methods to be tested, target ARB/ARGs) will be discussed at the kick-off meeting in order to fine tune it (**Task 1**) and agreed with EFSA as explained above.



Considering the pros and cons of different detection methods and the current lack of harmonization to investigate water^{19,20,21} and FVH samples^{2,22} the methods to be used and accordingly optimized **should be a combination of culture and molecular methods as described** in the following tasks:

- **Task 2. To optimize culture-dependent detection methods** complemented with the phenotypic and/or genotypic characterization of the strains and resistance traits (e.g., antimicrobial susceptibility testing, whole genome sequencing analysis) to be applied in Objectives 2 and 3 to detect specific ARB/ARGs of highest priority for public health selected among those proposed below (see 1.2.1.1.). Protocols to be used for objective 2 and 3 should be developed.
- **Task 3. To optimize the PCR-based detection methods** (e.g., qPCR, ddPCR, HT-PCR, etc.) to be applied in Objectives 2 and 3 to detect specific ARB/ARGs of highest priority for public health selected among those proposed below (see 1.2.1.1.). Protocols to be used for objective 2 and 3 should be developed.
- **Task 4. To optimize metagenomics-based detection methods** (e.g., targeted metagenomics) to be applied in Objectives 2 and 3 to be able to characterize the resistome of the samples to be analysed. Protocols to be used for objective 2 and 3 should be developed.

The use of different methods will allow not only to detect the ARB/ARGs but to provide some information on their abundance and variety. The use of additional new developed methods to complement or substitute some of the molecular methods mentioned above is possible if well justified (e.g. accuracy, sensitivity, etc.).

1.2.1.1: Bacteria suitable to be tested

Depending on the context (clinical, veterinary, food, environment, One Health, new antimicrobials needed, etc.), there have been several prioritizations of bacteria of “public health importance” that could be suitable to be targeted for the current study considering a One Health approach.

The WHO priority pathogens list for research and development (R&D) of new antibiotics²³ (currently under revision), includes “a catalogue of 12 families of bacteria that pose the greatest threat to human health” for which the need to develop new antimicrobials drugs is considered critical, of high priority and medium priority. Based on this list and other information available, in the EFSA AMR Environment scientific opinion² the **antimicrobial-resistant bacteria identified as of highest priority for public health in food-producing environments** were the following:

Group 1: Species, serotypes or lineages associated with infection and resistant to antimicrobials of choice for the treatment of serious bacterial infections or to last resort antibiotics.

¹⁹: Lira et al., 2020. Sci Rep. doi: 10.1038/s41598-020-65031-y

²⁰: Franklin et al., 2021. J Microbiol Methods. doi: 10.1016/j.mimet.2021.

²¹: Liguori et al., 2022. Environ Sci Technol. doi: 10.1021/acs.est.1c08918.

²²: Chelaghma et al., 2021. Microorganisms. doi: 10.3390/microorganisms9122534

²³ <https://www.who.int/news/item/27-02-2017-who-publishes-list-of-bacteria-for-which-new-antibiotics-are-urgently-needed>



- Non-typhoidal *Salmonella enterica* serovars resistant to 3rd- generation cephalosporins, carbapenems, or fluoroquinolones.
- *Campylobacter* spp. resistant to macrolides, fluoroquinolones, aminoglycosides or carbapenems.
- Enterobacterales other than *Salmonella* spp. resistant to 3rd-, 4th- and 5th- generation cephalosporins, carbapenems, colistin, plazomicin, fluoroquinolones or glycylycylines.
- *S. aureus* resistant to methicillin, 5th-generation cephalosporins, glycopeptides, oxazolidinones, lipopeptides or glycylycylines.
- *Enterococcus faecium* and *E. faecalis* resistant to glycopeptides or oxazolidinones, lipopetides or glycylycylines.
- *Acinetobacter baumannii* and *Pseudomonas aeruginosa* resistant to carbapenems and colistin.

Group 2: organisms without recognised potential of causing infection, commensal or environmental bacteria, with mobile resistance genes to last resort antibiotics:

- Enterobacterales, *Pseudomonas* spp., *Acinetobacter* spp., *Aeromonas* spp. and *Vibrio* spp. with mobile resistance genes to last resort antibiotics
- *Enterococcus* spp. with mobile resistance genes to last resort antibiotics
- *Staphylococcus* spp. with mobile resistance genes to last resort antibiotics

According to the framework for standardized methods and quality control for the AMR monitoring in water environments proposed by Liguori et al. 2022²¹, the bacteria that resulted more indicated for that monitoring were *E. coli*, *Enterococci*, *Enterobacteriaceae*, *Pseudomonas aeruginosa*, *Acinetobacter baumannii*, *Salmonella* spp. and *Aeromonas* spp.

E. coli is included among the bacteria that shall be monitored to assess the water quality within the Water Reuse Legislation⁵, and isolates recovered within this monitoring could be available for further AMR characterization.

Also in the AMR Environment opinion², some genes were considered as of highest priority ARGs, e.g., those conferring resistance to carbapenems (e.g. *bla*_{VIM}, *bla*_{NDM}, *bla*_{OXA-48-like}, *bla*_{OXA-23-like}), extended-spectrum cephalosporins (e.g. *bla*_{CTX-M}, AmpC genes), plazomicin (*armA*), colistin (*mcr* genes), methicillin (*mecA*, *mecC*), glycopeptides (*vanA*) and oxazolidinones (*cfp*, *optrA*), all of them having been described as present in food production environments. Other genes as *sul1* and *intI1* are usually included as target genes for monitoring of environmental samples due to their ubiquity and strongly association with anthropogenic sources²¹.

Taken into account all the above and the gaps on information on the occurrence of some of these ARB/ARGs in irrigation/processing water and in the FVH themselves, **we would recommend to give priority to include in the studies to be performed within this tender at least those bacteria of highest priority for public health in food-producing environments** including, resistant *Klebsiella*, *Salmonella*, *E. coli*, *Enterococci*, *Acinetobacter*, MRSA, *Pseudomonas aeruginosa*, and ESBL/CPEs producers. Other isolates previously obtained in the frame of on-going monitoring (e.g. *E. coli* from the Water reuse Legislation⁵) could be included if they fulfill the requirements mentioned in the tasks description below and those defined in section 1.5, and permissions for their further use are granted.

1.2.2 Objective 2



Objective 2. Generation of new data on the occurrence and potential spread of ARB and ARGs in FVH as a potential result of the use of reclaimed water for irrigation in pre-harvest and other activities at primary production (e.g. during harvest).

To achieve **Objective 2** it will be necessary to perform field case studies, including different scenarios in the UWWTPs/reclamation facilities and FVH growing fields (Figure1). The tenderer(s) will need to engage with and have access to those compartments to take the samples needed to perform the studies for a wide range of FVH commodities and for a representative sample of the different EU/EFTA countries as described below. Samples collected in previous studies can be included in these studies if they comply with the requirements mentioned in the tasks described below and those defined in section 1.5, and permissions for their further use in this study are granted.

The description of the study design made by the tenderer in their offer to achieve Objective 2 (e.g., countries, UWWTPs/reclamation facilities, growing fields, commodities, number of samples, sampling points, sampling times, etc.) will be discussed at the kick-off meeting in order to fine tune it (**Task 1**) as indicated above.

The field studies to be performed shall cover **occurrence of ARB/ARGs of high priority for public health** selected among those proposed in Objective 1 (see 1.2.1.1.).

The **Objective 2** will cover three different aspects included into the following subobjectives (Sos 2a-c):

- **SO2a**, to look for the occurrence and potential reduction of ARB/ARGs in the wastewater/reclaimed water, intended to be used for irrigation, at the UWWTPs/reclamation facilities after different water treatments during the reclamation process.
- **SO2b**, to look for the occurrence of ARB/ARGs in the reclaimed water used for the irrigation or other activities at primary production (e.g. during harvest) of FVH.
- **SO2c**, to look for the occurrence of ARB/ARGs in the FVH irrigated with reclaimed water.

1.2.2.1 Subobjective 2a

SO2a, to look for the occurrence and potential reduction of ARB/ARGs in the wastewater/reclaimed water, intended to be used for irrigation, at the UWWTPs/reclamation facilities after different water treatments during the reclamation process.

Differences in the types of treatments applied during the wastewater/reclamation treatment (primary, secondary, tertiary, etc) affect the ARB/ARGs presence in the treated effluents, but different studies show mixed findings^{2,12,19,24}. Among the conclusions of the AMR Water Environment Opinion², it was underlined that some advanced wastewater treatment technologies such as membrane filtration or reverse osmosis systems have been recognised as an effective approach to remove ARB/ARGs in full-scale UWWTPs and have the added advantage of removing antimicrobial residues. There is still a need to generate data to be able to compare the effect on AMR (ARB/ARGs load, variety) of different treatments applied in

²⁴ Bairán et al. 2020. Int J Environ Res Public Health. doi: 10.3390/ijerph17238866.



different moments of the wastewater treatment/reclamation process, in order to identify the most suitable methods to reduce AMR (see 1.2.3).

Accordingly the Task 5 defined below should be performed.

- **Task 5. To generate data on the occurrence of ARBs/ARGs in the water along the water reuse system (UWWTPs/reclamation facilities with different treatments), to assess the effect** (e.g. reduction of ARB/ARGs load, variety) **of different water treatments** (e.g., secondary treatment/tertiary treatment; specific treatments for irrigation systems; membrane filtration, disinfection, UV-radiation, ozonisation, etc.) **during the waste water reclamation process when producing water intended** for irrigation purposes.

For this, it will be needed to sample the water at different points from the UWWTPs/reclamation facilities (e.g., **raw influent**, secondary effluents, **tertiary effluents and/or final effluents** at the point of compliance, and if applicable, also at intermediate storage points before going to the agriculture fields, see Figure 1).

- Ideally the water should originate from at least **6 UWWTPs/reclamation facilities from three different EU/EFTA countries** (two UWWTPs/reclamation facilities/country) in which different water treatments to produce reclaimed water suitable for irrigation are applied. At least three of the UWWTPs/reclamation facilities should provide the water for irrigation of growing fields included in Task 6 and 7.
- The samples should be taken **at different sampling points** during the reclaimed water process, ideally among the following: **raw influent**, secondary effluents, **tertiary effluents and/or final effluents at the point of compliance** (Figure 1), as well as, if applicable, at intermediate storage facilities before arriving to the growing fields. If possible, final effluents of different quality reclaimed water -A, B and/or C- according to the Water Reuse Regulation (EU) 2020/741⁵, see also EC Commission Notice 2022/C 298/01 Guidelines⁶) should be tested.
- Per UWWTPs/reclamation facility, the samples **should be collected at different time points** (e.g., different days distributed along the year to cover potential seasonal differences).
- The analysis should be performed with the methods resulting from Objective 1 (culture-based, qPCR based and/or metagenomics), **focusing mainly on ARB/ARGs of highest priority indicated** in Section 1.2.1.1.
- The contractor should collect, if available, relevant information on the origin of the waste water (community, hospital, livestock farms; local, regional plants; size, etc.) and characteristics of the reclaimed water investigated (e.g., use of additional treatments for irrigation purposes, quality of the reclaimed water tested, eg. A, B and/or C as explained above, etc).

Indicative variables relevant to Task 5:



Variables	
Countries:	<ul style="list-style-type: none"> • EU/EFTA countries.
ARB/ARGs:	<ul style="list-style-type: none"> • Mainly highest priority and others included in Objective 1, section 1.2.1.1.
Samples:	<ul style="list-style-type: none"> • Wastewater/reclaimed water intended to be used for agricultural irrigation.
Compartments:	<ul style="list-style-type: none"> • UWWTPs/reclamation facilities.
Detection methods:	<ul style="list-style-type: none"> • Culture-based (combined with AST and/or WGS), PCR-based, metagenomics, others (see Objective 1, section 1.2.1.).
Sampling points:	<ul style="list-style-type: none"> • Pre/after different treatments during the reclamation process (e.g., raw effluent, secondary, tertiary, additional specific treatments for irrigation systems).
Sampling times:	<ul style="list-style-type: none"> • Different days along the year (seasonal differences).

1.2.2.2. Subobjective 2b

SO2b, to look for the occurrence of ARB/ARGs in the reclaimed water used for the irrigation or other activities at primary production (e.g. during harvest) of FVH.

Accordingly the Task 6 defined below should be performed:

- **Task 6. To generate data on the occurrence of ARB/ARGs in reclaimed water used for agricultural irrigation** (and other activities at FVH primary production).
 - This should include the testing of samples of reclaimed water intended for irrigation, preferable from different quality (A, B and/or C) according to the Water Reuse Regulation (EU) 2020/741⁵ (see also EC Commission Notice 2022/C 298/01 Guidelines⁶, and Figures 1 and 2).
 - The study should include **samples of reclaimed water used for agricultural irrigation** collected at least at **six agricultural fields** from which the food commodities will be analyzed in Task 7 (see Section 1.2.2.2, Objective 2b), of at least **3 EU/EFTA countries** (preferable countries with different water needs and irrigation uses).
 - These fields mentioned above, should not be connected to the same water reuse system (UWWTPs/reclamation facilities, see Figures 1 and 3). Additional fields with different food commodities, also if connected to the same systems as those included above, could be included for comparison purposes.
 - The source of the water sampled in these fields, should correspond with at least **three of the UWWTPs/reclamation facilities** included in the SO2a sampling (Task 5, and Figure 3).
 - The samples should be taken at the **points of irrigation**. It would be recommended to take the water samples the closest possible to the food commodities intended to be irrigated, at **different time points** during the production (different climate seasons if applicable).



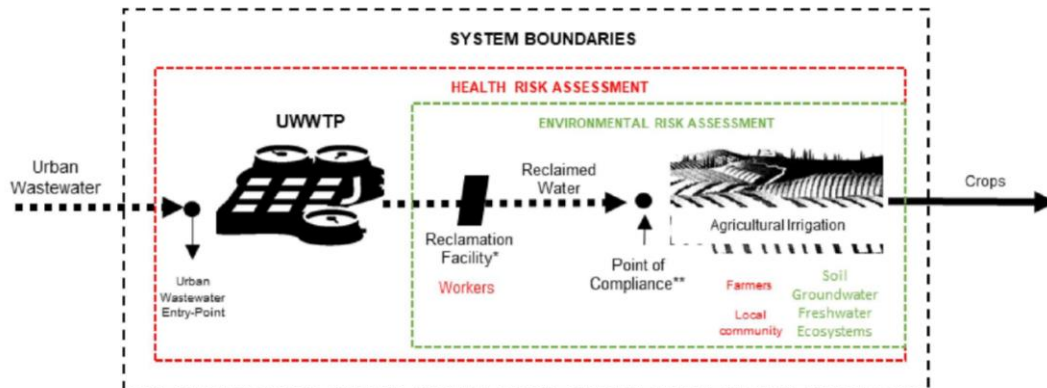
- In the case that the reclaimed water used for agricultural irrigation would be further used during the harvest in the fields for handling or minimal processing operations, e.g. for washing the FVH, at least three additional samples of that re-used water (e.g. before vs. after washing) should be collected at different time points and included in the analyses.
- The analysis should be performed with the methods resulting from Objective 1 (culture-based, qPCR based and/or metagenomics), **focusing mainly on ARB/ARGs of highest priority** as indicated in Section 1.2.1.1.
- The contractor should collect, if available, relevant information on the origin and characteristics of the investigated reclaimed water used for agricultural irrigation (e.g., origin of UWWTPs/reclamation facility, additional water treatments for irrigation purposes, distance of the reclamation facility to the field, place of storage of the water, water quality category, irrigation water flow, etc.).

Indicative variables relevant to Task 6:

Variables	
Countries:	<ul style="list-style-type: none"> • EU/EFTA countries
ARB/ARGs:	<ul style="list-style-type: none"> • Mainly highest priority and others included in Objective 1, section 1.2.1.1.
Samples:	<ul style="list-style-type: none"> • Reclaimed water used for agricultural irrigation (also if applicable, reclaimed water using for other handling and/or minimal processing operations during harvesting (e.g., washing))
Compartments:	<ul style="list-style-type: none"> • Growing fields
Detection methods:	<ul style="list-style-type: none"> • Culture-based (combined with AST and/or WGS), PCR-based, metagenomics, others (see Objective 1, section 1.2.1.)
Sampling points:	<ul style="list-style-type: none"> • Different points of irrigation
Sampling times:	<ul style="list-style-type: none"> • Different days along the production (seasonal differences)



Main elements of a water reuse system, identifying receptors in the risk assessment

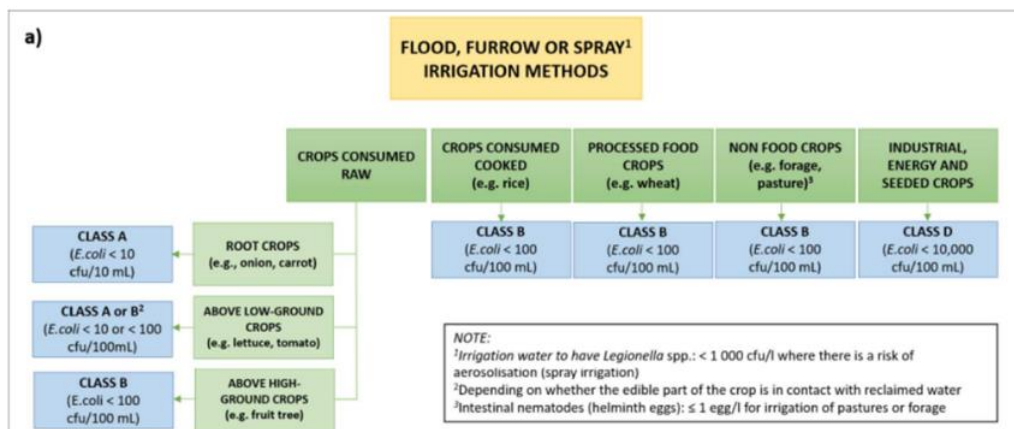


*Reclamation Facility: it can be the urban waste water treatment plant or other facility that further treats urban waste water that is fit for a use specified in Section 1 of Annex I of the 741/2020 Regulation.

**Point of Compliance: the point where a reclamation facility operator delivers reclaimed water to the next actor in the chain. In this image the reclaimed water is delivered directly to the end-users, but in other situations it may be delivered to a distribution operator or a storage operator.

Figure 1. Elements of the water reuse system. Taken from Commission Notice 2022/C 298/01 Guidelines⁶ and JRC Report on Technical guidance water reuse risk management for agricultural irrigation schemes in Europe⁷.

Examples of schematics for selecting the class of reclaimed water (according to the Regulation) for (a) open irrigation methods or (b) localised irrigation methods



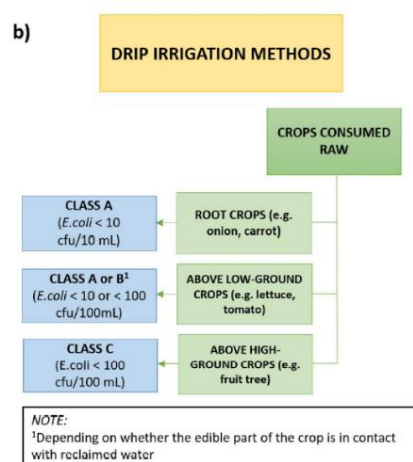


Figure 2. Examples of irrigation methods, type of foods and way of consumption and accordingly the reclaimed water quality class needed. Taken from Commission Notice 2022/C 298/01 Guidelines⁶

1.2.2.3. Subobjective 2c

SO2c, to look for the occurrence of ARB/ARGs in the FVH irrigated with reclaimed water.

Considering the production of FVH in the EU²⁵, several food commodities could be suitable to be included in the study (Table 2). The ones mentioned in table 2 as an example, are recognised as important FVH that have been implicated as suspect food vehicles in food outbreaks associated with food of non-animal origin, and/or in which the presence of ARB/ARGs has been reported. They represent root crops, above low-ground crops <25 cm, above low-ground crops >25 cm and/or above-ground high-growing crops that can be eaten raw that need different reclaimed water quality for irrigation depending on the irrigation method, as referred to in the Water Reuse Regulation (EU) 2020/741⁵ and EC Commission Notice 2022/C 298/01 Guidelines⁶ (Figure 2). These food items can be further subjected to handling (washing, packing, etc.) or minimal processing (cutting, rinsing, freezing, etc.) before they reach the consumer. Accordingly, **Task 7** defined below should be performed:

- **Task 7. To generate data on the occurrence of ARB/ARGs in FVH growing in the field when irrigated with reclaimed water.**
 - The study should include the testing of FVH that can be consumed raw, with **at least 3 different commodities representing different crop types** of those described in the EC Commission Notice 2022/C 298/01 Guidelines⁶ (see examples in Table 2).

²⁵ https://ec.europa.eu/eurostat/statistics-explained/index.php?title=Agricultural_production_-_crops#Vegetables



- The study should include samples collected from at least the **6 agriculture fields**, from at least **3 EU/EFTA countries** (preferable countries with different water needs and irrigation uses) from which the reclaimed water samples will be analyzed in Task 6 (irrigated with reclaimed water from different water systems). As explained in Task 6, additional fields with different food commodities, also if connected to the same systems as those included above, could be included for comparison purposes.
- Per field, the **FVH samples should be collected at different time points** during the production/growing period.
- In the case that the **FVH** would be further **handled and/or minimally processed in the fields**, e.g. washing with irrigation or reused processing water (see Task 7), **additional samples** of those FVH considered as end-products at the fields, **collected at different time points** (to cover seasonal differences) should be included in the analyses.
- The analysis should be performed with the methods resulting from Objective 1 (culture-based, qPCR based and/or metagenomics), **focusing mainly on ARB/ARGs of highest priority indicated** in Section 1.2.1.1.
- The contractor should collect, if available, relevant information on: the irrigation methods applied in the selected fields and selected products (flood, furrow, spray, drip, see Figure 2; irrigation water flow), as well as to look for other potential AMR risk concomitant to the use of irrigation water in those fields: e.g., use of organic fertilizer (e.g., manure, sewage sludge), type of production (greenhouses, grown under cover, open fields, etc.), use of additional water sources for irrigation (e.g., ground water), access of wild/domestic animals to the fields, floods during the production period tested, additional food handling operations in the field that involve the use of the reclaimed irrigation water, etc.

Indicative variables relevant to Task 7:

Variables	
Countries:	<ul style="list-style-type: none"> • EU/EFTA countries.
ARB/ARGs:	<ul style="list-style-type: none"> • Mainly highest priority and others included in Objective 1, section 1.2.1.1.
Samples:	<ul style="list-style-type: none"> • FVH (irrigated; also if applicable, end-product if washed with irrigated/reused processing water in the fields)
Compartments:	<ul style="list-style-type: none"> • Growing fields.
Detection methods:	<ul style="list-style-type: none"> • Culture-based (combined with AST and/or WGS), PCR-based, metagenomics, others (see Objective 1, section 1.2.1.).
Sampling points:	<ul style="list-style-type: none"> • Different points in the field.
Sampling times:	<ul style="list-style-type: none"> • Different days along the production (seasonal differences).

**Table 2:** Examples of commodities suitable to be investigated (SO2c, SO3b, SO3d).

Food commodity	General commodity category (EFSA 2013)	Crop type	Examples of safety hazards	AMR References ^a
Carrot	Root and tuberous vegetables	Root crops that can be consumed raw	Environmental factors, animal reservoirs, contamination, cross-contamination, agricultural water, soil microbiome	Chelaghma et al., 2021, Mei et al., 2021
Lettuce	Leaves greens (leafy)	Above low-ground leaf crops that can be consumed raw	Surface contact exposure to introduce human pathogens	Weidhass et al., 2022, Summerlin et al., 2021, Bhullar et al., 2021
Strawberry	Soft fruits	Above low-ground leaf crops that can be consumed raw	Environmental factors, contact with animals, untreated compost, contaminated agricultural water (irrigation or chemicals), contamination and cross-contamination	Bhullar et al., 2021, Zhang et al., 2020, Tenea et al., 2023
(Bean) Sprouts	Sprouted seeds	Above low-ground leaf crops that can be consumed raw	Contamination: dry seed contaminated with bacterial pathogens, poor practices	Moon et al., 2022, Nuesch-Inderbinen et al., 2015
Melon	Melons	Above low-ground leaf crops that can be consumed raw after peeling (edible part not in contact with the water)	Rind surfaces, ground spots greater microbial populations than non-ground spot areas. Cross-contamination during crop handling, water use during cooling	Enciso-Martinez et al., 2022, Xu et al., 2023



Food commodity	General commodity category (EFSA 2013)	Crop type	Examples of safety hazards	AMR References ^a
Basil	Leaves herbs (fresh)	Above low-ground leaf crops that can be consumed raw	Non-composted or incompletely processed manure used as fertilizer, irrigation water, and contact surfaces such as hands, crates, and processing equipment (Willeke 2016)	Veldman et al., 2014, Khater et al., 2021, de Bruin et al., 2016
Tomato	Vegetable fruits	Above low-ground leaf crops (edible portion at <25 cm above the soil surface) that can be consumed raw	Field site, land use, adjacent land use, agricultural inputs (e.g., irrigation waters, fertilizers), workers, production practises	Weidhass et al., 2022, Cordova et al., 2022, Seyoum et al., 2022, Sun et al., 2021
Apple	Fruits	Above-ground high-growing crops (fruit tree, edible portions at >50 cm above the soil surface, which therefore do not normally touch the soil) that can be eaten raw	Storage and transport as potential risk parameters to distribute AMR globally. ^b	Wassermann et al., 2022

^a: References listed in Table 2 are included in Appendix 1.





1.2.3 Objective 3

Objective 3. Generation of new data on the occurrence and potential spread of ARB and ARGs in FVH as a potential result of the use of reused processing water in post-harvest processing activities in the EU/EFTA zone.

To achieve **Objective 3**, it will be necessary to perform field case studies, including different scenarios in the FVH processing plants. The tenderer(s) will need to engage with and have access to those compartments to take the samples needed to perform the studies for a wide range of FVH commodities, and for a representative sample of different EU countries as explained below. Samples collected in previous studies/projects can be included in these studies if they comply with the requirements mentioned in the tasks description below and those defined in section 1.5, and permissions for their further use are granted.

Similarly to what was mentioned in relation to the water treatments and AMR in section 1.2.2.1, there is few information on the effect of different disinfection treatments applied in the food processing on AMR²⁶. Thus, there is a need to include a comparison between the spread of ARB/ARGs to the FVH as a result of applying reused processing water, and taking into account if the water is subjected or not to different disinfection treatments (after being used with a food charge). Also, if there is a difference (e.g. potential reduction of ARBs/ARGs load, changes in their diversity) on the effect of different disinfection treatments.

The description of the study design made by the tenderer in their offer to achieve Objective 3 (e.g., countries, FVH processing plants, size of those processing plants, combinations commodities/types of foods- whole fresh, fresh cut, frozen-, reused processing water disinfection treatments, number of samples, sampling points, sampling times,) will be discussed at the kick-off meeting in order to fine tune it (**Task 1**) as indicated above.

The field studies to be performed shall cover the **occurrence of ARB/ARGs of highest priority for public health** selected among those proposed in Objective 1 (see 1.2.1.1.).

The **Objective 3** will cover different aspects included into the following subobjectives (SOs 3a-d).

- **SO3a**, to look for the occurrence of ARB/ARGs in the reused processing water used in the handling and/or processing of FVH in the processing plants when this water is not subjected to disinfection treatments.
- **SO3b**, to look for the occurrence of ARB/ARGs in the FVH when these were handled and/or processed with reused processing water that was not subjected to any disinfection treatment in the processing plant.
- **SO3c**, to look for the occurrence and potential reduction of ARB/ARGs in the reused processing water used in the handling and/or processing of FVH when this water was subjected to different disinfection treatments in the processing plant.
- **SO3d**, to look for the occurrence of ARB/ARGs in the FVH when these were handled and/or processed with reused processing water that was subjected to different disinfection treatments in the processing plant.

²⁶ Oniciuc et al., 2019. Current Opinion in Food Science. <https://doi.org/10.1016/j.cofs.2018.09.002>.



1.2.3.1 Subobjective 3a

SO3a, to look for the occurrence of ARB/ARGs in the reused processing water used in the handling and/or processing of FVH in the processing plants when this water is not subjected to disinfection treatments.

Accordingly, the Task 8 defined below should be performed:

- **Task 8. To generate data on the occurrence of ARB/ARGs in the reused processing water used in FVH handling and/or processing operations when the water has not been subjected to disinfection treatments.**
 - This should include the testing of samples of **reused processing water**, used in the FVH handling and processing operations, which has **not been subjected to disinfection treatments**.
 - The **reused processing water samples** should originate from at least **six** different **FVH handling/processing plants** (ideally from different industry sizes, e.g., small, medium, large²⁷), from at least **3 different EU/EFTA countries**, from which different food commodities/types of foods (whole fresh, fresh cut, frozen) will be analyzed in Task 9.
 - Per processing plant, **samples** should be collected at **different sampling points** during the post-harvest production operations (e.g., before washing vs. after washing). These samples should be taken at **different times** of the duration of the operation and/or during different days (e.g. to detect seasonal differences).
 - The analysis should be performed with the methods resulting from Objective 1 (culture-based, qPCR based and/or metagenomics), **focusing mainly on ARB/ARGs of highest priority indicated** in Section 1.2.1.1.
 - The contractor should collect, when available, relevant information on the characterization of the processing water (e.g. treatments and water reuse practices applied in those establishments (times that the water is recycled, frequency of water replenishment, type and volume of food products processed, etc.).

Indicative variables relevant to Task 8:

Variables	
Countries:	<ul style="list-style-type: none"> • EU/EFTA countries.
ARB/ARGs:	<ul style="list-style-type: none"> • Mainly highest priority and others included in Objective 1, section 1.2.1.1.
Samples:	<ul style="list-style-type: none"> • Reused processing water not subjected to disinfection treatments.
Compartments:	<ul style="list-style-type: none"> • Processing plants.
Water treatment	<ul style="list-style-type: none"> • No disinfection treatment.
Detection methods:	<ul style="list-style-type: none"> • Culture-based (combined with AST and/or WGS), PCR-based, metagenomics, others (see Objective 1, section 1.2.1.).

²⁷ https://single-market-economy.ec.europa.eu/smes/sme-definition_en



Sampling points:	<ul style="list-style-type: none"> Different points in the processing line (before and after the handling and/or processing operations using water, eg. washing).
Sampling times:	<ul style="list-style-type: none"> Different time points in the same day and/or different days along the production period (e.g. to detect seasonal differences).

1.2.3.2 Subobjective 3b

SO3b, to look for the occurrence of ARB/ARGs in the FVH when these were handled and/or processed with reused processing water that was not subjected to disinfection treatments in the processing plant.

Accordingly, Task 9 should be performed.

- Task 9. To generate data on the occurrence of ARB/ARGs in the FVH during/after handling and/or processing operations in processing plants that use reused water that it is not subjected to disinfection treatments.**
 - The study should include FVH that can be consumed raw in line with the description done in Task 7.
 - The FVH samples should be taken from at least **the same six handling/processing plants** from which the water samples were analyzed in Task 8.
 - The FVH samples should represent at least **two food commodities** from those included in Task 7, and at least **three different types of foods** (whole fresh, fresh cut, frozen).
 - Per processing plant, **FVH samples should be collected at different sampling points** during the post-harvest handling and/or processing operations and at end of the process (e.g., before washing, after washing, after rinsing, freezing; as well as the end-product -e.g. after packaging). These samples should be taken ideally at **different times** of the day and/or during different days (e.g. to detect seasonal differences).
 - The analysis should be performed with the methods resulting from Objective 1 (culture-based, qPCR based and/or metagenomics), **focusing mainly on ARB/ARGs of highest priority indicated** in Section 1.2.1.1.
 - The contractor should collect, if available, relevant information on the water usage practices applied for those products (frequency of water replenishment, volume of food products processed, etc.).

Indicative variables relevant to Task 9:

Variables	
Countries:	<ul style="list-style-type: none"> EU/EFTA countries.
ARB/ARGs:	<ul style="list-style-type: none"> Mainly highest priority and others included in Objective 1, section 1.2.1.1.



Samples:	<ul style="list-style-type: none"> FVH processed with reused processing water not subjected to disinfection treatments.
Compartments:	<ul style="list-style-type: none"> Processing plants.
Water treatment	<ul style="list-style-type: none"> No disinfection treatment.
Detection methods:	<ul style="list-style-type: none"> Culture-based (combined with AST and/or WGS), PCR-based, metagenomics, others (see Objective 1, section 1.2.1.1).
Sampling points:	<ul style="list-style-type: none"> Different points in the processing line (before and after the handling and /or processing operations using water, e.g. washing, rinsing, freezing; as well as the end product).
Sampling times:	<ul style="list-style-type: none"> Different time points in the same day and/or different days along the production period (e.g. to detect seasonal differences).

1.2.3.3 Subobjective 3c

S03c, to look for the occurrence and potential reduction of ARB/ARGs in the reused processing water used in the handling and/or processing of FVH when this water is subjected to different disinfection treatments in the processing plants.

Accordingly the Task 10 should be performed:

Task 10. To generate data on the occurrence of ARBs/ARGs in the reused processing water used in FVH handling and/or processing operations when this water is subjected to different disinfection treatments, in order to assess the effect of the treatments on AMR (e.g. reduction of ARB/ARGs load, variety) of the different treatments.

- Opposite to Task 8, this should include the testing of samples of **reused processing water**, used in the FVH handling and processing operations, **subjected to different water disinfection treatments**.
- The **reused processing water samples** should originate from at least **six FVH processing plants** (ideally from different industry sizes, e.g., small, medium large²⁷), from at least **3 different EU/EFTA countries**, from which different food commodities/types of foods (whole fresh, cut fresh, frozen) will be analyzed in Task 11.
- Per processing plant, **processing water samples should be collected at different sampling points** during the post-harvest production operations (e.g., before washing vs. after washing). These samples should be taken **at different times** of the duration of the operation and/or during different days (e.g. to detect seasonal differences).
- The analysis should be performed with the methods resulting from Objective 1 (culture-based, qPCR based and/or metagenomics), **focusing mainly on ARB/ARGs of highest priority indicated** in Section 1.2.1.1.



- The contractor should collect, if available, relevant information on the characterization of the processing water (e.g. treatments and water reuse practices applied in those establishments, times that the same water is recycled/used, frequency of water replenishment, type and volume of food products processed, etc.).

Indicative variables relevant to Task 10:

Variables	
Countries:	<ul style="list-style-type: none"> • EU/EFTA countries.
ARB/ARGs:	<ul style="list-style-type: none"> • Mainly highest priority and others included in Objective 1, section 1.2.1.1.
Samples:	<ul style="list-style-type: none"> • Reused processing water subjected to disinfection treatments.
Compartments:	<ul style="list-style-type: none"> • Processing plants
Water treatment	<ul style="list-style-type: none"> • Different disinfection treatments.
Detection methods:	<ul style="list-style-type: none"> • Culture-based (combined with AST and/or WGS), PCR-based, metagenomics, others (see Objective 1, section 1.2.1.).
Sampling points:	<ul style="list-style-type: none"> • Different points in the processing line (before and after the handling and/or processing operations using water, e.g. washing)
Sampling times:	<ul style="list-style-type: none"> • Different time points in the same day and/or different days along the production period (e.g. to detect seasonal differences).

1.2.3.4 Subobjective 3d

SO3d, to look for the occurrence of ARB/ARGs in the FVH when these were handled and/or processed with reused processing water that was subjected to different disinfection treatments in the processing plant.

Accordingly the Task 11 should be performed.

- **Task 11. To generate data on the occurrence of ARB/ARGs in the FVH during/after handling and/or processing operations in processing plants that use reused water subjected to different water disinfection treatments.**
 - The study should include FVH that can be consumed raw in line with the description done in Task 7.
 - The FVH samples should be taken from at least **the same six handling/processing plants** from which the water samples were analyzed in Task 10.
 - The FVH samples should represent at least **two food commodities** from those included in Task 7, and at least **three different types of foods** (whole fresh, fresh cut, frozen).
 - Per processing plant, **FVH samples should be collected at different sampling points** during the post-harvest handling and /or processing



operations and at end of the process (e.g., before washing, after washing, after rinsing, freezing; as well as the end-product -e.g. after packaging). These samples should be taken ideally **at different times** of the day and/or during different days (eg. to detect seasonal differences).

- The analysis should be performed with the methods resulting from Objective 1 (culture-based, qPCR based and/or metagenomics), **focusing mainly on ARB/ARGs of highest priority indicated** in Section 1.2.1.1.
- The contractor should collect, when available, relevant information on the water usage practices applied for those products (frequency of water replenishment, volume of food products processed, relevant physicochemical characteristics of the water, etc.).

Indicative variables relevant to Task 11:

Variables	
Countries:	<ul style="list-style-type: none"> • EU/EFTA countries.
ARB/ARGs:	<ul style="list-style-type: none"> • Mainly highest priority and others included in Objective 1, section 1.2.1.1.
Samples:	<ul style="list-style-type: none"> • FVH processed with reused processing water not subjected to disinfection treatments.
Compartments:	<ul style="list-style-type: none"> • Processing plants.
Water treatment	<ul style="list-style-type: none"> • Different disinfection treatments.
Detection methods:	<ul style="list-style-type: none"> • Culture-based (combined with AST and/or WGS), PCR-based, metagenomics, others (see Objective 1, section 1.2.1.1).
Sampling points:	<ul style="list-style-type: none"> • Different points in the processing line (before and after the handling and/or processing operations using water, e.g. washing, rinsing, freezing; as well as the end product).
Sampling times:	<ul style="list-style-type: none"> • Different time points in the same day and/or different days along the production period (e.g. to detect seasonal differences).



1.2.4. Interrelation between Objectives

As previously explained, Objectives 1, 2 and 3 are interrelated as shown in Figure 3 and text below.

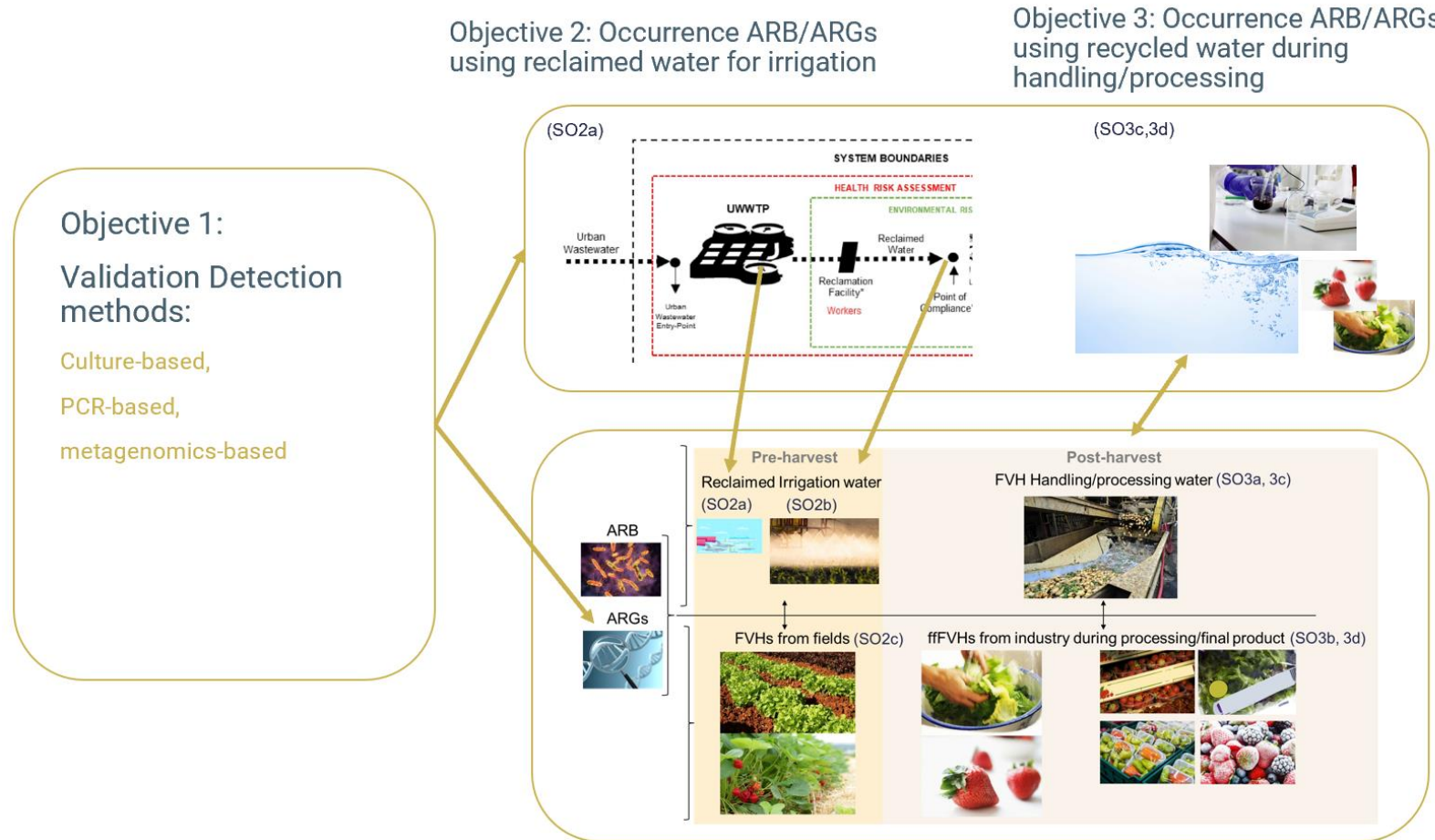


Figure 3. Summary of the Objectives covered by this call and their interrelation* (pictures source, <https://www.shutterstock.com/>)



- The methods optimised in Objective 1 are to be used for Objective 2 and Objective 3.
- FVH growing fields from which the reclaimed water used for irrigation and the FVH samples will be analysed in Objective 2 (SO2b-c, Task 6-7, respectively) shall receive water from some of the UWWTPs/reclamation facilities investigated in SO2a (Task 5).
- Processing plants from which processing water and FHV will be sampled for analysis in SO3a and SO3b (Tasks 8 and 9 respectively) focus on the use of reused processing water that has not been treated with water disinfection treatments. Commodities should be selected among those included in Task 7 (SO2c).
- The studies proposed for SO3c-d (Tasks 10 and 11, respectively), are similar to those proposed for SO3a-c, but focus on the use of reused processing water that is subjected to different water disinfection treatments. Commodities should be selected among those included in Task 7 (SO2c).
- The effect of different water treatments (potential reduction of ARB/ARGs, variety) is investigated similarly within SO2a and SO3c (sampling along the process).

Once the studies have been performed, there is the need **to integrate the results obtained for Objective 2 and 3 in order to identify potential links**. Accordingly, the task to be performed is:

- **Task 12. To integrate the results of the studies performed to achieve Objective 2 and 3**, comparing the results obtained with the ones available from other published studies, **in order to: i) identify potential links between the occurrence of ARB/ARGs** in the reclaimed water used for irrigation/washing at pre-harvest level in the fields and the reused processing water used in the processing plants for handling and/or processing operations of FVH. **ii) identify potential differences on the effect of different water treatments on AMR** (e.g. potential reduction of ARB/ARGs load, variety) in order to identify suitable methods to diminish/eliminate ARB/ARGs.



1.3 TASKS, DELIVERABLES, TIMELINE AND PAYMENTS

Objectives	Subobjectives	Tasks	Deliverables ¹	Deadline
		<p>Task 1: To fine tune the study design (e.g. detection methods to be tested, target bacteria/genes, countries, compartments-UWWTPs/reclamation facilities, fields, handling/processing plants, commodities, types of crops and foods, water treatments, number of samples, sampling points, sampling times, commodities, etc.) proposed by the tenderers in their offer after discussion at the kick-off meeting of the project, justifying the rationale behind the selections (see 1.2)</p>	<p>Deliverable 1 (D1): Inception report containing the description of the experimental set up and planning of the tasks that will be executed for all objectives, as discussed, fine-tuned and agreed with EFSA after the kick-off meeting, indicating and justifying adequately the selection of the sampling points, sampling times, geographical distribution, analytical methodology, etc. etc. Relevant template and guidance will be provided by EFSA.</p>	2 months from kick-off meeting
<p>Objective 1: Optimization of ARB/ARGs detection methods</p>		<p>Task 2: To optimize the culture-dependent detection methods complemented with the phenotypic and/or genotypic characterization of the ARBs and resistance traits to be applied in Objectives 2 and 3 (see 1.2.1.).</p>	<p>D2: First interim report¹, containing the final results of the Tasks 2-4 of objective 1 (including protocols).</p>	10 months after kick-off meeting
		<p>Task 3: To optimize the PCR-based detection methods (e.g., qPCR, ddPCR, HT-PCR, etc.) to be applied in Objectives 2 and 3 to detect specific ARB/ARGs (see 1.2.1.).</p>		
		<p>Task 4. To optimize the metagenomics-based detection methods (e.g., targeted metagenomics) to be applied in Objectives 2 and 3 to characterize the resistome of the samples to be analysed (see 1.2.1).</p>		



<p>Objective 2: Occurrence ARB/ARGs in reclaimed water for irrigation (and other harvest activities), EU/EFTA zone</p>	<p>SO2a In water at UWWTPs/reclamation facilities</p>	<p>To generate data on the occurrence of ARB/ARGs in the water along the water reuse system, to assess the effect (e.g. reduction of ARB/ARGs load, variety) of different water treatments during the waste water reclamation process when producing water intended for irrigation purposes. To be done by collecting samples at the UWWTP/reclamation facilities, at different points of the process at different time points, in different EU/EFTA countries (see 1.2.2.1).</p>	<p>D3 (Tasks 5-12): second interim report¹ including an update on the progress and preliminary results of the analyses developed for Objective 2-3, Tasks 5-11, and if applicable, integration of those results (Task 12) including tables, graphs, discussion and conclusions of the preliminary data collected for this tender.</p> <p>D4 (Tasks 5-12): third interim report¹. Updated D3 for Objectives 2-3 and task 12 (see above)</p> <p>D5 (Tasks 5-12): fourth interim report¹. Updated D4 for Objectives 2-3 and task 12 (see above)</p> <p>D6 (Tasks 2-12): Final report containing the full analyses developed for objectives 1, 2, 3, and the integration of the results, including tables, graphs, discussion and conclusions of the data obtained. The final report must contain the following sections: introduction, objectives (terms of reference), data and methodologies, results, discussion comparison with previous existing data, and conclusions. Relevant template and guidance will be provided by EFSA.</p>	<p>18 months from kick-off meeting</p>
	<p>SO2b in reclaimed water intended for irrigation at the growing fields</p>	<p>Task 6: To generate data on the occurrence of ARB and ARGs in reclaimed water used for agricultural irrigation (and other activities at FVH primary production), by collecting and analysing reclaimed water samples taken at the growing fields with production of different FVH, at different time points, in different EU/EFTA countries (see 1.2.2.2).</p>		<p>24 months from kick off meeting</p>
	<p>SO2c in FVH at the growing fields</p>	<p>Task 7: To generate data on the occurrence of ARB and ARGs in FVH irrigated with reclaimed water (and/or handled or minimally processed with reclaimed water), by collecting and analysing FVH samples (different commodities) taken at the growing fields, at different time points, in different EU/EFTA countries.</p>		<p>30 months from kick off meeting</p>
<p>Objective 3: Occurrence ARB/ARGs in reused processing water used for handling/processing operations. EU/EFTA zone</p>	<p>SO3a In reused processing water, no disinfection treatment</p>	<p>Task 8: To generate data on the occurrence of ARB/ARGs in the reused processing water used in FVH handling and/or processing operations when the water has not been subjected to disinfection treatments, by collecting and analysing water samples collected at the processing plants, at different sampling points along the process, at different times points, in different EU/EFTA countries (see 1.2.3.1)</p>	<p>35 months from kick off meeting</p>	
	<p>SO3b In FVH, after handling/processing operations using non treated processing water</p>	<p>Task 9: To generate data on the occurrence of ARB/ARGs in the FVH during/after handling and/or processing operations in processing plants that use reused water that it is not subjected to disinfection treatments, by collecting and analysing FVH samples (different commodities/types of foods) collected at the processing plants, at different sampling points along the process, at different times points, in different EU/EFTA countries. (see 1.2.3.2.).</p>		



	<p>S03c</p> <p>In reused processing water with disinfection treatment</p>	<p>Task 10: To generate data on the occurrence of ARBs/ARGs in the reused processing water used in FVH handling and/or processing operations when this water is subjected to different disinfection treatments, in order to assess the effect of the treatments on AMR (e.g. reduction of ARB/ARGs load, variety) of the different treatments. This shall be done by collecting and analysing water samples collected at the processing plants, at different sampling points along the process, at different times points, in different EU/EFTA countries (see 1.2.3.3).</p>		
	<p>S03d</p> <p>In FVH, after handling/processing operations using treated reused processing water</p>	<p>Task 11. To generate data on the occurrence of ARB/ARGs in the FVH during/after handling and/or processing operations in processing plants that use reused water subjected to different water disinfection treatments, by collecting and analysing FVH samples (different commodities/types of foods) collected at the processing plants, at different sampling points along the process, at different times points, in different EU/EFTA countries (see 1.2.3.4).</p>		
		<p>Task 12. To integrate the results of the studies performed to achieve Objective 2 and 3, comparing the results obtained with the ones available from other published studies, in order to: i) identify potential links between the occurrence of ARB/ARGs in the reclaimed water used for irrigation/washing at pre-harvest level in the fields and the reused processing water used in the processing plants for handling and/or processing operations of FVH. ii) identify potential differences on the effect of different water treatments on AMR (e.g. potential reduction of ARB/ARGs load, variety) in order to identify suitable methods to diminished/eliminate ARB/ARGs (see 1.2).</p>		
Subcontracting is allowed for all tasks				

No.	Meetings	Deadline for finalisation
1	Kick-off meeting: physical meeting in Parma or hybrid meeting– one day ²⁸	Within one month after entry into force of contract

²⁸ One day = 8 hours, half day = 4 hours



	During this meeting, in addition to operational implementation the administrative and financial matters related to contract implementation will be discussed. It will be used to present the overall strategy and the project plan, as well as to agree on the detailed experimental set up design and work plan. At least the Project coordinator and partners' representatives (in case of joint tender) should attend the meeting. The agenda of the meeting will be agreed between the awarded contractor and EFSA.	
2	Interim meeting 1: teleconference meeting–half day To update on the progress of the project, and clarify any pending issue. At least the Project coordinator and partners' representatives (in case of joint tender) should attend the meeting.	6 months from kick-off meeting
3	Interim meeting 2: physical meeting in Parma or hybrid meeting – one day To present and discuss deliverable 2 (first interim report). At least the Project coordinator and partners' representatives (in case of joint tender) should attend the meeting.	11 months from kick-off meeting
4	Interim meeting 3: teleconference meeting–half day To present and discuss deliverable 3 (second interim report). At least the Project coordinator and partners' representatives (in case of joint tender) should attend the meeting.	19 months from kick-off meeting
5	Interim meeting 4: physical meeting in Parma or hybrid meeting – one day To present and discuss deliverable 4 (third interim report). At least the Project coordinator and partners' representatives (in case of joint tender) should attend the meeting.	25 months from kick-off meeting
6	Interim meeting 5: teleconference meeting–half day To present and discuss deliverable 5 (fourth interim report). At least the Project coordinator and partners' representatives (in case of joint tender) should attend the meeting.	31 months from kick-off meeting
7	Final meeting: physical meeting in Parma or hybrid meeting – one day To present and discuss deliverable 6 (final report). At least the Project coordinator and partners' representatives (in case of joint tender) should attend the meeting.	36 months from kick-off meeting
*	This meeting structure/calendar is not limitative and should allow for having further exchange and ad-hoc meetings to provide regular update to EFSA or request any clarification, if needed.	
No.	Payments	Linked to EFSA approval of deliverable No.
1	Interim payment 1 of 25 %	1,2
2	Interim payment 2 of 25 %	3,4
3	Payment of the balance of 50% of the interim payment	5,6

The working language for contract implementation including execution of tasks, meetings and deliverables shall be English. Any written deliverables must be to a high standard of English which does not require proof reading.



1.4 INFORMATION ON THE CONTRACT

Nature of expense services

Type of contract direct

Place of performance: contractor's premises

Duration of tasks in direct contract

36 months from kick-off meeting.

Budget information

The maximum budget EFSA has available is **950,000 €**. Any offer exceeding this maximum will be excluded from further assessment during evaluation.

1.5 OWNERSHIP, INTELLECTUAL PROPERTY RIGHTS, USE OF RESULTS

As regards any product or delivery commissioned by EFSA and developed by the contractor in the context of the contract resulting from this call for tenders, as well as source codes of IT applications and models developed for EFSA, the intellectual property rights will be owned by EFSA only in its capacity as financial source of the contract. The contractor cannot file a trademark, patent, copyright or other IPR protection scheme in relation to any of the results or rights obtained by EFSA in performance of the contract, unless the contractor requests EFSA ex-ante authorisation and obtains from EFSA a written consent in this regard.

In addition, the contractor selected as a result of the present procurement procedure shall be solely responsible and liable for the following:

- To ensure that terms and conditions asserted by any copyright holder of publications or information referred to in the final deliverable for EFSA are fully satisfied;
- To make the necessary arrangements enabling EFSA to reproduce and make non-commercial use of publications and information referred to in the final deliverable it commissioned. As needed, the contractor shall consult with copyright licensing authorities (i.e., at national level) for guidance on purchasing copyright licenses to reproduce any publications provided to EFSA. The contractor remains solely responsible and liable for obtaining all necessary authorizations and rights to use, reproduce and share the publications provided to EFSA

PARTS OF RESULTS PRE-EXISTING THE CONTRACT

If the results are not fully created for the purpose of the contract this should be clearly pointed out in the tender. Information should be provided about the scope of pre-existing materials, their source and when and how the rights to these materials have been or will be acquired.

EFSA does not acquire ownership or any license of pre-existing rights not incorporated in the deliverables. The full ownership is limited to the deliverables, which might include licensed pre-existing rights on excerpts, parts, texts etc., if fully or partially incorporated in the final deliverables.



The draft contract in Annex 2 contains further provisions on ownership of intellectual property rights. All quotations or information the tenderer provides in the technical and financial offer for EFSA which originates from other sources to which third parties may claim rights, have to be clearly marked in the offer in a way allowing easy identification (source publications, including date & place, creator, number, full title etc.). The tenderer shall take account of the above specification on ownership and copyrights in their technical and financial offer.

Use of results

EFSA is committed to the publication of contract deliverables - such as supporting evidence in the form of datasets, raw data, protocols etc. in the Knowledge Junction in order to improve transparency, reproducibility and evidence reuse. The [Knowledge Junction](#)²⁹ repository of EFSA runs on the EU-funded Zenodo research-sharing platform where uploaded items receive a unique Digital Object Identifier to make them citable. Any part of the output resulting from this contract may be published (at EFSA's discretion) on the Knowledge Junction repository, with attribution to the contractor, and several deliverables can be cross-linked among them and to the published final Report on Wiley Online Library.

1.6 PERSONAL DATA PROTECTION AND CONFIDENTIALITY

Processing of personal data in the context of this contract shall comply with Regulation (EU) 2018/1725 ('the EDPR')³⁰. The EDPR constitutes the specific data protection legal framework applicable to EU institutions, bodies, offices and agencies, including EFSA and is aligned with the rules and principles under the General Data Protection Regulation (EU) 2016/679 (GDPR), applicable in the European Union.

In terms of the EDPR, EFSA acts as the controller for processing of personal data under the contract and the selected contractor, any consortium partner and subcontractor, as the processor or sub-processor.

Processing of personal data by EFSA as contracting authority (controller)

Information on the processing of personal data by EFSA as contracting authority in charge of the present procurement procedure is available in the [Privacy Statement](#) on the EFSA website as well as in Article II.9.1 of the draft contract in Annex 2.

Please note that your personal data as a tenderer or selected contractor may be registered in the Early Detection and Exclusion System (EDES) if you are in one of the situations mentioned in Article 136 of the Financial Regulation. The relevant Privacy Statement is available on the European Commission's website, here:

http://ec.europa.eu/budget/explained/management/protecting/protect_en.cfm#BDCE.

Processing of personal data by the selected contractor (processor/sub-processor)

In case tasks and activities under this call relate to the processing of personal data, Article II.9.2 of the draft contract in Annex 2 shall be observed.

For further information on data protection, please refer to the [EFSA guidance for tenderers](#) on the EFSA website, page 13.

Confidentiality

²⁹ <http://www.efsa.europa.eu/en/press/news/190117> and <https://zenodo.org/communities/efsa-kj/?page=1&size=20>

³⁰ <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:32018R1725>



Tender bids will be treated confidentially in accordance with the case law of the European Courts, which confirms the existence of a presumption of non-disclosure in case of a request for public access to documents in accordance with Regulation (EC) No 1049/2001. This does not prevent that specific parts of the submitted tender may be subject to disclosure when applicable law so requires. Unless there is an overriding public interest in disclosure, EFSA will refuse full access to the submitted tender, redacting the parts that contain confidential information, the disclosure of which would undermine the protection of commercial interests and intellectual property of the tenderer. Accordingly, EFSA will disregard general statements that the whole tender or substantial parts thereof are confidential information. Tenderers need to mark clearly the specific parts of their tender bid they consider confidential providing an explanation why the information should not be disclosed, which may be subject to EFSA's further assessment in accordance with applicable law.



PART 2 EVALUATION - HOW WILL YOUR OFFER BE ASSESSED?

In case you apply as a group of economic operators in a joint offer or if your offer envisages the use of subcontractors, please refer to the [EFSA Guidance for tenderers](#).

2.1 OPENING OFFERS

The aim of the public opening session is to check whether the offer received was dispatched by the deadline for tender receipt and that the tenders are electronically protected until the official opening.

2.2 ORDER OF EVALUATION

Tenderers should note that the content of their offers will be assessed in the following pre-defined order: Exclusion criteria (Access to EU Market); Selection criteria (Technical & Professional capacity); Compliance with tender specifications; Award Criteria (Quality and Price).

Following the above assessment and identification of the winning tenderer, the following will be assessed only for the tenderer proposed for contract award: Selection criteria (Professional Conflict of Interest – Institutional and Individual Declarations of Interest); Exclusion criteria (Declaration on Honour, section A); Selection criteria (Economic and financial capacity-Declaration on Honour, section B).

Evidence under sections 2.3.2 and 2.4(A) will be requested in the award letter for the winning tenderer and assessed prior to contract signature. Such evidence does not have to be submitted to EFSA if it has already been submitted in response to a previous EFSA call. In such case the evidence must be exactly the same as requested in these tender specifications and not older than 12 months. Please specify the reference of the EFSA call for tenders under which you have already submitted the evidence to EFSA if you chose to rely on such evidence.

2.3 GROUNDS FOR EXCLUSION

Criterion No. 2.3	Requirements and requested evidence
1	Eligibility – access to EU Market
	Requirements:
	<p>Only offers from tenderers established in eligible countries will be allowed to the next step of the evaluation. Please refer to the EFSA Guidance for tenderers for further details³¹.</p> <p>By submitting an offer, tenderers (including partners and/or subcontractors) confirm that they are not subject to EU restrictive measures adopted under Article 29 of the Treaty on the European Union (TEU) or Article 215 of the</p>

³¹ Please note that Procurement procedures of EFSA are not covered by the WTO Multilateral Government Procurement Agreement (GPA).



	Treaty on the Functioning of the EU (TFEU) ³² . EFSA reserves the right to refer to publicly available information to check whether an organization is subject to EU restrictive measure. The prohibition of being subject to EU restrictive measures applies throughout the whole performance of the contract.
	Requested evidence:
	Administrative data forms (including LEF and BAF): available here

Criterion No. 2.3	Requirements and requested evidence
2	Exclusion
	Requirements:
	Tenderers must not be in one of the exclusion situations listed in article 136 of the Financial Regulation, explained in the EFSA Guidance for tenderers .
	Requested evidence:
	<p>Declaration on Honour (section A): Tenderers must declare that they are not in one of the exclusion situations by providing a signed and dated Declaration on Honour, available here. In case of a joint offer from a group of economic operators, or in case of subcontracting, such declaration should be submitted for each member of the group and for each identified subcontractor.</p> <p>Further evidence in support of this declaration may be requested from the successful tenderer prior to signature of the contract. Such requested evidence will be specified in the award letter and may have to be provided to EFSA before the contract is signed.</p>

2.4 SELECTION CRITERIA

A) Economic and financial capacity

Criterion No. 2.4.A	Requirements and requested evidence
1	Minimum economic and financial capacity

³² The EU Official Journal contains the list of entities subject to restrictive measures and is regularly updated.



	Requirements:
	The tenderer must have generated an overall annual turnover of at least 600.000 € in each of the last 3 closed financial years (2019, 2020 and 2021).
	Requested evidence:
	Declaration on Honour (economic and financial capacity section B): Tenderers must declare they fulfil the economic and financial capacity by providing a signed and dated Declaration on Honour , available here . In case of a joint offer from a group of economic operators, such declaration should be completed by the leading partner only.

In addition to the evidence requested above, EFSA has the right, during the evaluation process, to request further evidence on the tenderer's compliance with the economic, financial, technical and professional capacity requirements.

EFSA will request proof of annual turnover from the successful tenderer prior to signature of the contract. Such requested evidence will be specified in the award letter and must be provided to EFSA before the contract is signed. This evidence will be evaluated on a consolidated basis.

In the event of partners in a joint offer or subcontractors providing the financial capacity, if during contract implementation, there is a request to change a subcontractor or to assign the contract to a new legal entity, the economic and financial capacity will be checked for the last 3 most recent closed financial years and not necessarily the financial years published with the call.



B) Professional and Technical capacity

Criterion No. 2.4.B	Requirements and requested evidence
1	Professional capacity: overall at organisational level (see Annex 3)
	Requirements:
	<p>The tenderer overall must have extensive and demonstrable experience in:</p> <ol style="list-style-type: none"> a) Applied research on antimicrobial resistance: generating experimental data to assess antimicrobial resistance in food and water samples b) Applied research on water reuse (reclaimed water used for irrigation, processing water, generating experimental data on processes, treatments, microbiological analyses, etc). c) Applied research on molecular detection and analysis of microorganisms/genes, bioinformatics. d) Problem formulation: <ul style="list-style-type: none"> o reviewing and synthesising data and information from various sources, solid interpretation of the findings and results; o having a solid scientific background to understand the problems and analyse the issues related to the objectives of this call. o writing reports and scientific articles in English and reporting to scientific audiences e) Project management dealing with multidisciplinary teams.
	Requested evidence:
	<ul style="list-style-type: none"> • Annex 3 completed with a list of at least three relevant projects or publications related to the subject matter of this contract, carried out in the course of the past 5 years. For the projects, please provide the name/title, the execution time (years of start-end), a brief explanation of the project including links to published outputs (e.g. publications, reports) and specific role with regards to managing multidisciplinary teams.
2	Professional capacity: Ability to provide a team of experts compliant with these specific expertise requirements (see Annex 4)
	Requirements:
	<p>The tenderer should provide a team of at least 4 experts compliant with the following requirements One expert can cover more than one area:</p> <ol style="list-style-type: none"> a) One expert with at least 5 years of experience in antimicrobial resistance (epidemiology, molecular epidemiology of ARB/ARGs, risk assessment, etc.):



	<ul style="list-style-type: none"> ○ Antimicrobial resistance in water (e.g. irrigation water, food processing water, reclaimed water, wastewater and/or, environmental water, etc.). ○ Antimicrobial resistance in vegetables, fruits and/or herbs. <p>b) One expert with at least 5 years of experience in food (in particular vegetables, fruits and/or herbs) and water microbiology (microbial safety, risk assessment, microbial analysis, etc.).</p> <p>c) One expert with at least 5 years of experience in water reuse (reclaimed water used for irrigation, processing water, water treatments to diminish/eliminate microbial load and/or AMR, etc).</p> <p>d) One expert with at least 5 years of experience in molecular techniques to detect ARB and ARGs (at least WGS, qPCR and metagenomics).</p> <p>e) One expert with at least 3 years of experience in bioinformatics (WGS and/or metagenomic analyses).</p> <p>f) One expert with at least 5 years of experience in knowledge on drafting scientific reports/publications.</p> <p>g) One expert acting as project leader with at least 5 years expertise in project management in the area of public health or food/feed safety, who will manage the coordination of the project development and be responsible for the overall contract and for the implementation of all services requested by EFSA in this call for tender. The project leader will be the contact point for the services requested by EFSA and must update regularly EFSA on the progress of work.</p>
	Requested evidence:
	<ul style="list-style-type: none"> • Detailed CVs of the Project team members proposed for the assignment (recommended max. 3 pages) taking into account the minimum expertise requirements detailed above. EFSA strongly recommends submitting the CVs in the EU CV format which can be accessed here. • Tenderers should also provide a one-page summary of the names of the individual Project team members and the profiles covered (Annex 4).
3	Professional capacity: English language and IT capacity of each team member individually
	Requirements:
	Each team member listed in section 2.4.B.2, above, must have individually a very good level of spoken and written standard UK English. For non-native speakers, this should be demonstrated by: (i) experience (minimum three years) in international projects where English is the working language; OR (ii) at least two years of work/study in an English-speaking environment; OR (iii) certificate of English proving at least a C1 level OR iv) at least 3 publications written in English.



	Requested evidence:
	<ul style="list-style-type: none"> • Include in the CVs requested in section 2.4.B.2 the English level • Annex 4 completed with the English level of the team members. • Certificate of English proving at least a C1 level where relevant
4	Technical capacity: overall at organisational level (see Annex 5)
	Requirements:
	<p>The tenderer must:</p> <ol style="list-style-type: none"> a) have the technical equipment, resources and tools needed to perform the required microbiological and molecular analysis of water and FVH samples. b) Engage with, and have access to different establishments including, FVH growing fields, FVH handling/processing plants, and water reclamation/wastewater facilities to take the samples needed to perform the studies for a wide range of FVH commodities and reclaimed/recycled water sources, for a representative sample of the different EU countries. c) The tenderer(s) must have access to library services/databases to search for background literature (e.g., PubMed, Web of Science, Scopus, etc.) d) The tenderer must have an architecture for digital collaboration, including video/tele-meeting facilities for progress meetings, and a common document management system such as Office 365 for simultaneous handling of documents.
	Requested evidence:
	<ul style="list-style-type: none"> • For requirement a): A list of available equipment, resources and tools available (Annex 5) • For requirement b): <ul style="list-style-type: none"> ○ A list of the facilities/establishments/industry that will be included in the sampling study (Annex 5), and the letters of agreement from those establishments (reclamation/waste water treatment plants, FVH growing fields, FVH handling/processing plants) that will facilitate access to their settings for sampling purposes. These establishments should be made aware by the tenderer(s) that no reference to their identification will be made in the final external scientific report that will be published as final deliverable, as all the information regarding the providers of samples will be anonymised. In the case in which samples were collected in previous studies, see section 1.5 above. ○ Declaration on honour from the tenderer that he will not pay nor accept payment from the facilities/establishments/industry from which he is collecting the water samples or in the execution of any



	<p>other tasks under the contract outcome of the present procurement procedure.</p> <ul style="list-style-type: none"> • For requirement c) and d): <ul style="list-style-type: none"> ◦ A statement confirming access to the relevant library services/databases and specifying the name of the databases as well as the disposal of an architecture for digital collaboration.
5	Declaration on Honour
	Requirements:
	a) Signed declaration on honour.
	Requested evidence:
	<ul style="list-style-type: none"> • Declaration on Honour (Professional and Technical capacity-section B), available here. To be completed by the tenderer (in case of joint offer by the leading partner only);
6	Confirmatory statement of resources
	Requirements:
	a) Signed declaration on honour
	Requested evidence:
	<ul style="list-style-type: none"> • Declaration on Honour (section C), available here. To be completed by the leading partner, any other partners and/or subcontractors (only applicable for joint offers or offers with subcontracting)

C) Professional conflicting interest

In accordance with article 167(1)(c) of the Financial Regulation and paragraph 104 of the recitals, if EFSA, based on the assessment of the technical and professional capacity evidence, concludes that the tenderer has a professional conflicting interest and therefore does not possess the professional capacity to perform the contract to an appropriate quality standard, the tenderer may be rejected.

Evidence requested:

The tenderer proposed for contract award will be requested, prior to and as a condition of contract signature, to provide:

Institutional declaration of interests available [here](#) In case of a group of economic operators and/or in case of subcontracting, such declaration will need to be completed separately and submitted for each partner and for each identified subcontractor and;

Individual declarations of interests available [here](#) may be requested for members of the project team having influence and/or control over scientific outputs.

Institutional and Individual DoIs do not need to be provided with your offer. The requirement to submit Institutional and Individual DoIs will be specified in the award letter and will have to be provided and assessed by the EFSA Authorising Officer before and as a condition of contract signature. Please refer to [EFSA's policy on](#)



[independence](#) and the [Decision of the Executive Director on Competing Interest Management](#) for detailed information.

With the exception of declarations of interest, evidence must be included in the offer for partners in a joint offer and/or subcontractors only if the capacity of those entities is necessary to satisfy the minimum economic, financial, technical and professional capacity requirements.

If any of the declarations or information provided proves to be false, EFSA may impose administrative sanctions (exclusion or financial penalties) on the entity providing the false declarations/information.

For the purposes of the evaluation related to exclusion and selection criteria EFSA may also refer to publicly available information, in particular evidence that it can access on a national database free of charge.

2.5 COMPLIANCE WITH TENDER SPECIFICATION AND MINIMUM REQUIREMENTS

Your offer will be assessed for compliance with the tender specifications before its assessment against the award criteria.

Tenders do not comply with the tender specifications and will be rejected if they:

- do not comply with minimum requirements laid down in the tender specifications;
- propose a solution different from the one imposed;
- propose a price above the fixed maximum set in the specifications;
- propose contractual terms or conditions which deviate from what is provided in the draft contract (Annex 2),
- are submitted as variants, when the specifications do not authorise them;
- do not comply with applicable obligations under environmental, social and labour law established by Union law, national law and collective agreements or by the international environmental, social and labour law provisions listed in Annex X to Directive 2014/24/EU³³ and compliance with data protection obligations resulting from Regulation (EU) 2016/679 and Regulation (EU) 2018/1725³⁴.

The grounds for rejection is not linked to the award criteria so there is no evaluation. The tenderer will be informed of the grounds for rejection without being given feedback on the content of the tender other than on the non-compliant elements.

2.6 AWARD CRITERIA

Tenders will be evaluated against the below award criteria. The award criteria serve to identify the **most economically advantageous offer**.

A) QUALITY AWARD CRITERIA

³³ OJ L 94 of 28.03.2014, p. 65

³⁴ Regulation (EU) 2018/1725 of the European Parliament and of the Council of 23 October 2018 on the protection of individuals with regard to the processing of personal data by the Union institutions, bodies, offices and agencies and on the free movement of such data and repealing Regulation (EC) No 45/2001 and Decision No 1247/2002/EC, OJ L 295/39 21.11.2018, <https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32018R1725&from=EN>



Criterion No. 2.6	Criteria:
1.	UNDERSTANDING OF THE ASSIGNMENT AND TASKS REQUIRED. (max. 25 points - minimum threshold 60% i.e., 15/25)
	<p>This is intended to assess the extent to which the offer demonstrates a clear understanding of the assignment and project objectives covering all the aspects of the technical specifications. The tenderer should:</p> <ul style="list-style-type: none"> a) Describe how they propose to provide the services described in the technical specifications and to perform the work necessary for achieving the objectives requested in this Open Call; 10 points b) Demonstrate awareness of the state of the art regarding: AMR in the FVH food production and in reused (reclaimed/recycled) water; water reuse (use of reclaimed water for irrigation of FVH, use or recycled water during the FVH handling and processing, water treatments to reduce/eliminate microbiological hazards); FVH production in Europe; and ARB/ARGs/resistome detection techniques, citing relevant available literature and on-going projects on similar subjects covered within this call. 15 points
2.	METHODOLOGY PROPOSED FOR IMPLEMENTATION (max 40 points - minimum threshold 60% i.e., 24/40)
	<p>This is to assess the degree to which the proposed methodology shows the capacity to address the tasks underlined in the tender specifications, including convincing justification for the choice of proposed methodology highlighting advantages and disadvantages. The tenderer should:</p> <ul style="list-style-type: none"> a) Provide an appropriate methodology and well-structured step by step explanation for addressing all objectives. Include convincing justification for the choice of the proposed methodology (eg. with advantages and disadvantages of the approaches proposed) and convincing evidence to ensure that the activities and milestones identified are feasible; 20 points b) Justify the proposed selection for "detection methods, targeted bacteria, countries, food commodities, crop types, wastewater treatment/reclamation facilities, growing fields, irrigation practices (e.g. irrigation methods, water quality), food handling and/or processing operations, processing plants size, water disinfection treatments, etc." combinations so that they cover the relevant variability that may occur in the FVH production sector in the EU/EFTA, allowing comparisons; 20 points
3	PROJECT MANAGEMENT AND ORGANISATION OF THE TASKS WITHIN PROJECT TEAM (max 20 points)
	<p>This is to assess the extent to which the team set-up is suitable for the implementation of the assignment, and to meet the agreed deadlines for deliverables. The tenderer should:</p>



	<p>a) Provide clarity of organisation of the project into work packages, including project phases, timelines, milestones, deliverables, providing a Gantt chart. Provide convincing evidence to ensure that the activities and milestones identified are feasible; 10 points</p> <p>b) Provide a clear and detailed information on distribution of the tasks among the project team members; in case of joint offer & subcontractors, clarity on who does what, when and why (justify why the partner/subcontractor is proposed to do the particular task/work-package); 5 points</p> <p>c) Provide clear and detailed information on the frequency and type of communication with EFSA and internal team communication (in case of joint offers & subcontractors also the frequency and type of communication between partners and/or subcontractor), the role of project leader in the coordination and tasks allocation in relation to the methodology and tools proposed; 5 points</p>
4	RISK MANAGEMENT (max 10 points)
	<p>This is to assess the risk management awareness of the tenderer, in particular the ability to identify any potential risks to the achievement of the project objectives, assess risk impact & likelihood, and ability to foresee effective mitigating actions.</p> <p>The tenderer should identify potential risks associated to the achievement of the project objectives with the proposed methodology, as well as those risks related to project management issues (achieving deadlines, absence of team members, etc.) which might appear during the implementation of the assignment, assessing their risk impact & likelihood, as well as to propose risk mitigation actions and their likely effectiveness; this shall also include measures to ensure availability of proposed team members and mitigation strategies to cover absences for continuity of the service or unforeseen events. 10 points</p>
5	MEASURES TO GUARANTEE QUALITY OF DELIVERABLES (max 5 points)
	<p>This is to assess the quality assurance mechanisms put in place to guarantee the high quality of deliverables.</p> <p>The tenderer should explain the role of team leader / leading partner(s) in quality assurance and describe special additional measures for quality assurance proposed for this particular project, including language quality check and technical review. 5 points</p>

The sum of all quality award criteria gives a maximum possible total of 100 points.

Tenderers must provide a detailed technical offer addressing all points in the technical specifications and each of the quality award criteria. Repetition of mandatory requirements in the technical specifications without providing detail in the technical offer will only result in a very low score.



Offers must score at least 60% for criteria 1 and 2, and at least 70 points out of 100 maximum possible total points against the quality award criteria.

Tenders that do not reach these minimum quality thresholds will be eliminated from subsequent stages of the evaluation process.

B) PRICE AWARD CRITERION

Tenders which passed the quality thresholds will be further assessed to ensure:

- I. the price offer is made within the maximum budget for financial offers indicated in the tender specifications and;
- II. the financial offer satisfies the formal requirements of the tender specifications.

C) THE BEST PRICE-QUALITY RATIO

Tenders for which financial offers were made within the maximum budget and satisfied the formal requirements indicated in the tender specification will be retained for the identification of the tender with the best price-quality ratio based on the following formula:

OPTION 2: WEIGHTED FORMULA

$$\begin{aligned} & \text{TOTAL SCORE OF THE EVALUATED OFFER (C) =} \\ & \quad \mathbf{30} * \text{Cheapest price offer/price of tender X} \\ & \quad + \\ & \quad \mathbf{70} * \text{Total quality score (out of 100) for all quality award criteria of tender} \\ & \quad \quad \text{X/100} \end{aligned}$$



PART 3 - HOW TO SUBMIT YOUR OFFER USING e-SUBMISSION

You must submit your tender electronically via the e-Submission application available from the e-Tendering website before the time limit for receipt of tenders.

The e-Submission application allows economic operators to respond to call for tenders by preparing their tenders electronically in a structured and secured way and submitting their tenders electronically. The e-Tendering is the starting point for launching the e-Submission application.

Make sure you submit your tender on time: you are advised to start completing your tender early. To avoid any complications with regard to late receipt/non-receipt of tenders within the deadline, please ensure that you submit your tender several hours before the deadline. It is not possible to submit a tender through eSubmission after the time-limit for receipt of tenders indicated in the contract notice and/or the TED eTendering website.

No more than one tender and, in case of lots, no more than one tender per lot, can be considered per tenderer. If the same tenderer submits more than one tender, neither of which has been withdrawn as described below, only the latest tender will be considered. The tenderer may not refer to earlier submitted tenders to complement, clarify or correct its latest tender.

A natural or legal person cannot participate at the same time and for the same lot (if applicable) within the same procedure either as member of two or more groups of economic operators or as a sole tenderer and member of another group of economic operators. In such case, all tenders in which that person has participated, either as sole tenderer or as member of a group of economic operators, will be rejected.

Economic operators linked by a relationship of control or of association (e.g. belonging to the same economic/corporate group) are allowed to submit different and separate tenders provided that each tenderer is able to demonstrate that its tender was drawn independently and autonomously.

Registration in the Participant Register

Any economic operator willing to submit a tender must be registered in the [Participant Register](#) - an online register of organisations and natural persons participating in European Commission's calls for tenders or proposals.

On registering each participant obtains a Participant Identification Code (PIC, 9 - digit number) which acts as its unique identifier in the Participant Register. A participant needs to register only once – the information provided can be further updated or re-used by the participant in other European Commission's calls for tenders or calls for proposals.

At any moment during the procurement procedure the Research Executive Agency Validation Services (hereafter *the EU Validation Services*) may contact the participant and ask for supporting documents on legal existence and status [and financial capacity].

The requests will be made through the register's messaging system to the e-mail address of the participant's contact person indicated in the register. It is the responsibility of the participant to provide a valid e-mail address and to check it regularly.



The documents that may be requested by *the EU Validation Services* are listed in the [EU Grants and Tenders Rules on Legal Entity Validation, LEAR appointment and Financial Capacity assessment](#).

Please note that a request for supporting documents by the *EU Validation Services* in no way implies that the tenderer has been successful.

How to Submit your Tender in e-Submission

You can access the e-Submission application via the corresponding call for tender in TED e-Tendering, as specified in the Invitation Letter.

In order to have access to e-Submission, you will need to "Subscribe to call for tenders" on TED e-Tendering first. To subscribe, you will need to login with your an [EU Login](#)³⁵. In case you don't have an [EU Login](#), you can [create an account](#) at any moment. For more information see the [EU login help](#). After logging in with your EU Login password, the e-Tendering will then display a button 'submit your tender' and you will be able to access the e-Submission.

The [e-Submission quick guide](#) is available after logging in with your EU Login password.

Information to be filled in

In the e-Submission application, fill in and upload all necessary fields and documents as appropriate. All tenders must be clear, complete and consistent with all the requirements laid down in the tender specifications, including:

- **Signed declaration on Honour on Exclusion criteria (section A) and Confirmatory statement of resources (section C).** All members of a joint tender, including subcontractors – if applicable – must upload the signed and dated declaration on honour using the template available [here](#).
- **Signed declaration on Honour on Selection criteria (section B).** In case of a joint offer from a group of economic operators, such declaration should be completed by the leading partner using the template available [here](#).
- **Exclusion criteria.** If requested in the tender specifications, the tenderer and all members of a joint tender including subcontractors – if applicable – must provide the documentary evidence for exclusion criteria.
- **Selection criteria.** If requested in the tender specifications, the tenderer and all members of a joint tender including subcontractors – if applicable –, must provide the documentary evidence for selection criteria.
- **Technical tender.** It must address all the requirements laid down in the tender specifications.
- **Financial tender** The complete financial tender, including the breakdown of the price as provided in the tender specifications.

For detailed instructions on how to submit your tender, consult the Quick Reference Guide for Economic Operators where you will find:

- Technical requirements to use e-Submission
- Step-by-step guide to help you submit your tender

³⁵ Previously called European Commission authentication system (ECAS)



- Important advices and information on how to get technical support

Please make sure all required documents and evidence are submitted with your tender.

Documents to be signed and dated while creating your Tender

The following documents must be signed and dated during the creation of your tender in e-Submission:

- **Declaration on honour.** All members of a joint tender, including subcontractors must complete, sign and date the declaration on honour (sections A and C). Only the leader in a joint tender must complete, sign and date the declaration on honour (section B). The declaration on honour must be converted to PDF format and then signed by the authorised representatives with advanced electronic signature based on qualified certificates or by hand.

Re-submission of a tender

After submitting a tender, but within the time limit for receipt of tenders, you may still submit a new version of your tender. **If you submit a new Tender you must include all your Tender documents, including the Qualification and Tender documents.**

You must formally notify EFSA that the previous tender is withdrawn. The notification letter must be signed by the legal representative who signed the original tender stating the call reference and the Tender ID you wish to withdraw. The notification must be uploaded in e-submission together with the new version of all tender documents. You are kindly requested to also e-mail the notification letter to EFSAProcurement@efsa.europa.eu.

Withdrawal of tenders

If after submitting a tender, you wish to completely withdraw your tender, you must formally notify EFSA that you wish to withdraw your submitted Tender(s) as indicated above.

Deadline for receipt of tenders

The tender (including all documents) must be fully uploaded and received before the deadline for receipt of tenders indicated in the invitation to tender. It is not possible to submit a tender through eSubmission after the time-limit for receipt of tenders indicated in the contract notice and/or the TED eTendering website.

Please note that you are responsible to ensure that your full tender reaches the destination in due time.

In case of problems with the submission of the electronic tender, we recommend that you call the helpdesk in reasonable time before the time limit for receipt. The time it takes to submit the tender and upload all your documents may vary considerably depending on the number of concurrent submissions by other economic operators, the size of your tender and the type of internet service you are using. We recommend that you upload the documents the day before the deadline.



If the contracting authority detects technical faults in the functioning of the electronic equipment used for submitting and receiving tenders due to which it is impossible to electronically submit and receive tenders, you will be informed of the extension of the time limit by the contracting authority at the e-Tendering link.

Contact

- Notifications for re-submission or withdrawal of tenders must be sent to: EFSAProcurement@efsa.europa.eu

When communicating state the reference to the call for tenders and, if applicable, the Tender ID.

- If you need technical support on e-Submission, you can contact the e-Submission support team, from 08:00 until 20:00 CET at the following address: ec-funding-tender-service-desk@ec.europa.eu



APPENDIX 1: Abbreviations

AMR: antimicrobial resistance
ARB: antimicrobial resistant bacteria
ARGs: antimicrobial resistant genes
AST: antimicrobial susceptibility testing
CPE: Carbapenemase-producing *Enterobacteriaceae*
EC: European Commission
EEA: European Economic Area
EFSA: European Food Safety Authority
EFTA: European Free Trade Association
ESBL: Extended Spectrum Beta-Lactamase
EU: European Union
ffFVH: fresh and frozen fruits, vegetables and herbs
FHV: fruits, vegetables and herbs
JRC: Joint Research Centre
MRSA: methicillin-resistant *Staphylococcus aureus*
R&D: research and development
SO: Subobjective
WGS: whole genome sequencing
WHO: World Health Organization
WWTP(s): wastewater treatment plant(s)



APPENDIX 2: References included in Table 2

- Bhullar et al., 2021. *Escherichia coli* survival on strawberries and unpacked Romaine lettuce washed using contaminated water. *Foods*. doi: 10.3390/foods10061390
- Chelaghma et al., 2021. Vegetables and fruit as a reservoir of β -Lactam and Colistin-resistant Gram-negative bacteria: a review. *Microorganisms*. doi: 10.3390/microorganisms9122534
- Córdova et al., 2022. Antimicrobial multiresistant phenotypes of genetically diverse *Pseudomonas* spp. isolates associated with tomato plants in Chilean orchards. *Horticulture*. doi.org/10.3390/horticulturae8080750
- de Bruin et al., 2016. Microbiological status and food safety compliance of commercial basil production systems. *J Food Prot*. doi: 10.4315/0362-028X.JFP-15-182
- Enciso-Martínez et al., 2022. Prevalence of antibiotic-resistant *E. coli* strains in a local farm and packing facilities of Honeydew melon in Hermosillo, Sonora, Mexico. *Antibiotics* (Basel). doi: 10.3390/antibiotics11121789.
- Khater et al., 2021. Production of basil (*Ocimum basilicum* L.) under different soilless cultures. *Sci Rep*. doi: 10.1038/s41598-021-91986-7
- Mei et al., 2021. Bioaccumulation of manure-borne antibiotic resistance genes in carrot and its exposure assessment. *Environ Int*. doi: 10.1016/j.envint.2021.106830
- Moon et al., 2022. Isolation of AmpC- and Extended Spectrum β -Lactamase-producing *Enterobacterales* from fresh vegetables in the United States. *Food Control*. doi: 10.1016/j.foodcont.2021.108559
- Nüesch-Inderbinnen et al., 2015. Assessment of the prevalence of Extended-Spectrum β -Lactamase-producing *Enterobacteriaceae* in Ready-to-Eat salads, fresh-cut fruit, and sprouts from the Swiss market. *J Food Prot*. doi: 10.4315/0362-028X.JFP-15-018
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- Sun et al., 2021. Antibiotic resistance genes and bacterial community on the surfaces of five cultivars of fresh tomatoes. *Ecotoxicology*. doi: 10.1007/s10646-020-02303-3
- Tenea et al., 2023. Pathogenic microorganisms linked to fresh fruits and juices purchased at low-cost markets in Ecuador, potential carriers of antibiotic resistance. *Antibiotics* (Basel). doi: 10.3390/antibiotics12020236
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- Wassermann et al., 2022. The microbiome and resistome of apple fruits alter in the post-harvest period. *Environ Microbiome*. doi: 10.1186/s40793-022-00402-8
- Weidhass et al., 2022. Microbial and chemical risk from reclaimed water use for residential irrigation. *Water Reuse*. doi: 10.2166/wrd.2022.014
- Xu et al., 2023. Genome-wide identification of BES1 gene family in six *Cucurbitaceae* species and its expression analysis in *Cucurbita moschata*. *Int J Mol Sci*. doi: 10.3390/ijms24032287
- Zhang et al., 2020. *Enterobacteriaceae* predominate in the endophytic microbiome and contribute to the resistome of strawberry. *Sci Total Environ*. doi: 10.1016/j.scitotenv.2020.138708



ANNEX 1 - FINANCIAL OFFER TEMPLATE

Tenderers are requested to use this template for preparing their financial offer. In doing so tenderers confirm they are aware of the following facts:

- As referred to in part 1.4, the maximum budget EFSA has available for this assignment is **950,000 €**. Any offer exceeding this maximum will not be retained for contract award.
- Prices must be quoted in Euro. Tenderers from countries outside the euro zone have to quote their prices in euro. The price quoted may not be revised in line with exchange rate movements. It is for the tenderer to bear the risks or the benefits deriving from any variation.
- Pursuant to the provisions of Article 9 of the Italian Law n. 17 dated 10/01/2006 and under Article 151 of Council Directive 2006/112/EC, EFSA is exempt from all duties, taxes and other charges, including VAT. For this reason, all prices given in the financial breakdown should be free of VAT and other taxes or duties.
- The price offered below is understood to be all-inclusive. For example any additional costs which can be incurred by the contractor in performing the contract, such as overheads, travel, subsistence/accommodation expenses, etc. should also be factored in to the all-inclusive price. In addition, if the deliverables incorporate pre-existing rights, the tenderer should factor into their total price the cost of licensing those pre-existing rights to EFSA.
- It is the responsibility of each tenderer to ensure that the total amount of the tender inserted in the relevant field of the e-Submission application corresponds to the amount indicated in the uploaded financial offer. In case of discrepancies, only the amount indicated in the financial offer will be taken into account.

<p style="text-align: center;">ALL INCLUSIVE TOTAL PRICE</p> <p style="text-align: center;">to be used for the evaluation and for contract implementation in the case of award.</p>	<p style="text-align: center;">..... €</p>
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Tenderer name:

Name of person signing the financial offer:

His/her position in the company:

His/her signature:

Date:



ANNEX 2 - DRAFT CONTRACT

The contract which results from this procurement procedure will be based on the model annexed to these tender specifications.



ANNEX 3. MINIMUM PROFESSIONAL CAPACITY

List of projects and publications* covering the requirement under 2.4.B.1	
a) Applied research on antimicrobial resistance: generating experimental data to assess antimicrobial resistance in food and water samples	
b) Applied research on water reuse (reclaimed water used for irrigation, processing water, generating experimental data on processes, treatments, microbiological analyses, etc).	
c) Applied research on molecular detection and analysis of microorganisms/genes, bioinformatics.	
d) Problem formulation: <ul style="list-style-type: none"> ○ reviewing and synthesising data and information from various sources, solid interpretation of the findings and results; ○ having a solid scientific background to understand the problems and analyse the issues related to the objectives of this call. ○ writing reports and scientific articles in English and reporting to scientific audiences 	
e) Project management dealing with multidisciplinary teams.	<u>Specific role</u> , e.g. Coordinator, work package leader, project manager, etc...

*Note= the same project/publication can be listed to demonstrate several requirements. Insert here the list of at least three relevant projects or publications related to the subject matter of the contract, carried out in the course of the past 5 years. For the projects, please provide the name/title, the execution time (years of start-end), a brief explanation of the project including links to published outputs (e.g. publications, reports) and specific role with regards to managing multidisciplinary teams.



ANNEX 4. EXPERTISE OF THE PROPOSED TEAM

Expert profile	Expert's name	English level*	Other
<p>a) One expert with at least 5 years of experience in antimicrobial resistance (epidemiology, molecular epidemiology of ARB/ARGs, risk assessment, etc.):</p> <ul style="list-style-type: none"> ○ Antimicrobial resistance in water (e.g. irrigation water, food processing water, reclaimed water, wastewater and/or, environmental water, etc.). ○ Antimicrobial resistance in vegetables, fruits and/or herbs. 			
<p>b) One expert with at least 5 years of experience in food (in particular vegetables, fruits and/or herbs) and water microbiology (microbial safety, risk assessment, microbial analysis, etc.).</p>			
<p>c) One expert with at least 5 years of experience in water reuse (reclaimed water used for irrigation, processing water, water treatments to diminish/eliminate microbial load and/or AMR, etc).</p>			
<p>d) One expert with at least 5 years of experience in molecular techniques to detect ARB and ARGs (at least WGS, qPCR and metagenomics).</p>			
<p>e) One expert with at least 3 years of experience in bioinformatics (WGS and/or metagenomic analyses).</p>			
<p>f) One expert with at least 5 years of experience in knowledge on drafting scientific reports/publications.</p>			
<p>g) One expert acting as project leader with at least 5 years expertise in project management in the area of public health or</p>			



<p>food/feed safety, who will manage the coordination of the project development and be responsible for the overall contract and for the implementation of all services requested by EFSA in this call for tender.</p>			
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* Each team member listed in section 2.4.B.2, above, must have individually a very good level of spoken and written standard UK English. For non-native speakers, this should be demonstrated by: (i) experience (minimum three years) in international projects where English is the working language; OR (ii) at least two years of work/study in an English-speaking environment; OR (iii) certificate of English proving at least a C1 level OR iv) at least 3 publications written in English.

**ANNEX 5. LIST OF TOOLS AND RESOURCES**

Equipment, resources and tools available	
A list of available equipment, resources and tools available (selection criterion 2.4.B.4.a of the tender specifications)	
Facilities/establishments/industry that will be included in the sampling study (selection criterion 2.4.B.4.b of the tender specifications).	