**Big Picnic: Big Questions –**

**engaging the public with Responsible Research and Innovation on Food Security**

**ACRONYM: BigPicnic**

**Grant Agreement 710780**

# BigPicnic

## Deliverable D7.3 Quality Management Report

**30/04/19**

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| **Authors** | Theano Moussouri (UCL), Suzanne Kapelari (UIBK) & Georgios Alexopoulos (UCL) |

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## Partners

| Project Number | 710780 | Project Acronym | BigPicnic |
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| List of Beneficiaries | | | | | |
|---|---|---|---|---|---|
| No | Name | Short name | Country | Project entry month | Project exit month |
| 1 | BOTANIC GARDENS CONSERVATION INTERNATIONAL* | BGCI | United Kingdom | 1 | 36 |
| 2 | UNIVERSITAET INNSBRUCK | UIBK | Austria | 1 | 36 |
| 3 | UNIVERSITY COLLEGE LONDON* | UCL | United Kingdom | 1 | 36 |
| 4 | AGENTSCHAP PLANTENTUIN MEISE | APM | Belgium | 1 | 36 |
| 5 | STICHTING WAAG SOCIETY* | WAAG | Netherlands | 1 | 36 |
| 6 | COMUNE DI BERGAMO | BERG | Italy | 1 | 36 |
| 7 | UNIVERSITEIT LEIDEN | UL | Netherlands | 1 | 36 |
| 8 | UNIWERSYTET WARSZAWSKI | UNIWARSAW | Poland | 1 | 36 |
| 9 | UNIVERSIDADE DE LISBOA | ULISBOA | Portugal | 1 | 36 |
| 10 | HELLINIKOS GEORGIKOS ORGANISMOS - DIMITRA | HAO-BGGK | Greece | 1 | 36 |
| 11 | SOFIISKI UNIVERSITET SVETI KLIMENT OHRIDSKI | UBG | Bulgaria | 1 | 36 |
| 12 | AGENCIA ESTATAL CONSEJO SUPERIOR DE INVESTIGACIONES CIENTIFICAS | CSIC | Spain | 1 | 36 |
| 13 | UNIVERSIDAD DE ALCALA | UAH | Spain | 1 | 36 |
| 14 | LANDESHAUPTSTADT HANNOVER | SBZH | Germany | 1 | 36 |
| 15 | FREIE UNIVERSITAET BERLIN | FUB-BGBM | Germany | 1 | 36 |
| 16 | WISSENSCHAFTSLADEN BONN EV* | WILABONN | Germany | 1 | 36 |
| 17 | UNIVERSITETET I OSLO | UiO | Norway | 1 | 36 |
| 18 | TOORO BOTANICAL GARDENS | TBG | Uganda | 1 | 36 |
| 19 | ROYAL BOTANIC GARDEN EDINBURGH | RBGE | United Kingdom | 1 | 36 |

## Executive Summary

This document presents the Quality Management report of the BigPicnic project which was used to ensure that a high degree of course quality is achieved with all participants. The processes and procedures formalised in the project enabled effective, timely and responsible delivery of project objectives. It also summarises the process followed and reflects on the findings from the Team-Based Inquiry studies, the Process Evaluation study as well as the survey on food choices.

The Quality Management encompasses all aspects of the BigPicnic project and integrated aspects of each work package, such as setting up, developing co-creation activities, scheduling and implementation, consolidation and so on. Each work package facilitated the inclusion of quality checkpoints, such as the provision of training and workshops; templates evaluation; supportive communication processes; and support visits and practices that centred on the main theoretical dimensions: professional learning and development, communities of practice and reflective practice. This particular approach to project management enabled the team to embed co-creation and evaluation – with regard to the subject of food security and the professional learning and development of the botanic garden Partners - at all stages of the project lifecycle.

This report begins by situating BigPicnic in the context of Learning Outside the Classroom institutions, their role and value to society and their contribution to creating a culture of increased citizen engagement. It then presents the scope of the Quality Management across all the key elements of the project and the role and responsibilities of the Quality Management team as well as the quality checkpoints put in place. The next section introduces the theoretical and methodological approach employed by BigPicnic and how they were applied in order to both evaluate the project activities related to food security and also the project processes, in particular the development of knowledge and skills in relation to RRI, co-creation and Team-Based Inquiry (i.e. a form of participatory action evaluation). We then identify five key questions that the project posed and answer them using evidence collected though the Process Evaluation Approach. Findings presented in this section are supported by a large amount of evaluation studies (e.g. Team-Based Inquiry studies focusing on stakeholder understanding of and engagement with food and food security; and the food choices survey) carried out throughout the project. These are presented in Annexes 3 and 4. The final section of the report summarises the main findings and draws its main implications for further research and practice.

# 1. Introduction

## 1.1. Background

Learning Outside the Classroom (LOtC) institutions in general and botanic gardens in particular are by definition multidimensional institutions that have continuously responded to pressing societal and environmental changes and needs. Botanic gardens, originally founded as centres for the collection and study of plants hundreds of years ago, have increasingly been playing an important educational and social role by providing a platform for science and society to discuss social scientific issues such as future food security. In addition, they ensure genetic diversity in crops, by conserving wild crop relatives and connecting people with the origins of their food crops. By capitalising on their educational, social and scientific roles, botanic gardens can inform, raise awareness of and engage the public with global environmental matters. Indeed, botanic gardens are already recognised as centres of excellence for educational provision on environmental and plant science matters, with large numbers of visiting groups from the formal education sector, from primary to higher education. Botanic garden practitioners are best placed to both deliver and evaluate their educational provision, and use the learnings to improve their practice. However, for a number of reasons, practitioner-led evaluation is not common in practice. BigPicnic counteracts this trend by developing and offering a reflective evaluation training, namely Team-Based Inquiry (TBI), aimed at botanic garden practitioners. TBI reflects the participatory approach to research (i.e. RRI) and programme development (i.e. co-creation) that characterises the BigPicnic project. Specifically, TBI worked at two levels within this project: it provided evidence related to the process and impact of the activities and events and it was also used as a way to bring about change in practice through encouraging Partners to collect their own data, reflect on them and use them to improve their work.

Indeed, evidence-based practice is a hot topic across LOtC institutions. The lack of access to and use of the existing body of evidence by LOtC practitioners as a barrier to professional development in the field was identified by the 2012 Review of Informal Science Learning (RISL) commissions by the Wellcome Trust (Falk et.al. 2012). With regard to co-creation projects, in particular, lack of good evaluation is probably the greatest contributing factor to their slow acceptance and use in LOtC institutions (Simon, 2010). Evaluation can help practitioners measure the impact of past projects, and advocate for future initiatives. It can help them articulate and share what worked and what did not with regard to both the co-creation process and the outcome. Particularly in an emerging field of practice, such as co-creation projects, evaluation can help professionals learn from and support each other's progress. Evaluation carried out by practitioners themselves can also forge effective action/practice (Rothman 1998).

As a result of the above issues, increasing attention has been paid to how evidence collected through evaluation can actually affect practice. So how do we build the capacity of our teams, our organisations, and our networks to conduct evaluation and implement findings? Evaluation capacity building (ECB) is a relatively recent conceptual development that has gained prominence in the last decade (King & Volkov, 2005; Preskill & Boyle, 2008). Scholars have described ECB as a change effort that fosters individuals' skills and knowledge to conduct evaluation, as well as organisational structures and cultures to support evaluation use (Huffman, Thomas, & Lawrenz, 2008; Kowalski, Limber & Agatston, 2008; Preskill & Boyle, 2008). Importantly, the ultimate goal of ECB has been

described as “a sustainable evaluation practice—where members continuously ask questions that matter, collect, analyse, and interpret data, and use evaluation findings for decision making and action.” (Preskill & Boyle, 2008, p. 444). Despite the appeal of this goal, however, for those interested in fostering the growth of evaluation capacity within a team, an organisation, or a network, the interconnectedness—the complexity—of the modern workplace has brought with it both challenges and opportunities.

Building evaluation capacity is not only about skills and knowledge, it is also about values and attitudes (Preskill & Boyle, 2008; Stockdill, Baizerman, & Compton, 2002; Suarez-Balcazar et al., 2010; Taylor-Powell & Boyd, 2008). Individuals ultimately need to see the value of evaluation to be motivated to incorporate it into their work. More than that, professionals wishing to grow the evaluation capacity of themselves, their organisation, or their project teams also need to feel a shared sense of value from their leaders and their colleagues. For example, through a series of TBI training opportunities, we have seen how botanic garden practitioners have been developing their own evaluation knowledge and skills. Participants left the experience feeling energised, expressing a strong sense of value for evaluation and motivation to incorporate TBI into their practice, and possessing a broader toolbox of resources and skills to use evaluation and data-informed decision-making. This passion and new knowledge can be translated into long-term changes at their own institutions with the support of their leaders and colleagues. TBI provides a step-by-step approach in both carrying out evaluation, and in evaluation capacity building. This will be done through integrating evaluation and data-based decision-making from the beginning of any co-creation activity, and considering how to foster shared value for evaluation through discussing data and/or evaluation findings.

In addition, LOtC organisations often fail to institutionalise collaborations with the public or the educational system. The reasons for this state of affairs are manifold and are often related to the hybrid nature of these collaborations, which are both formal and informal at the same time (Bevan et al. 2010). Thus, another goal for the BigPicnic Quality Management team is to learn more about how Partner institutions can be supported to transfer individual knowledge gained by those working in a collaborative and reflective learning environment into organisational knowledge that will be sustained post project. A Process Evaluation Approach (PEA) is applied to understand more about how imposed theoretical views such as ‘Responsible Research and Innovation, co-creation or food security’ are interpreted by BigPicnic Partners and whether knowledge developed in this collaborative, expansive learning environment has the potential to become sustainable. The next part of this report presents a detailed schedule of delivery of the project before explaining the evaluation processes carried out by Partners (consortium and members of the co-creation teams) during the project - specifically how they were supported in their evaluations through training and developing a reflective TBI practice approach - and also presenting an accompanying evaluation focussing on artefacts produced by Partners to monitor their own learning process.

## 1.2. Schedule

This report reflects the quality and effectiveness of the project outcomes. To achieve this, a three-year plan of training development, delivery and dissemination was devised, as follows.

**The first year** of the project involved developing the pilot TBI course, a TBI manual (including a TBI project summary sheet; for a sample see Annex 2) and website resources. Discussions were held about TBI methodologies, course structure, and how this course can be adapted to different country conditions, taking into consideration cultural differences in evaluation and working practices. A draft TBI manual was developed and adapted to the needs of different European countries as well as to the needs of the botanic garden (BG) Partners. A series of training workshops were held for all Partners to develop a shared understanding of TBI, and follow-up tailor-made workshops were ran in each botanic garden. Follow-up Skype training sessions were provided to each botanic garden individually in order to respond to individual needs.

**The second year** of the project saw the launch of the pilot TBI training manual. Participating Partners engaged in reflective evaluation practice to look at their own process of change and gather data on how co-creation works – through outreach exhibitions - in their own botanic garden and with different communities. Botanic garden practitioners were supported through in-garden training workshops and regular follow-up Skype training sessions offered to small groups of BG Partners. The Skype sessions provide an open informal space for practitioners to meet and discuss their experiences gained through the project. They also provided the opportunity to discuss new methods they tried out and which were shared with their colleagues involved in the project and beyond.

**The third year** of the project saw Partners embed the TBI approach within their botanic gardens, through the evaluation of the outreach exhibitions and the science cafes. The TBI training manual was finalised, edited and published on-line. We also plan to add further updates and to publish it as a short booklet as well as offer it in digital format on the project website and the BGCI website. This will enable us promote it widely throughout the regional and international networks. QM Partners supported practitioners' reflective TBI practice through continuing training and development opportunity, including Skype meetings where practice issues were discussed. UCL and UIBK led the compilation of the final TBI report which brings together findings from all the separate TBI studies about food security BG Partners carried out, and aligns them with Food 2030 priorities and relevant SDGs; see Annex 3). The BigPicnic consortium continued to publish regular e-newsletters and encourage shared dialogue through the website (https://www.bigpicnic.net/)) and other publications such as Roots (see - http://www.bgci.org/public-engagement/roots/).

### 1.3. Purpose

The BigPicnic project (May 2016 – April 2019) brought together the public, scientists, policy-makers and industry to generate dialogue and build greater understanding of food security.

*The BigPicnic project aims to bring new perspectives to research and innovation on food security, to enable individuals and organisations to reflect on their practices and, with tailored engagement activities, to ensure that diverse voices - including those from less privileged backgrounds - will be heard through a cycle of evaluation process. To achieve that, it will co-create and deliver outreach exhibitions, science cafés and engagement events and activities to engage a variety of publics with issues of food security from an RRI approach.*

Consequently, the Quality Management Team (QMT) was responsible for managing the evaluation processes carried out during the project as well as the outcomes. The QMT developed a Quality Management Plan (QMP) to support consortium Partners and co-creation team members to co-produce outcomes sensitive to the needs / priorities of regional and local audiences, and culturally appropriate methods for evidence collection. The QMT contributed to elements of the evaluation work. This depended on local and regional needs and was agreed at meetings with the co-creation teams.

The purpose of the QMP was to reflect and meet co-creation team members' needs and priorities. The plan was completed and distributed in April 2017 and was and included:

a) Formative and summative assessment focussing on capacity building and training of members of the consortium and co-creation teams who were evaluators of the events (BigPicnic outreach exhibitions, science cafés, final festival). The QMT supported evaluators in designing the evaluation approach (i.e. which data collection methods will be used suitable for the events and practices they wanted to document). Events were evaluated using local priorities and criteria, devised collaboratively and ensured a wide range of events and locations were selected. Analysis and interpretation of the findings was situated in the local/regional context, and the findings/outcomes of the evaluation studies were used to improve further events as well as to assess processes and impact.

b) The evaluator practitioners' manual (see D7.2) included guidelines on how to structure and run reflective practice while implementing the events. It was based on the TBI inquiry cycle: question, investigate, reflect, and improve.

c) The QMT also worked collaboratively with other consortium Partners to evaluate the process and outcomes of the project itself (PEA).

Finally, during the External Review of the project in June 2017 it was suggested to complement the largely qualitative studies carried out as part of TBI with a large-scale survey that would focus on food choices. The focus of the survey reflected the overwhelming evidence generated through the qualitative studies, which identified the central role food plays in developing and sustaining personal and collective identities. Food as (intangible) cultural heritage came up as an overarching theme during the co-creation sessions, in particular. Yet, there is hardly any mention of it in food security policies at the European (e.g. Food 2030) and global level (e.g. SDGs). Raising the profile of food heritage was seen as one of BigPicnic's key contributions, especially on a policy level (see also policy recommendations: https://www.bigpicnic.net/resources/bigpicnic-recommendations/). The key findings of the survey are presented in Annex 4 below.

### 1.4. Scope of the Quality Management

Reflecting the project's participatory nature, the evaluation process adopted a participatory/dialogic communication approach 'fitting in' to participants' own norms and procedures for ethical practice and acknowledging the multiplicity of ethical frameworks, approaches, ethical guidelines and review practices existing in complex community-based research (Carcasson, 2009). This developmental,

democratic and deliberative approach to evaluation (Howe and Ashcraft, 2006), where all project Partners and participants become a resource for identifying and addressing ethical issues and dilemmas by bringing in their knowledge, experience and practices of ethics, mirrors the project's ethos driven by theories of dialogic pedagogy (Hooper-Greenhill, 1999; Lindauer, 2007) and deliberative democracy fostering a more engaged citizenry (Dryzek, 2010; Escobar, 2010; Parkinson, 2006; Sirianni, 2009).

### 1.4.1. The Process Evaluation Approach (PEA)

Process evaluation is based on the idea that Partner organisations themselves are taking part in a highly rewarding learning process when participating in an international European project. However, these learning processes are hardly ever documented. Thus, the BigPicnic Quality Management wanted to raise awareness of this important aspect not only for Partner institutions themselves, but also for the European Commission and other funding organisations. Project evaluation which is simply focussing on quantifiable outcomes such as the number of people reached, number of clicks on web pages, number of public and scientific publications, or number of report pages will always fall short of demonstrating the true value and the impact of international educational projects. A cultural psychology design based evaluation approach was previously developed for the INQUIRE project which was adapted to the needs of the BigPicnic Partners (Kapelari, 2015). This approach was based on the Engeström's idea of 'Expansive Learning', which is very similar to the underlying theory of TBI and is particularly concerned with:

- learning of new forms of activities as they are created rather than the mastery of already known and well-defined existing knowledge and skills;
- collective learning rather than individual learning; and
- although it acknowledges vertical learning Engeström (2000) suggests that 'we focus on constructing a complementary perspective, namely that of horizontal or sideway learning and development (p. 533)'.

### 1.4.2. Co-creation

Co-creation is an innovative and participatory process which aims to create shared ownership of a project between institutions and community Partners. Co-creation enables professionals to co-operate with and learn from others, to build a connection between groups that would not normally meet, to raise awareness and sensitivity towards important issues and to build relationships between groups and individuals that will last well beyond the scope of a project.

Though BigPicnic aims to train all gardens to work effectively and efficiently in co-creation processes that they can adopt with local audiences, stakeholders and colleagues on the issue of food security, there is not a 'one size fits all' approach. Working in specific local contexts leads to a great variety of approaches, a multitude of locally relevant audiences and stakeholders and to diverse outcomes of all local co-creation activities with respect to each individual garden's goals and abilities. With this wide variety of contexts in mind, a working structure has been given to the Partners, which allows room for flexibility and is adaptable to local specifics. Each garden is then able to use whatever strategy is most feasible or most relevant to their context.

Co-creation is central to BigPicnic as a strategy for the botanic gardens to engage with new and existing communities on the topic of food security. The aim of co-creation is to create shared ownership with your audience, stakeholders and allies and often also colleagues within the same institution. Co-creation enables professionals to collaborate with and learn from others, to find a connection between groups that would normally not meet, to raise awareness and sensitivity towards important issues and to build relationships between groups and individuals that exist well beyond the scope of a project. Co-creation is hands-on and creative by nature; its aim is to create shared value in collaboration with other communities.

*"The result [of co-creation] is a project that is truly co-owned by institutional and community Partners."*[1]

### 1.4.3. TBI

As mentioned above, the evaluation process integrated a participatory approach by adopting the TBI methodology. TBI according to Pattison et al. (2013, p.6) is a 'tool for helping those without formal training in evaluation to use data collection, evaluative thinking and data-based decision making to inform their work and more effectively achieve their educational goals'. The evaluation methodology was sensitive and responsive to the needs, values and priorities of the local and regional audiences (i.e. consortium members and co-creation teams) involved in the project and was based on the principles of participatory evaluation (Preskill and Torres, 1999; King, 1998) and evaluation capacity building (Cousins et al,. 2004, Huffman et al., 2008; Volkov and King, 2005). Built on a cycle of question, investigate, reflect and improve (see table 1), the TBI approach empowered individuals, organisations and research institutions involved in the project to build skills and capacity to conduct inquiry and evaluation. The evaluation methodology provided: 1) a framework within which practitioners worked and which they can apply to similar projects (D7.3 and D7.1); and 2) a guide for assessing RRI activities (see D7.1). Finally, it is worth reiterating that TBI had a dual purpose: it provides evidence related to the process and impact of the activities and events ran by BG Partners, and it was also used as a catalyst for change in BG practice.

| **TBI approach cycle** | **Definition** |
|---|---|
| Question | co-identification of the types of information the consortium Partnership and the members of the co-creation teams need to inform their work, and co-formulation of this information need as inquiry questions |
| Investigate | co-collection of data and information in a way that is best suited to answer the inquiry questions and that is practical and feasible within the constraints of the project |
| Reflect | discussion and co-analysis of information collected, co-articulation of key findings and lessons learned |
| Improve | support of the consortium Partnership and the members of the co-creation teams to inform their work based on the findings of the project |

*Table. 1:* TBI approach cycle and description

[1] Simon, N., 2011, The Participatory Museum. [online] Available at: http://www.participatorymuseum.org/read/ [Accessed 28th November, 2016]

## 2. Responsibilities of the Quality Management Team

The QMT facilitated a clear systematic approach for achieving project goals. This was achieved through:

- Ensuring the evaluation processes carried out are efficient and effective, timely and carried out within the ethical guidelines developed by the consortium and the members of the co-creation teams.
- Supporting and /or training the consortium Partnership and the members of the co-creation teams to become effective evaluators.
- Leading the co-production of a draft and final Quality Management Plan.
- Leading the co-production of a draft and final evaluator practitioners' manual.
- Co-assessing the process and outcomes of the project.
- Co-developing tools for measuring the engagement of the consortium Partnership and members of the co-creation teams with RRI and benefits of the co-creation, participatory approach adopted in the project.
- Co-developing an evaluation framework to be used by similar projects.
- Co-developing a manual/handbook for practitioners and professionals involved in the project.

In order to achieve the above goals, the Partners responsible for quality management broke down responsibilities into achievable tasks:

1. Task 7.2. The QMT managed and implemented the agreed Quality Management Plan (e.g. checklists, feedback analysis and loops, etc.).

2. Task 7.3. The QMT continually supported Partners in developing and running their project activities, through: training, reflective sessions and workshops as required during meetings; in-country visits to Partners where appropriate; via email and social network sites; face-to-face meetings. This included reviewing evaluation plans, data collection tools, data analysis categories, other analytical tools, draft reports.

3. Task 7.4. The QMT updated the QM Plan, responding to changing circumstances and local/ regional needs of co-creation team members. Maintaining a good working relationship with all stakeholders (i.e. the MB, the consortium Partners and the members of the co-creation teams) along with a flexible approach ensured efficient and effective project processes and supported the development of a 'spirit of community'.

4. Task 7.5 Partners reported to the QMT, providing data and feedback on a timely basis, and attended training / support sessions as required over the duration of the project.

5. Task 7.6. The QMT produced the current QM report, detailing the effectiveness of the project through the presentation of the evaluation of the project process and outcomes.

6. Task 7.7. The QMT produced a common definition of RRI, emerging through the understanding and practice of project stakeholders (see section 5.4 below). This project stakeholder-wide shared understanding of RRI was disseminated in an accessible format to suit the consortium Partnership, the co-creation team members and other external audiences (e.g. people working on similar projects, researchers/ academics working in public engagement or informal learning, museum and heritage professionals, SMEs and community organisations).

## 2.1. Quality Checkpoints Within The Project (QCP)

This section outlines the quality assurance processes that were used in the BigPicnic project and when they were used. Each quality checkpoint (QCP) described who will be involved, the criteria used for evaluation and who will review/approve the results.

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| QMP 1. Setting up I<br>- Creating a common project structure and methodology |

WPs 1 and 2 provided the foundations of the project, WP 1 was dedicated to setting up the project, including a kick-off meeting to discuss, refine and agree on project structure and methodology.

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| QMP 2. Setting up II<br>- Co-creation teams and developing a community of practice<br>- Develop a shared understanding of RRI, co-creation and TBI promoted in this project<br>- All Partners acquire the essential knowledge to accomplish the BigPicnic co-creation, picnic baskets, outreach exhibitions and science cafés successfully |

The central features of this QCP were community of practice and professional learning. This work package was dedicated to developing a shared understanding of RRI, co-creation and TBI, with all Partners participating in the process. Supported via their co-creation teams, Partners collected information e.g. understanding of food security, culturally sensitive evaluation methods, etc. Through a three day 'Train the Trainers' (TtT) meeting, WP 2 built Partners' capacity to develop and manage co-creation projects and activities using a range of techniques. A review of running science cafés was held and consortium Partners worked together to develop a shared understanding of RRI. This ensured that Partners had the skills and knowledge required to deliver the three phases of the project.

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| QMP 3. Engaging different publics with food security through co-creation activities<br>- Designing and developing outreach exhibitions<br>- Designing and developing associated activities some of which can be taken home |

The main goal of the project was to co-create and deliver outreach exhibitions, science cafés and engagement events and activities to engage a variety of publics with issues of food security from an RRI approach. Hence, WP 3 corresponded to the delivery of the 1st phase of the project. It was dedicated to designing and developing the 'in-country' outreach exhibitions, along with sets of activities to be used in association with the exhibition or take home activities to be given out at exhibitions.

QMP 4. Scheduling & implementation
- Developing, scheduling, agreeing content and format and delivering science cafés

WP 4 represented the 2nd phase of the project in that it involved developing, scheduling, agreeing content and format and delivering science cafés / debates and discussions in local venues or at Partner sites.

QMP 5. Consolidation
- Consolidate the learning and findings from WP 3 & 4
- Organisational change evaluation
- Reporting on RRI & food security
- Developing a co-creation toolkit
- Providing networking training

The 3rd phase of the project, consolidation, was the focus of WP 5 which aimed to consolidate the learning and findings from the previous two WPs and evaluate whether organisational change had taken place. The project findings and processes were cascaded through a report on RRI and food security, reflecting the opinions and views of the public, a toolkit on co-creation and by providing networking training to engage further organisations in co-creation activities and events.

QMP 6. Dissemination
- Disseminating information and knowledge between Partners and society

WPs 6 to 9 were functional throughout all phases of the project. WP 6 focused on disseminating information and knowledge between Partners and society.

QMP 7. Partner-run evaluation
- Developing a reflective TBI practice approach to evaluation
- Delivering TBI training and ongoing support to Partners

WP 7 represented the Quality Management for the project and focused on the evaluation processes carried out by Partners (consortium and members of the co-creation teams). This activity was supported through training and developing a reflective TBI practice approach.

QMP 8. Project management
- Ensure timely execution of all project relevant activities
- Ensure smooth and effective communication between all Partners
- Internal assessment of the work done during the course of the project

The BigPicnic Management Board was responsible for the day to day operation of the project to ensure that project milestones were reached within the proposed time and agreed upon deliverables were issued in a timely manner as well as of high quality. The managerial responsibility was assumed by the project coordinator (BGCI). The coordinator and the project management team monitored the timely execution of all activities, communication and were assisted by the management board in terms of the internal assessment of the work completed. An example is provided in Annex 1: This task – to produce a draft strategy for co-creation was circulated to all

Partners through Glasscubes (a web-based online collaboration tool and project management platform).

| QMP 9. Ethical considerations<br>- Developing culturally sensitive ethical guidelines |
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The ethical considerations surrounding the project were catered for by WP9. This involved the development of ethical guidelines, which were discussed at the first consortium meeting and then amended with any country adaptations. These were used to inform best practice, behaviour and responsibilities to support Partners in developing activities. Ethical guidelines related to particular stages were defined and agreed prior to starting that aspect of the project (e.g. guidelines for recruiting audiences were drafted and agreed prior to recruitment).

| QMP 10. Ethical requirements<br>- Ensure compliance with 'ethics requirements'. |
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The project complied with the ethical requirements set out in WP10. The three deliverables from this WP (H-Requirement No. 1, NEC Requirement No. 2 and NEC requirement No. 4) were delivered in month 5.

### 2.2. Supporting Quality Processes

The following section presents the theoretical and methodological framework that underpins the BigPicnic project and the Quality Management processes. It explains how the quality requirements for activities were achieved through the development of a culture of participation and reflective practice, organisational learning and change.

## 3. Theoretical Considerations

### 3.1. Theoretical Framework

Our understanding of knowledge and how people gain and finally use this knowledge is central for our understanding of education in general and western educational goals and educational systems in particular. In addition it is important to conceptualise knowledge as supporting individuals or groups or even organisations to gain knowledge is a central goal for any educational activity.

Ann Sfard (1998) used two metaphors to explain how knowledge is created. The most broadly accepted one sees knowledge as a property of each individual's mind. 'It is a matter of construction, acquisition and outcomes, which becomes visible in the process of using and applying this knowledge in new situations'. The acquisition is held in contrast to the participation metaphor. The latter sees knowledge as a process of participation in various cultural practices and shared learning activities. 'Knowledge in this metaphor is seen as an aspect of cultural practices. Learning is situated in networks of distributed activities'. Knowledge is although a matter of enculturation and learning thus situated in this culture. Paavola and colleagues (2004) suggest a 'metaphor of knowledge creation' as a new and third one and Engeström and Sannino (2010) address concepts such as participation, expansion and translation as relevant alternatives (Kapelari, 2015, S.14-15).

BigPicnic objectives are asking for knowledge development such as improving the understanding and realisation of RRI or building the capacity of botanic gardens across Europe to develop and deliver co-creation approaches with their local and regional audiences. However this knowledge is only partly constructed in individual people's brains. Some is developed while people work together and create new ways of understanding their practice. Thus it is situated in a Community of Practice.

### 3.1.1. Communities of Practice (CoP)

Situated learning, as emphasised by Lave and Wenger (1991) and a couple of colleagues following them later emphasing the idea that knowledge is created jointly and is unique to a given situation. Each participating individual may construct and acquire knowledge to a given extent while participating in a situated learning process. However, this knowledge is not equal for all members of the group. Learning is not something that takes place in the isolated individual only while acquiring new ideas, concepts and knowledge but is produced and reproduced in the social interaction of individuals when participating in a society. Lave and Wenger (2004) termed groups of people sharing and improving their knowledge collectively, communities of practice (CoP) and considered them important change agents for organisational development.

Etienne Wenger (2000) argues: 'Communities of practice grow out of a convergent interplay of competence and experience that involves mutual engagement. They offer an opportunity to negotiate competence through experience of direct participation. As a consequence they remain important social units for learning even in the context of much larger systems' (p.229). Education institutions such as botanic gardens, museums, etc. house such communities to various extents. These CoPs, be it educator, scientists or the management interact with each other to a given extent. How and whether this interaction works is crucial to organisations development and institutional adjustments to a changing environment.

However, Amin and Roberts (2006) argue that:

> 'Alongside the increasing popularity of communities of practice research, the approach has begun to attract criticism concerning, for instance, the neglect of power, its failure to take into account pre-existing conditions such as habitus and social codes, as well as its widespread application within organisational studies beyond its original focus on situated learning, and the term 'community' itself, which is problematic, embodies positive connotations and is open to multiple interpretations' (p.4)

Engeström and colleagues try to explain the interaction taking place in organisations with a model called Cultural Historical Activity Theory (CHAT).

As such this model is helpful to overserve and explain why some botanic gardens are open to change whereas others are reluctant.

### 3.1.2. Cultural Historical Activity Theory (CHAT)

CHAT is not a theory but a whole set of metaphysical and epistemological assumptions of how to examine e.g. a particular problem or inter-organisational learning and development. Engeström (2000) argues that CHAT is a general cross-disciplinary approach offering conceptual tools and methodological principals, which have to be tailored to the specific nature of the system observed accordingly.

Sociocultural approaches to learning and development have the potential to recognise the essential relationship between learning processes and their cultural, historical and institutional setting. CHAT argues explicitly that any activity is connected to cultural as well as historical processes. In addition it provides a link between individual learning and learning taking place among organisations.

As an analytical framework, it appears to be helpful to analyse the developmental processes occurring in the multicultural European BigPicnic consortium.

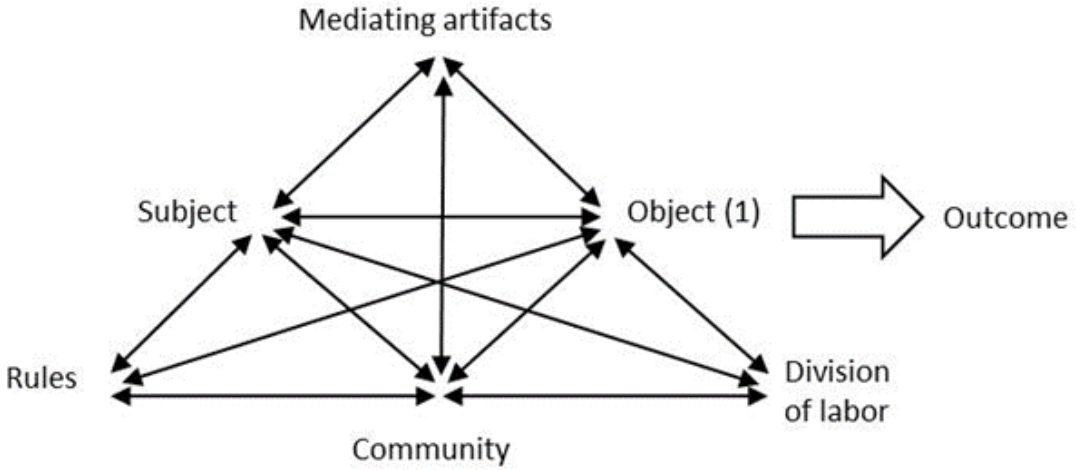



*Fig. 1:* A Botanic Garden is an Activity System (Engeström, 1987, p.78).

In terms of the BigPicnic project, the SUBJECT is a person or a group of individuals representing a particular botanic garden participating in the international consortium. These people, mostly the person or team working in the education department meet on a regular basis and exchange knowledge and experience gained while working towards project specific objects.

For each consortium Partner these OBJECTs are the BigPicnic project goals and objectives. These are developing a shared understanding of food security, adopting a collaborative and inclusive (co-creation) as well as reflective (TBI) approach to implement OUTCOMES, such as exhibitions, workshops and science cafés designed and implemented to engage a given target group of people in RRI and have a debate on food security related issues.

To work towards a given object the botanic garden team needs tools, instruments or mediating artefacts (Fig.1.). These tools are either individual knowledge or situated knowledge created in a co-creation event or Team-based Inquiry (TBI) setting.

Thus one analytical focus is put on whether and how BigPicnic Partner organisations adopt new and challenging ways of approaching a more or less familiar object.

Facilities in the garden or a particular exhibition hall or science café setting are also considered to be mediating tools in this respect.

In addition there is a COMMUNITY at each botanic garden site in which the activities takes place. This community consist of members of the larger group of garden employees (e.g. members of the

communication department, scientists, administrative staff, etc.), which are sharing more or less the same objects. The botanic garden community consist of people personally engaged in the implementation of BigPicnic goals on site and people working in the garden more or less involved in this process. The members of the community divide labour (DVISION OF WORK) amongst them, e.g. gardeners nurturing plants in general and food plants in particular or graphic designers producing leaflets, the garden directors or even the ticket sellers working at the exhibition entrance.

Finally the activity system has its own RULES and conventions that make members of botanic gardens behave in a particular way. These rules are norms and traditions, which are more or less explicitly understood and accepted by community members.

In CHAT terminology, the BigPicnic consortium is the place where inter-organisational learning takes place and activity systems work together to produce shared objects (see fig. 2).

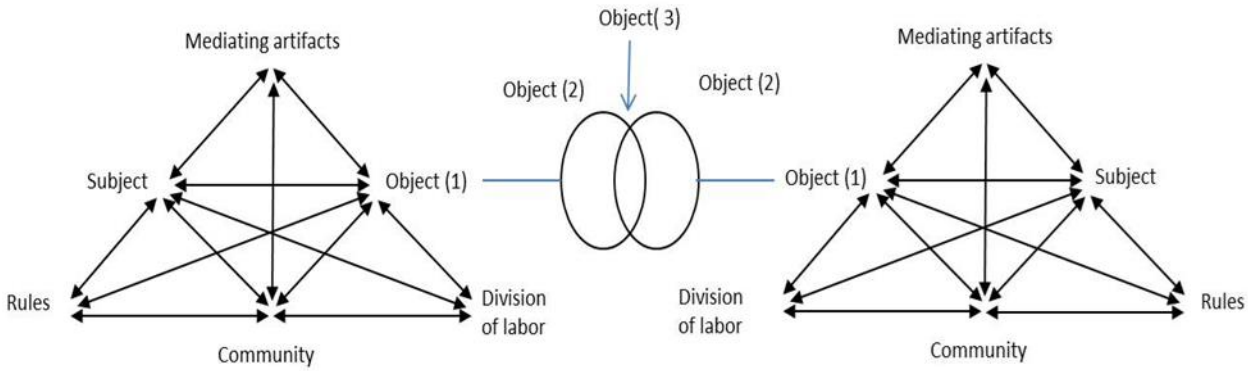



*Fig. 2:* Two botanic garden activity systems interacting as minimal model for inter-organisational learning (Engeström, 2001 p.136, cited by Kapelari, 2015)

A SHARED Object are e.g. project deliverables such as the science café and the co-creation toolkit, the Final Festival in Madrid, policy recommendations or project reports.

To understand inter-organisational learning we need to observe these collective outcomes the consortium has produced.

### 3.1.3. Expansive Learning (EL):

A fundamental assumption of sociocultural approaches to learning and development is that actions, rather than the human being or the environment considered in isolation, provide the entry point into the analysis. In this respect Engeström's 'Expansive Learning Theory' adds another set of 'somewhat philosophical' perspectives which need to be considered in this framework.

An Activity System respectively a botanic garden, 'resolves its pressing internal contradictions by constructing and implementing a qualitatively new way of functioning for itself'. (Engeström, 2007, p.24). However this is not a one way movement from incompetence to competence but includes horizontal movement while learners construct new concepts or objects for their activity. Thus expansive learning is concerned with learning of new forms of activities as they are created rather than the mastery of already known and well-defined existing knowledge and skills. It is mainly

concerned with collective learning rather than individual learning and although it acknowledges vertical learning Engeström (2000) suggests that 'we focus on constructing a complementary perspective, namely that of horizontal or sideway learning and development (p.533)'. A particular example for expansive learning is the approach Partner organisations took to develop and implement science cafés.

However whether and how this knowledge becomes organisational memory and leads to sustainable change of practice asks for another theoretical perspective.

### 3.1.3. Organisational Learning (OL)

Many scholars have dealt with finding ways to deal with the area of conflict between the learning as an individual task or as a teamwork. One approach is the so-called 'integrationist perspective' by developing a theory of 'organisational learning' (Starkey et al., 2004).

According to this perspective Dyck and colleagues (2005) argue that 'organisational learning begins with cognitive processes of individuals and is enhanced and preserved by organisational processes (p. 388). If learning is valued as a situated process in a social context the individual learner cannot be the only centre of attention. The social group, subgroup or organisation in which this learning takes place has to be recognised as an entity for learning. It is necessary to understand the process through which individual learning advances organisational learning and to address the role individual knowledge and memory plays in the process through which individual learning becomes embedded in the organisation's memory and in its structures (Kapelari, 2015).

'Organisational memory and knowledge' is the capability all members of an organisation have developed collectively over time. Its application depends on historically evolved collective understanding and experience. To draw distinctions in the process of carrying out their work in a particular concrete context, members of the organisation enact sets of generalisations (Kim, 2004). How learning is expected to take place, what is valued as important and what is assumed to be 'good teaching' or a 'successful exhibition' at a botanic garden, Zoo or Natural History Museum is not only a matter of each individual educator's understanding. It is influenced by organisational traditions, knowledge and experience accumulated over time. This may or may not be recognised or valued explicitly.

Organisational knowledge can be embedded in a variety of repositories such as educational programmes, including individuals, routines, and trans-active memory systems. A collective understanding of organisational knowledge is seen as a key to understanding organisations' growth. This knowledge enables the organisation to use its resources accordingly. It is a distinctive way of thinking and acting in the world (Kim, 2004).

Thus from this perspective, organisational learning is defined as a change in the organisation's knowledge that occurs as a function of experience. Organisational knowledge herein includes declarative knowledge, such as facts, and procedural knowledge, such as skills and routines which are shared in a particular community. Organisational knowledge may be measured either by the cognition of organisational members or by taking a behavioural approach. The latter focuses on knowledge embedded in performance such as accuracy or speed, etc. or in practices or routines. Changes to those are accepted as changes in knowledge. Thus organisational learning can be defined

as a change in the range of potential behaviours. However, it needs to be acknowledged that organisations may acquire knowledge without a change in behaviour (Argote, 2013).

Research in organisational behaviour studies the impact that individuals, groups, networks or structures have on behaviour within an organisation.

The purpose is quite similar to what this Quality Management report wants to achieve.

# 4. Methods

## 4.1. Introduction

This section presents the specific TBI and PEA evaluation methods used to collect evidence related stakeholder understanding and engagement with food security issues, and to organisational learning and development.

## 4.2. TBI Evaluation Process (Methods, Tools and Criteria)

TBI is an evaluation framework designed to help botanic garden practitioners to evaluate their projects and reflect on their practice. The key aspect of the TBI is that it is not an evaluation system conducted by an external evaluator, but aimed at developing capacity and knowledge exchange within each organisation, and creating spaces for learning and reflection. TBI is a form of action evaluation which is often used in complex social interventions where the aim is to help practitioners and other stakeholders (e.g. members of the co-creation teams) define and then formatively re-define project effectiveness, and to forge effective action/practice (Rothman 1998). As such, its philosophy and ethos reflects that of RRI and the co-creation approach to engagement utilised by the BigPicnic project.

TBI was originally developed by the NISE net (Nanoscale Informal Science Education Network), a community of informal educators and scientists, based in North America, dedicated to fostering public awareness, engagement, and understanding of current science, technology, engineering, and math (STEM) (Pattison, Cohn & Kollmann, 2014). It was adapted by the BigPicnic Partners to address issues of importance to them and to reflect the social and cultural context within which each botanic garden was situated.

TBI is based around a four-stage cycle of question, investigate, reflect and improve (see figure 3). In the question stage the gardens identify their inquiry questions – what is the key information about a project that the gardens would like to find out? In the investigate stage they identify the appropriate methods to answer these questions and then collect the data to investigate these questions. In the reflect stage the gardens analyse the data, undertaking basic statistical methods if they have adopted a quantitative approach, coding the data if they have adopted a qualitative approach. In the final stage, improve, the gardens feed this information back into their project, improving activities and exhibitions through prototyping and also reporting back to stakeholders about the impact of the finished product.

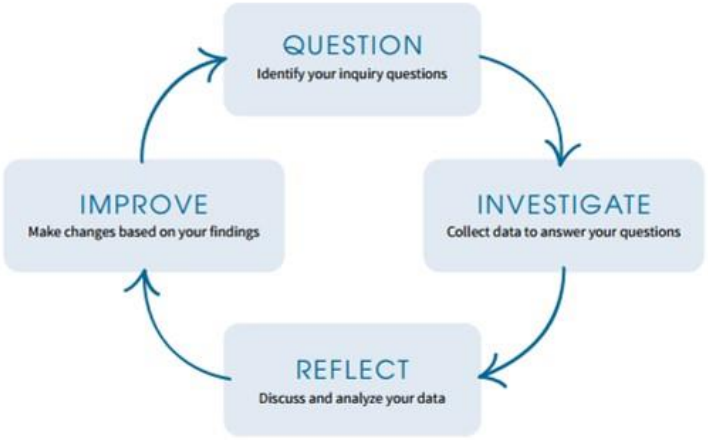



*Fig. 3:* TBI cycle of inquiry (Pattison, Cohn & Kollmann, 2014, p.5).

Botanic garden practitioners received on-going training and support (in the form of support visits, individual Skype meetings, and small group Skype meetings). These represented personalised support for Partners and an opportunity for participatory reflection.

### 4.2.1. TBI methods

#### *4.2.1.1. Interviews*

Interviews capture participants' thoughts, feelings and responses to particular activities they co-create. Botanic garden practitioners were provided with a set of interview protocols (see example in D7.2) which were adapted in order to meet the particular needs of the activity co-designed with community Partners, and to be culturally sensitive.

#### *4.2.1.2. Observations and field notes*

Observations capture how participants behave while they engage with an activity or an exhibition. Observations can focus on the entire visit of a participant or group, or they can be focused on particular activities. (See example in Deliverable 7.2: Practitioners Manual) Field notes tend to be more in depth and include both descriptive and reflective information (e.g. insights, thoughts, feelings) about the events, activities, actions and behaviours observed.

#### *4.2.1.3. Concept maps*

Concept maps are used to capture participants' views in their own words. They can also capture learning by assessing levels of understanding across four dimensions: i) the extent of someone's knowledge and feelings, the use of appropriate vocabulary; ii) the breadth of one's understanding, the range of someone's conceptual understanding, iii) the depth of one's understanding, how deeply and richly someone understands the concepts they use; and iv) mastery, the overall facility with which someone uses their understanding (including the emotional intensity associated with

someone's understanding). The latter is a holistic judgment which qualitatively takes into account the extent, breadth and depth of someone's knowledge. Moreover, concept map data have typically been analysed in a quantitative way (e.g., Falk, Moussouri and Coulson 1998).

#### *4.2.1.4. Feedback wall/tree*

A 'feedback wall/tree' represents an alternative way of capturing participants' thoughts and feelings about specific elements of an activity or an exhibition. As such they should pose a specific question such as 'What did you enjoy most about this activity?' and 'How would you describe this activity to a friend?'. 'Post-it' notes or labels can be provided for participants to write down their views of the events/activities.

#### *4.2.1.5. Surveys*

Surveys are most useful when the aim is to gather participant feedback on something specific, hear from a lot of people in a short amount of time, or provide participants extra privacy when answering questions. Surveys can help understand what participants like and do not like about the activity/event/exhibition, how they are reacting to specific aspects of the experience, or the kinds of messages or ideas they are taking away.

#### *4.2.1.6. Video data*

Video is used to record naturalistic behaviour or can be used by participants to develop video diaries of their thoughts and feelings in relation to a particular event or question. Video data can be analysed as text and/or observation data and can be re-visited or watched back many times (unlike observational data).

#### *4.2.1.7. Documenting the TBI process*

A number of tools were used to document the TBI, capturing the full TBI cycle of inquiry from questioning and investigating to reflecting and improving (see examples in Deliverable 7.2: Practitioners Manual).

### 4.3. PEA Evaluation Process (Framework and Methods)

#### 4.3.1 Framework for analysis

The underlying assumption of this theoretical approach is that, while designing and developing the activities for the BigPicnic outreach exhibitions as well as designing and running co-creation workshops and science cafés, the consortium Partners develop new knowledge about the activity, its assumptions and contradictions. Partners were expected to consciously understand the characteristic of their knowledge gaining process because their own learning cannot be separated from the activity.

Engeström's (2001) dynamic model of an activity system was used to explain the interactions between a subject (BGPartner), object (BigPicnic exhibition; science cafes, co-creation workshops),

mediating artefacts (activities initiated by the BigPicnic Management Board; BigPicnic description of work, etc.), rules (established at the Partner institutions)), communities (staff members in the organisation, members of the co-creation team, the BigPicnic consortium; other networks the BigPicnic Partner organisation is a member of), and division of labour (who is doing what on behalf of the BigPicnic Partner organisation).

A short overview of how we applied Activity Theory in BigPicnic in order to analyse and interpret data in relation to Engeström's (2001) principles is presented below:

1. The prime unit of analysis is a collective, artefact-mediated and object-oriented activity system. The subject (BG Partner, those attending the consortium meeting and predominately working on BigPicnic tasks = the CoP) is seen in its network of relations within the activity system (BigPicnic organisation, such as the whole botanic garden the BG Partner is a part of, or the University or City Council the botanic garden is a subunit of).(Goal directed individual and group actions (exhibition design, science café development and implementation, TBI report , posters presented at meetings, etc.) are relatively independent but subordinated units of analysis, understandable only when interpreted against the background of the entire activity system.

2. An activity system is always a community of multiple points of view, traditions and interest. The division of labour creates different positions for the participants (hierarchy in Partner institutions). The participants bring with them their own diverse histories and the activity system itself carries multiple layers and strands of history encapsulated in its artefacts, rules and conversations. The network multiplies this 'multi-voicedness' and is a source of both problems and innovation, demanding actions of translation and negotiation.

3. Activity systems get transformed and shaped over the length of time: The history of the entire activity system (BigPicnic organisation ) needs to be studied both as a 'local history of the activity and its objects' and as a 'history of the theoretical ideas and tools that shape the activity'.

5. Activity systems are open systems. Contradictions accumulate structural tensions within and between activity systems. When one activity system adopts new elements from outside this may clash with already existing ones, generating disturbance and conflict, but also innovative attempts to change the particular activity.

7. There is a possibility of expansive transformation in activity systems; however, they move through relatively long cycles of qualitative transformation. As the contradictions of an activity system are aggravated, some individual participants begin to question and deviate from established norms. An expansive transformation is accomplished when the object and motive of the activity are reconceptualised to embrace a radically wider horizon.

### 4.3.2. PEA Evaluation Methods

#### *4.3.2.1. Interviews*

Semi-structured interviews were conducted with all Botanic Garden Partners (at least one sometimes two representatives). They were transcribed and analysed following the content analysis

approach suggested by Mayring (2008). A deductive as well as inductive coding scheme is used for analysing interview transcripts.

In addition interview transcript provided by the external evaluator Qualia Analytics, conducted during the second Partner meeting in Edinburgh (May 2017) and via skype interviews (November - December 2018; see External evaluation report, D. 8.2) were included in this analysis procedure.

#### *4.3.2.2. Artefact analysis*

'Artefacts become data through the questions posed about them and the meanings assigned to them by the researcher. There is no one right way to analyse artefacts. A wide range of disciplines informs the analysis of artefacts, including anthropology, archaeology, art history, history, human geography, ethnography, and sociology. In the process of analysis, we are asking the data to tell us something. An artefact has a story to tell about the person who made it, how it was used, who used it, and the beliefs and values associated with it' (Norum, 2008, p. 1). Mediating artefacts in BigPicnic are: TBI reports, science café case studies, posters, co-creation activity reports, outcomes of group work done during meetings; reports and deliverables.

Whenever applicable, the same coding scheme used for analysing interview transcripts was applied to text-based artefacts.

### 4.4. Applied Methodology

A set of documents (poster, group work presentations, reports) and text based communication artefacts (interviews) was collected in the course of the project. They were analysed via inductive (codes developed from the text) and deductive (codes developed from research literature) content analysis.

Data source included:

- documents from first Partner meeting (poster, free writing activity; 20 & 21 June 2016)
- Interviews conducted by the external evaluator during the 2nd Partner meeting (17 & 19 May 2017)
- Interviews conducted by a PhD Student during the 4th Partner meeting (4-6 July, 2018) and the Final Festival and 5th Partner meeting (27-28 February 2019)
- Interviews conducted by the external evaluator via Skype (November –December 2018)
- Science café evaluation report
- Co-creation report
- TBI – Forms
- Report on exhibitions

## 5. Findings

### 5.1. PEA evaluation questions:

As explained in section *3. Theoretical Considerations*, process evaluation studies the impact the BigPicnic project has and will have on behaviour within a Partner organisation. Organisational learning will be one sustainable impact this project may have after it has ended. Thus, evaluation questions target the central goals the BigPicnic project wanted botanic garden Partners to achieve.

Understanding food security as a source of topics suitable for botanic gardens to address is a crucial learning goal. Botanic gardens in general do not focus on food plants but on the conservation of autochthonous plant diversity. Thus, Partner botanic gardens have to tap into a new field of action which may cause frictions and less acceptance in their own organisational environment. Understanding RRI as a participatory and reflective approach to research and practice is another challenge botanic garden Partners faced. The traditional way of designing educational activities is predominantly didactic in a broader sense. The botanic garden as a scientific authority is usually in charge of selecting the knowledge considered appropriate to be communicated to the public. BigPicnic asks gardens to approach a new path and co-create the content as well as the design of exhibitions, science cafés and workshops jointly. Not only scientist and educators but people with different backgrounds and expertise, different perspectives and interests were working and creating new and sometimes unfamiliar learning environments. Finally botanic gardens are asked to adapt a reflective approach and apply TBI to improve their practice systematically. This was another challenge not particularly unique for botanic gardens but for many informal education institutions. However adopting co-creation and TBI is fundamental to become a hub for RRI. RRI asks the scientist and the public to take over responsibility and become inclusive and reflective citizens. If botanic gardens want to use their full potential of being a platform for people to participate actively in research and innovation, they need to become reflective and inclusive practitioners themselves.

The PEA Framework enables the Quality Management Team (QMT) to focus on a set of theory based questions and select the perspective accordingly.

The following questions were used to analyse the data set described in section 4.4. Methodology.

1. **What are the key issues related to food security identified by the Partners through the TBI process?**
2. **Do project outcomes provide evidence for meeting project objectives (i.e. objects in the activity system)?**
3. **To what extent do BG Partners engage with 'Mediating Artefacts' (RRI, TBI and co-Creation)?**
4. **How do the division of work and established rules in a botanic garden mediate project outcomes?**
5. **What do Partner organisations consider sustainable outcomes of participating in BigPicnic?**

## 5.2. What are the key issues related to food security identified by the Partners through the TBI process?

The BG Partners organised various exhibitions and science cafés but also a wide range of other programmes that engaged with the topic of food security. Altogether through these activities the BG Partners managed to engage with a variety of audiences and using the TBI approach they were encouraged to reflect on both the process for answering their TBI question and their findings. This section contains a summary of the meta-analysis conducted on the TBI report findings about food security with the most significant categories that emerged from the metadata (see Annex 3 for more detail about the process, the methods and findings).

The two most important aspects covered by the TBI reports were the significance of nutrition for sustainable and healthy diets (approximately 60% of the TBI report findings) followed by the circularity and resource efficiency of food systems (a quarter of the data). 'Food Governance', the value of climate smart and environmentally sustainable food systems and 'Culture and Food' (all three emerging from around 10% of the reports) were also eminent.

Quality education was deemed the most important factor that can contribute to the improvement of nutrition and hunger alleviation. TBI reports identified the provision of food education as highly important and considered this to include 'the ability to know how to access information about food' but also the acquisition of food skills that can enable people to prepare healthy food and follow a balanced diet. All levels of education (primary, secondary and tertiary) featured as important and the role of the scientific community was also highlighted. The food choices that people make were underlined as vital for providing good health and boosting well-being while interviewees also frequently made references to safe food (e.g. not contaminated and not containing harmful substances). Various factors that can enable to effectively combat hunger included access to food (e.g. availability of food in the future and improving access to specific crops as resources), the cost of food and the availability for all people to consume food with nutritional qualities.

About a quarter of the findings from the TBI reports pointed towards the necessity of responsible food production and consumption as a way to achieve circularity and resource efficiency of food systems. The positive impact of producing fair trade and organic products as well as agricultural activity and framing practices that offered practical solutions to challenges and have minimal environmental impact were among the most prominent aspects. Consuming local food products and carefully considering food options (e.g. vegetarian diet as opposed to excessive meat consumption) were deemed important along with the crucial role of marketing and the tendency to reduce food waste.

TBI reports reflect, to a great extent, on calls for action on a political and societal level and have specifically identified informed citizenry, public engagement on decision-making and public opposition as important elements. This observation is supported by the fact that the category of 'Food and Governance' appeared in over half of the TBI reports and accounted for more than 10% of the total findings discussed by the BG Partners (see Annex 3). The three most important aspects highlighted were the importance to regulate food costs, the strong ethical considerations underlying food safety decisions and approaches on a political level, and the need for political measures on both national and international level.

A very interesting observation on the meta-analysis of the TBI findings is the emergence of the cultural and social values associated with food and the very significant role that food plays as part of peoples' cultural heritage and identity. This aspect of food and, by extension, food security revealed itself to be even more important bearing in mind that the questions addressed in the TBI reports and the nature of the activities on which these reports were based (science cafés, exhibitions, etc.) were not directly geared towards investigating aspects of food and culture. Nevertheless, nearly all of the BG Partners and more than half of the TBI reports they produced made some kind of reference to this aspect. Among the most prominent categories that emerged were the significance of 'traditional eating', the role of food in the context of migrant communities, cultural diversity in food use and the

importance of certain food products or dishes for triggering food stories/memories and for providing a certain social context of eating that is vital for people. This observation supported the change of the food security definition which recently added 'heritage' to 'access', 'sovereignty' and 'safety'. This was a recognition that 'supporting culinary traditions' and 'acknowledging that they help to shape and are shaped by personal and collective identities' is an equally important parameter in the overall conceptualisation of food security.

Finally, the TBI reports emphasised the impact of food systems to climate change and the importance of environmentally conscious actions. In this context the negative impact of climate change on food production was stressed along with various recommendations on how food production can be improved. In addition, food transport and the necessity for countries to balance the amount of imported products were underlined.

### 5.3. Do project outcomes provide evidence for meeting project objectives?

One overarching goal for BigPicnic was to bring together the pubic, scientists, policy makers and industry to generate dialogue and built greater understanding of whether and how a sustainable development of food systems may be achieved.

A total of 102 science cafés attracting a total number of 6,052 participants were organised in all Partner countries to engage the public in this dialogue. In addition, 103 exhibition activities were organised and attended by 178,261 people across a broad range of audience.

Science café and exhibition reports provide evidence that expansive learning has taken place with all Partners co-creating science café and exhibition designs most appropriate for a selected target group. Exhibitions have been delivered in a variety of locations to ensure the project reach is as wide as possible. Some exhibitions have even been shared between Partners of different countries (see Deliverable 3.1: Exhibition case studies). Exhibition design was versatile ranging from traditional designs with hands on activities and posters to a mobile outreach activity kit transported on a bicycle. Science café locations became fishpond grounds, conference centres, pubs or even private homes. Partners experienced different ways of including non-science experts as well as hands-on activities to help participants get into dialogue more easily. Expansive learning values practice that is not focusing on mastering a predefined task, e.g. an already published concept of 'how to run a science café' but working toward a most effective version appropriate in a given context. However, expansive learning is characterised by reflection and adaptation. Thus transferring TBI skills to collect data on food security issues as well as to improve a given science café and exhibition design was a pre-expected learning goal which most Partners mastered perfectly.

Science café case studies (Deliverable 4.2) and Exhibition case study (Deliverable 3.1) provide solid evidence that BG Partners used co-creation as well as TBI tools to design, apply and improve their science café approach as well as their exhibition design. They reported on lessons learned and how they adapted their ideas as well as generated new variations of the theme. Themes and topics summarised under the umbrella term 'food security' are mostly societal as well as scientific. Thus, a science café falls short if scientists are the only experts invited. Science café reports show that most Partners invited experts from more than one field and managed to create a dialogue amongst

disciplines. Expert practitioners, such as cooks, bakers, chefs, etc. often act as a bridge between researchers and participants. Depending on the given topic, even children were considered experts when it came to decision making in schools. In addition to short expert talks, which are commonly done in science café settings to stimulate the discussion at the beginning, consortium Partners also used a wide range of creative and innovative ideas in order to invite participants to participate actively. Final interviews revealed that BG Partners value science cafés as innovative and successful approaches to improve their one understanding of a given topic. The scientific as well as the public view are valued as important sources of knowledge and a variety of perspectives are considered most rewarding. Most of TBI data collected in relation to exhibition activities points towards the positive impact on visitors of the exhibitions. They experience these spaces as a learning hub. The variety of offers and approaches which included activities, games, quizzes, film viewings, storytelling, cooking, food testing and culinary demonstrations (sensory experiences), interactives, botanic garden visits, etc. contributed significantly to this experience. Visitor feedback was clearly mentioned as something that would be used by BG Partners for other and future activities. BG Partners applied a variety of evaluation tools to collect data relevant to their own evaluation perspective.

Findings in term of this evaluation question indicate that where organisations have created 'expansive learning environments' and practice an expansive approach to learning, they also provide the basis for the integration of personal and organisational development.

### 5.4. To what extent do BG Partners engage with 'Mediating Artefacts' (RRI, TBI and co-creation)?

Through their participation in the BigPicnic project the BG Partners were exposed to the concept and definition of Responsible Research and Innovation which is seen as "an approach that anticipates and assesses potential implications and societal expectations with regard to research and innovation, with the aim to foster the design of inclusive and sustainable research and innovation." (European Commission, 2019a). An important aspect of Responsible Research and Innovation is its strong emphasis on societal engagement, which refers to taking stakeholders' and other relevant actors' views and standpoints into account from the early stages of the research and innovation process. According to European Commission (2019a), "Responsible Research and Innovation (RRI) implies that societal actors (researchers, citizens, policy makers, business, third sector organisations, etc.) work together during the whole research and innovation process in order to better align both the process and its outcomes with the values, needs and expectations of society."

In practice, the implementation of RRI can take different shapes and forms, which – to a large extent – depends on the type of the research, its topic and the specific innovation culture as well as the stakeholders and relevant actors involved. As noted by European Commission (2019a), "[…] RRI is implemented as a package that includes multi-actor and public engagement in research and innovation, enabling easier access to scientific results, the take up of gender and ethics in the research and innovation content and process, and formal and informal science education."

The way in which the different elements of RRI are prioritised and approached by different organisations depends on the nature of the organisation and/or the department involved as well as

the nature of the project at stake. In the context of the BigPicnic project, the way into the topic of food security was through public engagement and science education in informal science setting, that is the BG Partners. This choice was based on the fact the BigPicnic is a public engagement project and that the BG Partners are based in learning/education/interpretation/public engagement departments within their organisations. According to European Commission (2019b), "public engagement (PE) in Responsible Research and Innovation is about co-creating the future with citizens and civil society organisations, and also bringing on board the widest possible diversity of actors that would not normally interact with each other, on matters of science and technology."

The PE literature covers a wide range of theoretical and methodological approaches to participation and points to different forms, methods and incentives to ensure that participation extends to the spectrum of societal actors being involved in shaping research and innovation processes. Based on the theoretical framework of the project, we made the decision to take a participatory approach to developing events and other activities and produces (i.e. co-creation); to collecting evidence about the process and outcomes of those activities, events and products (i.e. TBI); and to improving professional practice (i.e. TBI).

During the participation in the project and the application of co-creation and TBI, BG Partners developed a nuanced understanding of RRI and an appreciation of the key elements of PE in RRI: inclusivity and diversity; democratising the opportunities for different actors to have a say in key decisions that affect their lives and the lives of their children; involving citizens in shaping the questions that science needs to prioritise and answer regarding food security in a way that ensures quality of life; creating a platform within BG where different voices can be heard and different stories can be told in a way that shape research and innovation as well as contribute to collectively tackling common issues; and collecting, using and assessing evidence is as important as running activities and producing products. Furthermore, they understood RRI as a process rather than as an outcome; it is a way of thinking and acting in the world. Part of the process involves personal and professional development on the part of BG Partners so that they can be open, inclusive, truly engage in dialogue and develop skills and knowledge that leads to Partnerships and to extending their networks; Partnerships are essential for tackling complex societal issues such as food security. They also added more aspects to PE in RRI: they saw themselves as 'brokers' who can understand the world of scientists and citizens and communicate with them; and they also saw their work as contributing to the development of a new type of scientist ('a different kind of research person') who values PE in RRI. Finally, a critical approach to PE in RRI was also expressed: does greater representation lead to greater inclusivity since it is not possible to engage every citizen in the dialogue? What about those voices that are not heard?

A critical overview of the TBI reports compiled by the 15 BG Partners reveals how the afore-mentioned understanding of RRI was achieved and how the TBI approach was adopted and applied not only in the specific activities described but also in other subsequent activities undertaken for the BigPicnic project. The quality of engagement of the BG Partners with the TBI process can be testified by factors/indicators such as the amount of TBI reports compiled but more importantly the level of detail and depth of reflection afforded to each of the four TBI cycles – particularly on the last two, 'Reflect', 'Improve' (see Annex 2 which contains the relevant 'project summary sheet'). In addition, a series of critical incidents that were the result of the three-year plan of training development

(described in sections 1.2, 1.4.3 and 2) were also decisive in impacting the progress of the BG Partners.

It is clear that the TBI reports compiled after the second TBI training sessions, focusing on the coding and analysis of the qualitative data (held between April-July 2018), were lengthier and contained more detail and critical reflection. Compared to earlier documents, the vast majority of the reports produced after the training period had a more thorough reflection on the findings coupled with a systematic attempt to identify alignments with Food 2030 and the Sustainable Development Goals. The BG Partners made a good effort to correlate the data, summarise the meaning and in many cases illustrate the text with graphs and pictures. It is worth stressing that the sections that addressed TBI cycles 3 and 4 contained an evaluation of the methods used, the effectiveness of the process and interesting observations on how the findings would inform future practice and further activities. In a similar manner, the co-creation activity reports that the BG Partners compiled from the beginning of the project exhibited a steady progress in the length and quality of the content.

Another important parameter that has to be considered in the evaluation of the engagement of the 15 BG Partners with the TBI process is the previous experience in the conduction of qualitative research. Several of the Partners were taken out of their comfort zone in their attempt to employ qualitative methods and analyse qualitative data (rather than quantitative data that relies on numerical variables and statistical analysis with which BG Partners were more familiar). It is, however, significant to note that for those Partners whose team was familiar with qualitative research approaches (such as ethnobotany, anthropology and/or sociology), or who closely collaborated with people trained in relevant fields of study, the learning curve or threshold that had to be overcome was smaller. For these BG Partners, it was much easier to understand and adopt the TBI approach and their reports displayed early on their ability to tease out important issues and themes from the feedback of their audiences.

Overall, the level of collaboration and communication with the Quality Management Team as well as with the other BG Partners had also a significant impact on the adoption of the TBI approach. The budding group system adopted for some tasks and the knowledge sharing among certain Partners had a very positive effect and contributed to facing challenges and overcoming difficulties. Another factor that should not be overlooked is the size of the team working for the BigPicnic project in each botanical garden. The time-consuming process of qualitative data collection, transcription and analysis would not have been possible for some of the BG Partners without the valuable assistance of, for example, graduate or postgraduate students. Partners affiliated with universities or with close connections to relevant institutions had an additional advantage in this aspect while Partners who did not have this luxury were in certain cases challenged by the workload. As TBI places an emphasis on team-work and the active participation of as many members of the organisation as possible it was also evident that the BG Partners which managed to engage more staff in their work enjoyed the benefits of collective feedback and reflection on the various stages.

By the end of the BigPicnic project several of the Partners have indeed been convinced that the TBI approach will play a vital role in their future practice. Royal Botanic Garden Edinburgh (RBGE), for example, had from an early stage a very positive and creative attitude towards the TBI approach and the team actually contributed to the guidelines presented to all Partners for the coding and analysis

of qualitative data. In terms of the TBI process and particularly the digital storytelling that they employed, the RBGE gained valuable experience of a very useful methodology that they are already planning to implement in other international projects. The Belgian Partner (APM) have already built a reputation for working effectively with people of a variety of cultural backgrounds and their BigPicnic activities were very eloquently reflected upon through the TBI cycles and the reports they produced. The Portuguese Partner (ULisboa) have also very actively employed TBI and demonstrated this not only with their BigPicnic activities (culminating in their participation in the TBI workshop held at the Final Festival meeting) but also with their eagerness to embed this approach in their organisation and pursue future collaborations that would expand on the things they have learned.

## 5.5. How do the division of work and established rules in a botanic garden mediate projects outcomes?

As addressed in CHAT communities of practice are always situated in larger societal settings which have a major impact on their progression. Engeström's (2000ff) CHAT model explains how activities toward BigPicnic goals and objectives are mediated by the social context in which the national BG Partner is performing.

The community could range from a larger institution such as a university or botanic garden in which the BG education team plays a minor role to only a few people joining the BG Partner to help with administrative tasks. For the latter most of the staff is part of the BigPicnic team.

Partners frequently reported how their institutional environment had impacted on the ease with which project related information was communicated to decision makers or scientist in their own institution or outside their institution. Large organisations appeared to be less personal. The fact that they were in a different building and larger distances need to be conquered (geographically as well as emotionally). BigPicnic activities and events were perceived as an opportunity for the garden to work closely with other members of the organisation no matter whether the organisation was large or small. For some Partners the size of the organisation was not experienced as an obstacle, e.g. for attempts to improve the food supply for staff members to become more sustainable. For others the size as well as the particular role the individual person or garden plays in the organisational hierarchy hinders BG Partners to even consider approaching particular tasks.

Institutional traditions of communication and traded rules are taken for granted by some BG Partners where as others see a potential for change. This has an impact on the range of expansive learning movements BG Partners are confident to explore.

Rules such as who are the individuals deciding what accurate scientific knowledge is when it comes to selecting and communicating food related issues to the public or exploring the idea of co-creating a new exhibition on-site have an impact on the decision a BG Partner takes in the course of approaching BigPicnic tasks. In addition, people working in the communication or administration departments may support or hinder innovative approaches, which do not follow traditional procedures.

Whether the immediate superior takes part in BigPicnic project meetings or not appears to be important in terms of institutional support given to project activities. However, this support is mediated by the particular ways of thinking and acting of the person.

In terms of how the work is divided amongst botanic garden Partner as well as in the organisation explains some of the obstacles Partner institutions or project members faced while working towards BigPicnic objects. Interview data provides evidence that Partners who ask non-permanent staff, particularly hired for working on project related tasks, to do the work independently, have difficulties to use the full potential of their own organisation as well as the potential gain the project offers.

BigPicnic employees who are well integrated in a group of staff working at the organisation report on positive as well as negative impacts that traditions and rules have on how they pursue their work.

Working independently however is a source of creativity and innovation for the organisation because project employees are able to try out 'news things' and walk a non-traditional paths. In those rare cases in which there was hardly any involvement of permanent staff with the project, data suggest that knowledge gained and skills improved by this particular employee will leave the organisation as soon as the project ends. Permanent staff involved however report on a variety of future plans on how to take BigPicnic ideas and skills further. Most gardens tried to implement BigPicnic knowledge and individual skills sustainably by developing teaching material, reports or handbooks / kits to support others within their organisation or amongst the consortium to implement their ideas more easily.

Following this evaluation question, it is obvious that BG Partners engaging in the BigPicnic endeavour are active participants in a complex system in which they experience opportunities as well as barriers for learning. This system has an impact on who are able to learn, why they learn, what they learn and how they learn. Contradictions are driving forces for expansive learning cycles and possible forms of transformation in any activity system (Engeström 2000).

After the first BigPicnic meeting in Thessaloniki, many Partners where not sure how they should approach project related tasks and what they were expected to do. However, at the end of the project most Partners value the BigPicnic approach. As one participant put: 'Freedom to develop a project is good, but can be hard to begin with.' Many Partners finally value the variety of approaches, topics and ideas addressed in the BigPicnic consortium. As one Partner put it 'Okay, it was a good decision, because we discovered this methodology step by step. And when we discover, we get a very great value of this, and, and we learned and we understood a lot of things, we did it. Okay, a good way'. The expansive learning environment helped them to discover the task in new and creative ways while becoming empowered to evaluate and judge the quality of their approach themselves.

## 5.6. What do Partner organisations consider sustainable outcomes of participating in BigPicnic?

When asked to think about the legacy of the project Partners refer to a range of important learning experiences they relate to being a Partner in the project themselves or they address project outcomes they wish to take further or continue to use in the future explicitly.

Expansive learning in general and as a community of practice participating in an international, multicultural European project takes time. For many Partners the time given was too short. As a Partner put it 'Patience, it takes a time until everything falls into place' or as another one said 'New ideas/terms like RRI, TBI took too long time to mature in my head and in my organization'. However, sustainable learning hardly ever goes fast and easy. Finally changing ones perspective is rewarding and has the potential to lead to change in practice. 'Because of TBI I learned to focus more about the main reason for evaluation, and the importance to do it with colleagues'. This person is likely to apply TBI in the future.

Personal learning experiences are manifold ranging from changing individual attitudes toward food and food use such as 'I will never look at food in the same way. I think more about what I eat, how I cook it and of food waste` to the improvement of professional practice. 'I gained more experience on how to communicate my expertise but also co-create at the same time!' or 'I became confident with organizing science cafés – time taking discussion' or 'co-creation and other methods are very, important because we, now find, test and evaluate the results' . A feeling of confidence and self-effectiveness is a predictor for pursuing the work in the future.

A BG Partner raised the issue of valuing the botanic garden as a place for addressing issues about food security which had not been the case before. 'I discovered that food – the growing and consuming of it is legitimate interest for botanic gardens and they can become a focus for dialogue and debate on food matters'. Many consider food a good topic to engage people with plants and with sustainable development issues as well as to address a diverse audience. For some gardens food and food security will be topics for future public engagement activities. It is assumed 'that botanic gardens can (& should) be a leading voice in food security'.

Co-creation and science cafés are approaches most Partners consider to be successful, rewarding and a learning experience they do not want to miss.

National and international networking as well as learning from and with each other is valued. Partner organisations plan to continue to do this in the future.

All Partners appreciated learning from each other and valued different types of knowledge. 'Co-creation is a great tool to develop educational activities and materials' and 'tools that I can use in my daily work'. They feel confident to know enough 'how to develop and run co-creation workshop' and 'managed to expand my awareness/knowledge and application of various techniques relevant to co-creation, TBI, RRI '. They assume that they will use the co-creation approach to design community engagement events in the future. One Partner explained how the participatory approach helped her to see things differently: 'What actually [has] been in the context of co-creation, what was for me really an eye-opener, is that we can- [learn from each other] whereas before we were guiding people to our garden especially to our glass houses and we were telling our stories about the plants. What we did within the co-creation processes turned the other way round. We invited people

especially people with a migration background, most of them Africans, to tell their stories about [food]'.

Some gardens do have very concrete plans about how they will take project ideas further. 'I think [we will run] science cafés as I said, then a next thing we are starting to make a vegetable garden from next year with the kitchens. So I think the whole idea, the whole concept of how can you attract or make people interested in plants by using the food story, that's for me is a very important aspect too'.

In addition, they value the potential of heterogeneous groups of people who have been working with them so far and want to stay in contact in the future. 'Ah, okay (.) we (.) we must, we must do it again, again, and involve different target groups and speak with many people and reach new target groups'. They assume that 'one is the aim of the project itself. Because after this programme, I think we can capitalize this learning, this knowledge and we start, well, we started to be more well known as a discussion centre for food security'

## 6. Conclusion, implications and recommendations

BigPicnic was part of the *Pan-European public outreach: exhibitions and science cafés engaging citizens in science* funding scheme. Between early 2017 and the end of 2018, 15 exhibitions were developed and were visited by 1,786, 216 visitors at the 59 different locations the exhibitions travelled to; and 92 science cafés were held attracting a total of 6,982 participants. Both exhibitions and science cafés were the result of 80 co-creation sessions involving diverse audiences and representatives of different stakeholders. These co-creation sessions were ran by all BG Partners at the early stages of the project. During this period, 76 TBI studies were completed with data collected from approximately 4,500 people. This work highlighted a number of outcomes: the cultural and social values attributed to food and reaffirmation of identity and place identity; the link between food and cultural memory and values in general and in the context of migration in particular; a deeper understanding of the physiological value of nutritious food and its link to longevity and well-being; the acquisition of food skills (i.e. how to prepare, cook and handle food) and reliable information sources as well as knowing where food comes from and how to read food labels; ability to reflect on one's own food choices and how they affect one's health, food prices and wages, the environment, biodiversity and the climate; and the role in preserving and supporting local and indigenous knowledge about plants and food systems.

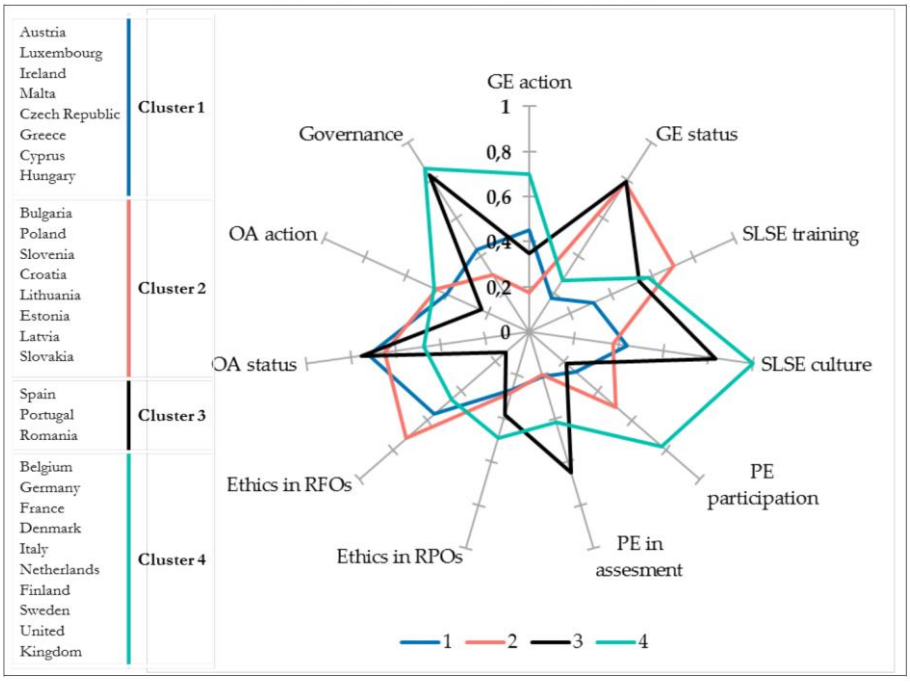
It is worth noting that, as BigPicnic was one of the *Pan-European public outreach: exhibitions and science cafés engaging citizens in science* funding schemes, the emphasis was on organising public outreach exhibitions and participatory events with the aim of engaging citizens in science. Carrying out empirical research was not part of this call. However, the BigPicnic Partners put together an ambitious work plan which incorporated practitioner reflective practice and a culture of participatory engagement at all stages of the project. This necessitated the collection of evidence upon which project Partners were to reflect on. Consequently, we carried out applied research, which generated a large amount of empirical data. Our data sets gave us insights into: 1) how different stakeholders understand and respond to food security issues, and 2) how participation in

the BigPicnic project impacted on BG Partners' practices. The next section summarised our key findings and their implications. These are organised under four key sections that reflect the main patterns that emerged, as follows:

**PE with food security in RRI**

- LOtC institutions like botanic gardens can provide the platform for representation and dialogue as they have the ability to engage with a wide range of stakeholders. Unlike other public institutions, they are seen as the most trusted institutions across the world, as many studies have demonstrated. The high level of trust and positivity towards LOtC and a widespread perception that they have a broader role to play in society makes the ideal places not only to engage citizens who feel disenfranchised and that they do not have a voice, but also to tackle issues that can be seen as highly political, such as food security. They can function as a contact zone where people from different cultures, or having different values and cultural references meet, clash and grapple with each other.
- The diversity of stakeholders and the types of knowledge they draw on to make sense of the value of food in their lives and of food security issues are mirrored by the diversity of the cultural heritage of food and its role in people's sociocultural lives. Although this clearly posed many challenges this diversity may be part of the solution. This necessitates using different theoretical and methodological approaches that can help us conceptualise and study the role of food in cultural heritage and collective identities, which can lead to asking more nuanced questions and creating a toolkit of solutions. BigPicnic has showed how the questions and methods of social sciences and humanities can give us insights into elements of food security that STEM science or financial considerations of the food system cannot.
- Botanic gardens can play a key role in this process. Yet, they need support and training in order to fulfil their full potential. BigPicnic showed that botanic gardens across Europe and in Uganda are at different levels of development. A critical aspect of their ability to engage with diverse stakeholders is the extent to which they embrace PE. Existing MoRRI data show that the picture is quite mixed.

  In 2018 the report 'Monitoring the evolution and benefits of responsible research and innovation in Europe' was published (MoRRI, 2018). It summarises insights from the MoRRI project and offers 11 RRI dimensions which can be used to characterise individual countries, but also to explore similarities and differences between and within clusters of countries. In the following figure (MoRRI, 2018, p.28) the characteristics of the 4 country clusters are portrayed. This radar plot shows how well each cluster of Member States embraces the 11 RRI dimensions. PE (Public Engagement) and SLSE (Science Literacy and Science Education) are two out of six key areas of RRI addressed predominately in the BigPicnic project.




Calculation: Aarhus University.

*Fig. 4.* RRI characteristics of four Member State clusters

Partner countries such as Austria and Greece, who are in cluster 1 and Spain and Portugal, who are in cluster 3, as well as Partner countries Bulgaria, and Poland, who are in Cluster 2 do not rank particularly high in PE participation and SLE culture. However, participation and science communication activities, which have been implemented by BigPicnic Partners in these countries may have contributed to improve this indicator in the future.

**BG Partners**

- The number of exhibitions, science cafés and co-creation events developed and evaluated, and the number of people/stakeholders involved in them as co-creators or visitors is not a small feat. However, what is more remarkable is the diversity of the stakeholders in terms of cultural, socioeconomic, gender, ethnic and education background. It would not be an overstatement to say that for BG Partners BigPicnic was the first project that encouraged them to work with such diverse groups of people, and exposed them to different points of view on a wide social issue, such as food security.
- To meet this challenge, BG Partners put together diverse teams and/or sought out opportunities to collaborate with individuals and organisations that had the knowledge and skills required. They had to cultivate the right environment within their organisations to facilitate PE with food security in RRI. Where the organisational culture was not supportive they used different strategies such as running outreach sessions. Outreach work was also carried out where new audiences, which do not traditionally visit botanic gardens, were targeted.
- The impact of their work reached far beyond their own organisations as their work took hold and enthused individuals and touched a chord with a number of organisations. For example, work carried out with schools in Lisbon, Meise, Alcala and Madrid led to changes to food menus at the canteens of local schools or the canteen of the botanic garden. This and other

activities empowered other organisations to take actions on food security issues and to also take notice of botanic gardens as possible Partners.

- Hence, in the course of working on BigPicnic, BG Partners found themselves becoming more connected to wider local, national and international networks and being offered a seat at the table where discussions about food security take place.
- Still, this has been a painful process for many as it is painful to leave the world you know and navigate a more complex and diverse world outside your organisation. It takes time and active engagement to develop an understanding of new concepts and ways of applying them in your everyday practice.
- When looking at the impact BG Partner's involvement in BigPicnic had, it is important to remember that each botanic garden has travelled a long way from where they started. Learning and development needs to be assessed against the position each BG Partner started from.
- Co-creation and TBI – and, in particular, their emphasis on self-reflection - empowered BG Partners to take control over every single aspect of the development, delivery and assessment of their activities. This process facilitated a deep and meaning-oriented learning and knowledge development, which led to change of practice.

**Organisational learning**

- Being part of an EC project raises the status and increases the visibility of the participating organisations. Among other things, an organisation that receives EC funding is recognised as an organisation that other stakeholders and organisations want to work with. This offers access to a wider network and promotes issues of interest to the organisation.
- However, this new status and increased visibility come with responsibilities on the part of the organisation. The following points will focus on the responsibility towards its employees and its audiences.
- As discussed in the previous section, it is clear that the teams and individuals who were part of the project have the skills, the background and the right attitude to reach out to new audiences. These skills and knowledge need to be developed further, to be nurtured and kept within the botanic gardens. For it is the people who work in botanic gardens that make them participatory and inclusive institutions. A strategy for keeping this knowledge and expertise within the gardens is necessary and would be the responsibility of the participating botanic gardens to draft as a next step.
- BigPicnic has clearly demonstrated that group work and reflecting on group practice has paid off. Organisations need to make time for their staff to reflect on their practice and allow the time to collect the evidence needed to make informed decisions.
- Learning to work with diverse audiences is a great outcome, which needs to be developed further. This will ensure the sustainability of the work done as well as facilitate civic and democratic participation.
- Capitalise on and utilise tools, resources and the support of wider infrastructure such as universities (both staff and students), volunteers, and other LoTC organisations.
- In order to tackle societal issues such as food security – a topic not covered by existing research carried out in botanic gardens – new approaches to recruitment are needed. The BG Partner teams were able to succeed because they came from different education backgrounds and brought in new expertise and knowledge to the organisation. This can go

even further by promoting women to high management positions and employing staff from BAME and diverse socioeconomic backgrounds, and allowing them to reach their full potential.

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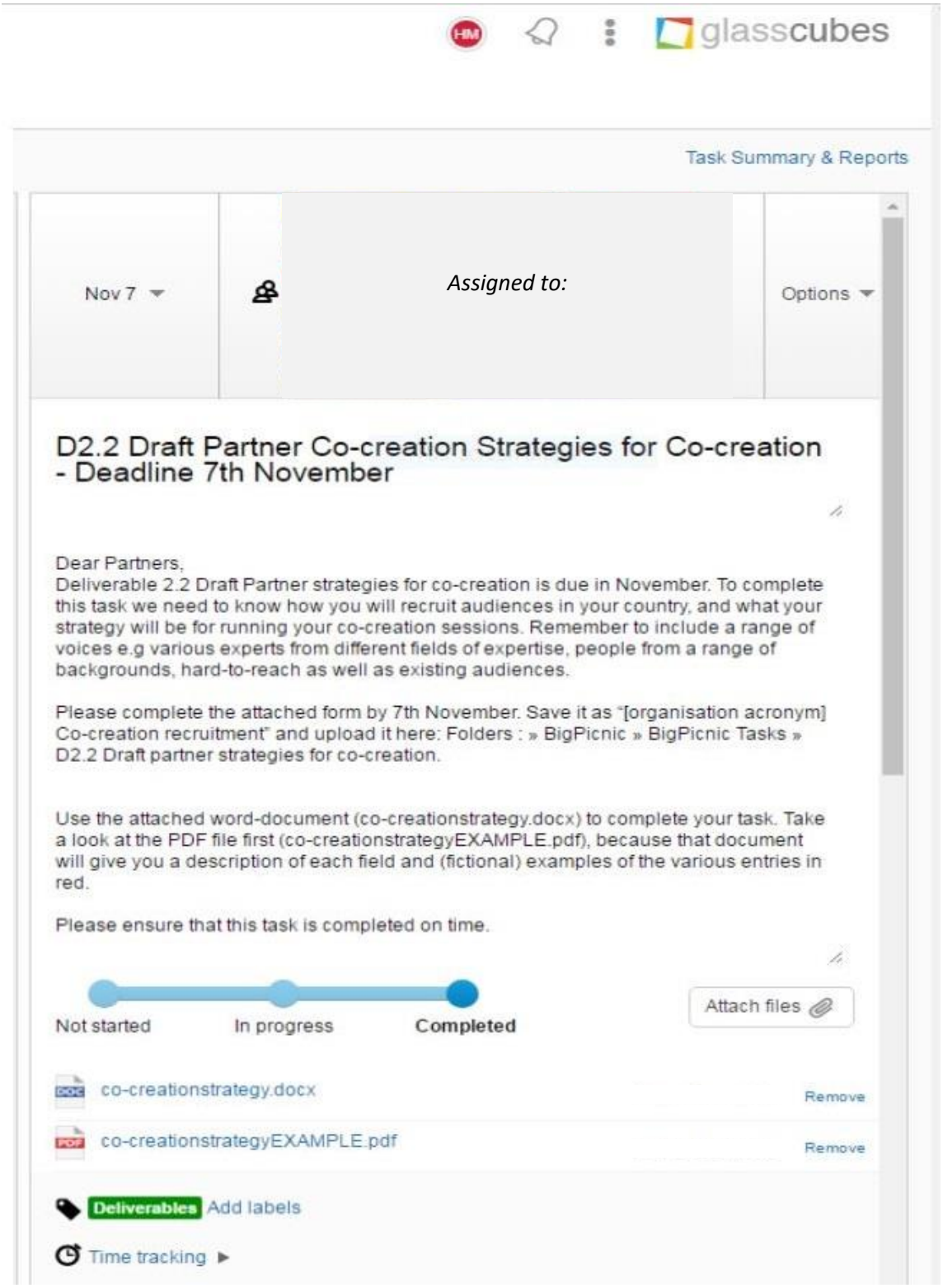
# Annexes

## Annex 1: Example of Glasscubes task



## Annex 2: Sample TBI project summary sheet

### Team-based Inquiry project summary sheet

*Please fill in the first two sections – Question and Investigate.*
*Fill in one project summary sheet for each of your TBI questions*

| 1. Question | What we hoped to learn and why it was important |
|---|---|
| What is the name of the co-creation project[1] that you are collect data for? | |
| What is the TBI question you are trying to answer? | |
| Why is it important for you to answer these questions? | |
| **2. Investigate** | **How we answered our questions** |
| What are the start and end dates of your study? | |
| Who are you going to collect data from? | |
| How are you planning to collect data? | |
| What type of data are you collecting? [Quantitative, qualitative] | |
| How do you plan to analyse the data? | |
| **3. Reflect** | **What we found out** |
| Summary of the data (possibly include tables or graphs) | |
| The most important patterns and findings that emerged | |
| **4. Improve** | **How we changed our practice** |
| How our group responded or plans to respond to the findings | |
| What worked well with your TBI evaluation | |
| From what you observed, what about the TBI evaluation didn't work as well? | |
| Any other reflections (e.g., other strategies to try, interesting visitor comments, group specific issues)? | |
| Recommendations for others | |
| Ideas for future TBI studies | |

[1] You can provide the name of the co-creation project, if you have one, or you can indicate what type of project it is (i.e. exhibition, science café, festival, family event etc.)

## Annex 3: Findings from TBI reports with regard to food security

### 1. Introduction

This section presents the findings of the TBI studies (findings from individual studies carried out by all the Partner organisations were coalesced and then aligned with Food 2030 and SDGs). Section 2 presents the methods used to collect data; how data were analysed followed by contextual information about the botanical garden Partners and the events they carried out and evaluated. This is followed by a short presentation of the key thematic categories that emerged from the data collection process. Section 5 gives a more detailed overview of the findings through an alignment with the 'Food and Nutrition Security priorities' (Food 2030)[2] identified by the European Union and the Sustainable Development Goals (SDG) set out by the United Nations.[3] The various categories that came across from the analysis of the TBI reports will be accompanied by a number of figures displaying the afore-mentioned alignment and a series of representative quotes that will illustrate the text and help contextualise the content. Two additional categories that were highlighted by the TBI report data – namely, 'Culture and Food' and 'Food Governance' - are also be examined in sections 5.5. and 5.6.

### 2. Methods and data analysis

The BG Partners organised a wide range of programmes and events such as science cafés, exhibitions, science festivals, open days, family events, targeting different audiences and communities. TBI studies were embedded in the development of a number of carefully selected activities, which covered a range of event formats and content, and types of audiences. The practitioners and their teams collected a large number of predominantly qualitative data, using a range of methods including observations, interviews, focus groups, concept maps, ethnographic field notes, video and photographs, speech bubbles. As mentioned before, the BG Partners had the opportunity to choose the method that was most useful and appropriate for their project and were supported in this by UCL. The data collected were transcribed and analysed looking for themes and patterns. Findings were presented in reports in their national language and key findings were translated in English and presented in TBI project summary sheets (see Annex 2). These summary sheets also covered other aspects of the TBI process, namely the evaluation questions each study aimed to answer, the methods used, practitioners' reflection on the evaluation process and the findings and suggestions for improving their practice.

A total of 76 TBI project summary sheets were completed by all the gardens during the life cycle of the project. These were gathered and used by the UCL and Innsbruck University (UIBK) researchers who used them as a basis for developing higher level analytical categories based on all the TBI studies. An excel spreadsheet was developed that created a coding system grounded on the data collected. Categories emerging from the TBI studies across all Partner gardens were then aligned with key food policy priorities identified by Food 2030 and SDGs. This excel spreadsheet was updated regularly as more studies were carried out and shared with the Partners. Each Partner had

[2] Food 2030 was launched after the 2015 Milan World Expo and is the European Union's research and innovation policy response to international policy developments such as the United Nations' Sustainable Development Goals and the commitments of the 2015 United Nations Climate Change Conference of Paris (Food 2030 2019).
[3] The 17 Sustainable Development Goals (SDGs), constituting an urgent call for action by all countries (both developed and developing) in a global Partnership were at the heart of the 2030 Agenda for Sustainable Development, adopted by all United Nations Member States in 2015 (UN SDGs 2019).

their own version of the excel spreadsheet which they used to code their data and to also add new categories or provide new dimensions to existing categories.

**3. Profile of the botanical gardens undertaking TBI evaluation**

A total of 15 botanic gardens carried out TBI evaluation in order to assess the process, content and impact of the food and food security related activities they developed. These included Tooro Botanical Gardens (TBG) in Uganda and another 14 European gardens located in 12 countries across Europe: Germany, Spain, the United Kingdom, Italy, Belgium, The Netherlands, Portugal, Austria, Poland, Bulgaria, Greece and Norway (see Table 1 below; Annex 5 for more information on the BG Partners, followed by Annex 6 which presents the QM Partners).

As illustrated by Table 1, eight of these gardens are part of a university, three are part of government funded research institutions, another three belong to local government, while one of them is a community owned institution.

Among the eight botanical gardens run by universities three of them are part of a museum:

- the Botanic Garden and Botanical Museum at Freie Universität Berlin (Germany) (BGBM),
- the Natural History Museum of the University of Oslo (Norway) (UiO),
- the National Museum of Natural History and Science at the University of Lisbon (Portugal) (ULISBOA)

The Bergamo Botanic Garden which is a municipal institution of the City of Bergamo (Department of Environment, Energy policy, and public green awareness) also constitutes a museum authorized by the Region of Lombardy.

The other two botanical gardens run by local government institutions are:

- the Botanic Garden Meise (APM) which belongs to the Flemish Community and the Federal Government of Belgium,
- the School Biology Centre Hannover (SZBH) which belongs to the Hannover City Council (in Germany).

Three botanical gardens are managed by national research organisations and these are:

- the Royal Botanic Garden of Madrid (CSIC) which belongs to the Spanish National Research Council,
- the Royal Botanic Garden Edinburgh (RBGE) which is a charity and a Non-Departmental Public Body (NDPB) sponsored and supported by the Scottish Government's Environment and Forestry Directorate (ENFOR)
- the Balkan Botanic Garden of Kroussia (BBGK) which belongs to the Hellenic Agricultural Organization (HAO) Demeter (part of the Hellenic Ministry of Rural Development and Food).

| Type of organisation | Name | Country |
|---|---|---|
| University Botanical gardens | Botanical Garden of the University Vienna | Austria |
| | University Botanic Gardens of Sofia University “Saint Kliment Ohridski” | Bulgaria |
| | Hortus botanicus Leiden | The Netherlands |

| | | |
|---|---|---|
| | University of Warsaw Botanic Garden | Poland |
| | Juan Carlos I Royal Botanic Gardens, University of Alcalá de Henares | Spain |
| University Botanical Gardens & Botanical Museums | Botanic Garden and Botanical Museum at Freie Universität Berlin | Germany |
| | Natural History Museum of the University of Oslo | Norway |
| | National Museum of Natural History and Science at the University of Lisbon | Portugal |
| Botanical gardens & Research Institutes (government funded) | Royal Botanic Garden of Madrid | Spain |
| | Royal Botanic Garden Edinburgh | United Kingdom |
| | Balkan Botanic Garden of Kroussia | Greece |
| Local government Botanical gardens | Botanic Garden Meise | Belgium |
| | School Biology Centre Hannover | Germany |
| Local government Botanical garden & museum | Bergamo Botanic Garden | Italy |
| Community owned Botanical garden? | Tooro Botanical Gardens | Uganda |

*Table 1:* The 15 botanical gardens of the BigPicnic project categorised according to the type of organisation they represent.

Altogether, the 15 botanic gardens produced more than 100 TBI reports during the lifecycle of the project. Annex 7 offers an overview of the variety of the activities undertaken by the Partners along with the relevant TBI questions addressed in each of the TBI reports based on a sample of 76 TBI reports. Slightly more than half of these reports (42/76) reflected upon a science café-related activity while the rest of the TBI reports evaluated either an exhibition (18/76) or other co-creation activities (16/76). These reports investigated activities that related to specific food and food security themes and the feedback received from the audiences and other stakeholders was in most cases used in order to create of a science café, exhibition or other activity or to measure the impact of an already undertaken activity/project.

**4. Profile of co-creators and other evaluation participants**

The 15 botanical gardens carefully designed and implemented an audience recruitment and development plan alongside the development of their various activities and events. A wide range of communities and audiences were targeted (as presented in table 2 below). Botanic gardens took a strategic approach to audience recruitment and development, taking into account the social and cultural context in which their institution is located as well as institutional priorities and national and international priorities related to food security.

More specifically, in the case of some gardens, the aim was to broaden the range of people visiting their institution and/or participating in their events and activities, or to reach out and engage with less privileged and often excluded members of the public. In other cases, of the choice of target audiences as based on their interest in or understanding of the theme of particular activities. In yet other case, the choice was made based on possible opportunities or desire for building stronger relationships on which to build future collaborations.

For example, the Belgian Partner (Botanical Garden Meise) placed a particular emphasis on collaborating with citizens of different cultural backgrounds and particularly, with members of the African diaspora, while the Royal Botanic Garden Edinburgh in the UK had a strong interest in engaging with people from deprived areas. Very important was also the motivation to engage with

the local community surrounding the institutions. Owing to the nature of the BigPicnic project – dealing with various aspects of food safety– several activities were also geared towards addressing specific professionals from science and environmental education sectors of the food industry (e.g. gardeners, farmers), nutritionists, environmentalists and policy makers (on local, regional or national level). As more than half of the Partners are part of a university, one of the target audiences was university staff (both academic and administrative) and students from different departments. Likewise, in the case of independent or local authority gardens, one of the target audiences was members of staff, ranging from gardeners and support staff to researchers and senior managers.

| **Name of organisation** | **Types of key audiences targeted** |
|---|---|
| Hortus botanicus Leiden | regular garden visitors; new target groups, including young families that do not currently have a connection to the garden. |
| Royal Botanic Garden of Madrid | students and teachers (both primary and secondary); the university community (students, teachers and researchers); people from socially excluded groups and the general public. |
| Alcalá de Henares University, Royal Botanic Gardens, Madrid | organisations that have shared audiences and objectives such as other departments of Alcalá de Henares University; local schools and cultural institutions; environmental education organisations and agricultural groups; local communities, including botanic garden and university staff and volunteers, neighbours and citizens of Alcalá de Henares, local restaurants, hotels, farmers, producers and retailers. |
| Balkan Botanic Garden of Kroussia | range of people responsible for preparing food for others, including parents, nutritionists, physicians, policy makers, and industry |
| Botanic Garden and Museum, Freie Universität Berlin | young people and the elderly, as well as local allotment holders. |
| School Biology Centre Hannover | pupils aged 4-18; parents and grandparents; teachers; and refugees. |
| University of Warsaw Botanic Garden | middle income people who have a preference for artisan food shops; local farmers and their families; existing Garden visitors; seniors citizens; and university students. |
| Botanic Garden Meise | organisations dealing with food catering; Belgian citizens from different cultural backgrounds. |
| National Museum of Natural History and Science, University Lisbon | key local groups including elderly people; botanic garden neighbours; families; Lisbon University students/communities; and local schools. |
| Tooro Botanical Gardens | farmers, food vendors, students and local communities |
| Natural History Museum, University of Oslo | university students and young adults; new immigrants; pre-school and primary school teachers; and local neighbourhood residents. |
| Botanical Garden of the University Vienna | senior citizens and their grandchildren (primary school); university students; and young adults (14-25). |
| University Botanic Gardens, Sofia | families (parents and children); schools; people who are interested in and want to learn more about plants (plant aficionados); the elderly; and people with disabilities |
| Bergamo Botanic Garden | Teenagers; students; garden visitors (in particular home-makers); urban farmers; and urban citizens. |
| Royal Botanic Garden Edinburgh | families from areas recognised by the Scottish Government as Areas of Multiple Deprivation (AMD); people undergoing challenges due to life problems such as homelessness or |

| | |
|---|---|
| | disconnection that affect their access to food; and those interested in helping them with 'bottom up' solutions and input to policy changes. |

*Table 2:* Target audiences of the 15 botanical gardens as originally identified at the beginning of the BigPicnic project (source: BigPicnic 2019).

Overall, the botanic gardens were very effective in creating activities that engaged a wide range of citizens from different age groups, cultural and educational backgrounds, who had different levels of interest in and knowledge of food and food security. It should be noted that, while compiling the TBI project summary sheets and throughout the project at large all Partners were asked to keep track of the number of participants. The findings from all 76 TBI studies discussed in the following sections are based on data collected from approximately 4,500 participants.

**5. Key thematic categories from the TBI studies**

This overview of the key thematic categories and overall findings from the TBI evaluation is based on a sample of 76 TBI reports. These reports were selected as they contained adequately completed project summary sheets and were accompanied with Excel spreadsheets that clearly indicated the categories that occurred in their corresponding report along with illustrative quotes. As mentioned above, the categories developed were grounded on the analysis of the data. These categories were then reviewed and organised under higher level analytical categories, which were in turn aligned with the four key priorities of the Food 2030 policy (see Figure 1) and the most relevant SDGs (see Figure 2). Specific SDGs were chosen for their close relevance to the particular themes that the gardens addressed in relation to food and food security. It is important to note that the analysis of the data generated two further categories which are not included in Food 2030 and SDGs. These are **culture and food**, and **food and governance**.

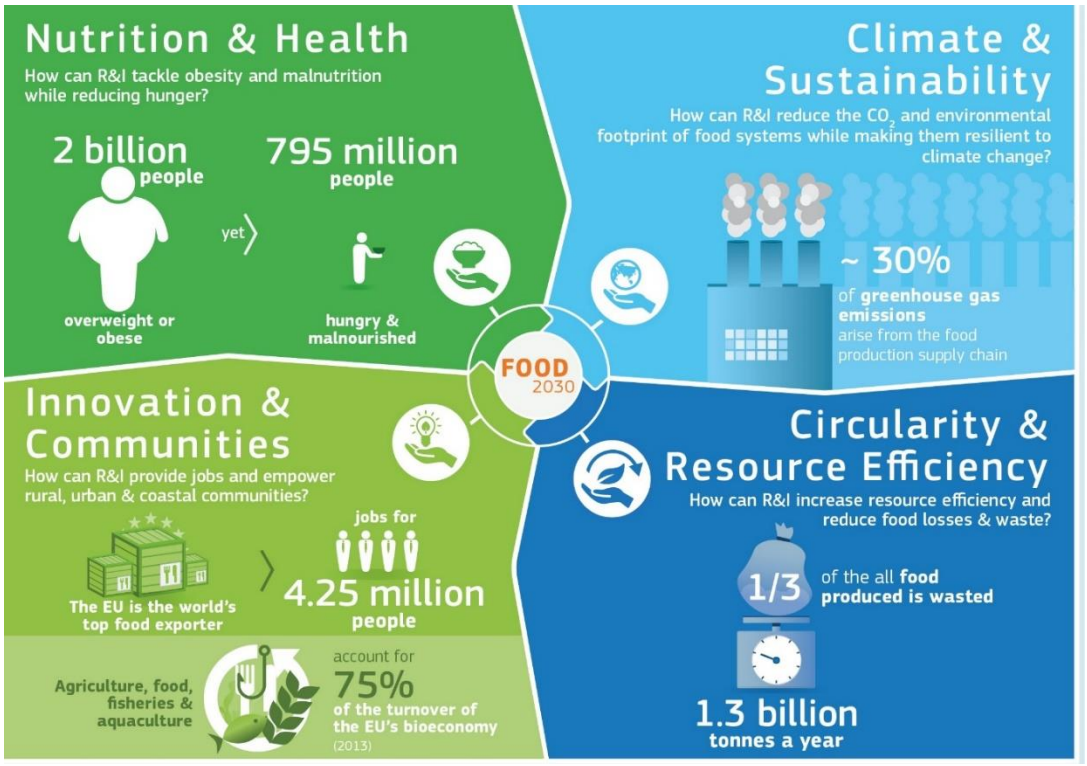



*Fig. 1:* Key priorities of the Food 2030 policy (Food 2003 2019).


*Fig. 2:* The Sustainable Development Goals (UN SDGs 2019)

The BG Partners made 1,214 entries in total to the excel spreadsheets that accompanied the TBI reports. Table 3 and figure 3 below present the frequency of occurrence of the Food 2030 priorities, the SDGs and the two additional thematic categories of 'Food and Culture' and 'Food Governance'. Key priority 1 of the Food 2030[4] (Nutrition for sustainable & healthy diets) was aligned with SDGs 2 (Zero Hunger), 3 (Good Health and Well-Being), 4 (Quality Education), 5 (Gender Equality), 6 (Clean Water and Sanitation), 8 (Decent Work and Economic Growth) and 11 (Sustainable Cities and Communities). Key priority 2[5] (Climate smart and environmentally sustainable food systems) was aligned with SDGs 13 (Climate Action) and 15 (Life on Land). Key priority 3[6] (Circularity and resource efficiency of food systems) was aligned with SDG 12 (Responsible Consumption and Production). Finally, key priority 4[7] (Innovation and empowerment of communities) was aligned with SDG 16 (Peace, Justice and Strong Institutions).

[4] '*Ensuring that nutritious food and water is available, accessible and affordable for all. It involves reducing hunger and malnutrition, ensuring high levels of food safety and traceability, reducing the incidence of non-communicable diet-related diseases, and helping all citizens and consumers adopt sustainable and healthy diets for good health and wellbeing*' (Food 2030 2019).

[5] '*Building climate smart food systems adaptive to climate change, conserving natural resources and contributing to climate change mitigation. It seeks to support healthy, productive and biodiverse ecosystems. Ensuring diversity in food systems (including production, processing, distribution and logistics) including in terms of cultural and environmental diversity. Natural resources (water, soil, land and sea) are used sustainably within the planetary boundaries and available to future generations*' (Food 2030 2019).

[6] '*Implementing resource-efficient circular economy principles across the whole food system while reducing its environmental footprint. Circularity is applied for sustainable and resource-efficient food systems and food losses and waste are minimized throughout*' (Food 2030 2019).

[7] '*Boosting innovation and investment, while empowering communities. A broad innovation ecosystem leading to new business models and value-added products, goods and services, meeting the needs, values and expectations of society in a responsible and ethical way. More and better jobs across the EU, fostering thriving urban, rural and coastal economies and communities. Through closer Partnerships with industry and food producers, markets that function in a responsible manner thereby fostering fair trade and pricing, inclusiveness and sustainability. Scientific evidence and knowledge from a wide diversity of actors underpinning the*

| Food 2030 | SDGs | |
|---|---|---|
| Key Priority 1: Nutrition for sustainable & healthy diets | SDG 2: Zero Hunger | 98 |
| | SDG 3: Good Health & Well-Being | 181 |
| | SDG 4: Quality Education | 208 |
| | SDG 5: Gender Equality | 6 |
| | SDG 6: Clean Water and Sanitation | 11 |
| | SDG 8: Decent Work & Economic Growth | 44 |
| | SDG 11: Sustainable Cities & Communities | 46 |
| | | |
| Key Priority 2: Climate smart and environmentally sustainable food systems | SDG 13: Climate Action | 49 |
| | SDG 15: Life on Land | 62 |
| | | |
| Key Priority 3: Circularity and resource efficiency of food systems | SDG 12: Responsible Consumption and Production | 250 |
| | | |
| Key Priority 4: Innovation and empowerment of communities | SDG 16: Peace, Justice and Strong Institutions | 39 |
| | | |
| Culture and Food | | 101 |
| Food and Governance | | 119 |

*Table 3: Frequency of occurrence of categories related to Key Priorities of Food 2030 and the Sustainable Development Goals across all 76 TBI summary sheets.*

As table 3 demonstrates, 'Nutrition for sustainable & healthy diets' was the most dominant Key priority of Food 2030 accounting for nearly half of the total entries (594/1,214) followed by Key priority 3 (Circularity and resource efficiency of food systems) which was highlighted in nearly a quarter of the entries. It is worth mentioning that the 'Food and Governance' and 'Culture and Food' categories (which were not aligned with Food 2030 and the SDGs) accounted together for approximately 1/5 of the entries. Key priority 2 had nearly three times more entries than Key priority 4, which was the least highlighted in this sample of 76 TBI reports. In terms of the SDGs, 'Responsible Consumption and Production' (SDG 12) was the most frequently occurring (nearly a quarter of the entries) followed by 'Quality Education' (SDG 4), 'Good Health & Well-Being' (SDG 3) and Zero Hunger (SDG 2) – the latter three were all aligned with Key priority 1.

*development and implementation of FNS relevant policies, at all geographical scales (Local to Global)*' (Food 2030 2019).

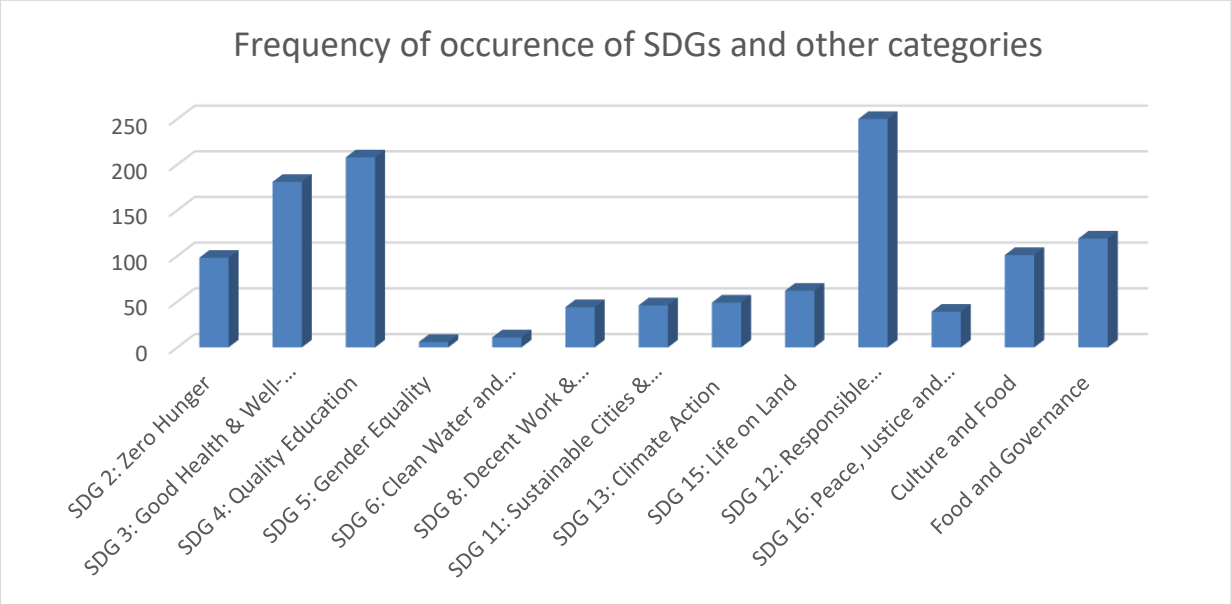



Fig. 3: Frequency of occurrence of SDGs and the categories of 'Food and Culture' and 'Food Governance' (total of 1214 entries).

The following sections will look more closely at the main categories that emerged from the TBI studies and are organised around the four key priorities of the Food 2030 policy. Each of the following sections presents the categories (and sub-categories) that emerged from TBI studies. Representative quotes for each category are included separately in text boxes.

### *5.1. Nutrition for sustainable and healthy diets*

Several aspects that relate to the improvement of nutrition and hunger alleviation were identified in the findings. The vast majority of the findings reflecting on this topic were aligned with SDGs 4 (Quality Education), 3 (Good Health and Well-being) and 2 (Zero Hunger). The least frequent entries were the ones linked with SDGs 6 (Clean Water and Sanitation) and 5 (Gender Equality).

The BG Partners identified numerous areas where quality education can contribute to nutrition for sustainable and healthy diets (tables 4 and 5). In fact, education seen in the context of nutrition was the second most frequent category featuring in the TBI reports as a whole. Audiences identified the provision of food education as highly important. Aspects of food education mentioned include the ability to know how to access information about food; the acquisition of food skills (i.e. how to prepare, cook and handle food); knowing how to prepare healthy food and what constitutes a balanced diet; the importance of food labels; knowing more about how to grow food plants and where food actually comes from. The significant role that science plays in providing food education was also underlined. In addition, findings also indicated that people value the raising of awareness about food-related issues. It was also deemed that developing certain food habits was an important sign that people have actually embedded a long-lasting attitude towards healthier food. The provision of environmentally sensitive education (termed in most cases as 'green education' by the BG Partners BG Partners that analysed the data) at both school and university level featured strongly as a positive factor. Findings from studies carried out at Alcalá de Henares in Spain emphasised the importance of adopting specific values that can lead to more informed food choices.

| SDG 4: Quality Education – aligned with Food 2030 priority 1 | |
|---|---|
| **Category** | **Frequency** |
| Food education provision | 115 |
| Raising awareness | 39 |
| Develop habits | 29 |
| Green education | 19 |
| Values | 6 |

Table.4: Frequency of occurrence of the categories aligned with SDG 4 and Key Priority 1.

**Priority 1: *Nutrition for Sustainable and healthy diets***

| SDG | Categories and Illustrative quotes |
|---|---|
| **'Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all'** | **'Food education provision'**<br>'*Nutrition should be a compulsory subject in schools*' (SBZH 5)<br>'*Education could improve healthy food habits and reduce the junk food consumption*' (BERG 8)<br>'*Bread makers aren't able to tell the story of their products*' (BERG 5).<br>'*I don't understand, fat connected with cholesterol, fat connected with sugar? It's all very complicated*' (RBGE 2)<br>'*Children think the vegetables come from the store. They do not reflect more on it*' (UiO 1).<br>'*We need more information about side effects of eating insects, more specifically about possible allergies for the different species of edible insects and about the feed used for rearing edible insects*' (BGM 2).<br>'*When the kids where still young, we used to have chickens. We thought: 'nice, eggs for breakfast,' but the kids thought it was disgusting because the eggs came from the chickens' butts. They were so confused, they thought that eggs came from the supermarket, out of a machine*' (UL 2).<br><br>**'Raising awareness'**<br>'*Think first, then do the grocery shopping*' (SBZH 4).<br><br>**'Develop habits'**<br>'*Not only eating because it's 12.30*' (SBZH 7).<br><br>**'Green education'**<br>'*There is a need of quality education in relation to urban agriculture in different sectors of society: schools, high schools, universities and other education institutions*' (UAH 7).<br>'*What we learn at home reaches us much deeper than advertisements*' (UAH 12).<br><br>**'Values'**<br>'*It is difficult for an organization (or society) to make "right" decisions when there is a conflict involving strongly ingrained values that are good in many (usually past) circumstances but they are negative in other (usually current) circumstances*'" (UAH 3). |

*Table 5: Categories and representative quotes aligned with Sustainable Development Goal 4 and Food 2030 Priority 1.*

The vast majority of the TBI reports attributed SDG3 (Good Health and Well-Being) to the food choices that people and to whether they opt to consume 'safe food'. Pursuing a 'healthy and balanced diet' was also mentioned frequently (tables 6 and 7). In terms of how people make their food choices what seemed to have a significant impact was whether a product is organic or natural followed by financial reasons. Audiences also stressed the importance of food that is regional or local and selection criteria that relate to whether a product looks good (including how it is packaged) and food habits (taste, liking or not liking a type of food). Other factors that were important included individual choices, ethics (e.g. animal welfare), nutritional and health benefits (such as eating more vegetables, veggie meals, legumes or grains), the quality, freshness and seasonality.

More than a quarter of the entries emphasised that safe food contributes to good health and well-being with the term 'safe' linking with healthy and hygienic qualities (avoiding food contamination and expired food products) while natural or organic products also featured strongly under this umbrella term. Food that contains no harmful substances (pesticides, pollutants, toxic elements) was also deemed important.

The significance of having a healthy and balanced diet was seen either in terms of what people should aim to eat more of (e.g. food that uses herbs, nutritional products), or in terms of what they should avoid eating (e.g. junk food, processed and fatty food) while abiding by specific health requirements (like food intolerances). 'Weight control' and 'Feeling well in one's self' accounted together for slightly less than 1/10 of the entries but are nevertheless worth mentioning. The aforementioned quotes by interviewees underlined the need to control weight as a way to combat the negative impact of obesity and eating disorders and the need for people to pursue a low carb diet. The idea of 'feeling good with one's self' was mostly linked with doing sports and reducing stress. This suggests a more holistic approach to well-being where food choices is but one factor.

| **SDG 3: Good Health and Well-being – aligned with Food 2030 priority 1** | |
|---|---|
| **Category** | **Frequency** |
| Food choice | 89 |
| Safe food | 50 |
| Healthy and balanced diet | 24 |
| Weight control | 7 |
| Feeling well in one's self | 7 |

*Table 6: Frequency of occurrence of the categories aligned with SDG 3 and Key Priority 1.*

| **Priority 1: *Nutrition for Sustainable and healthy diets*** | |
|---|---|
| **Sustainable Development Goals** | **Categories and Illustrative quotes** |

| | |
|---|---|
|  <br>**'Ensure healthy lives and promote well-being for all at all ages'** | **'Food choice'**<br>'*I go to the local market for vegetables and fruits, and I always choose the ugliest ones, crooked, I don't trust shiny, identical, polished apples*' (UNIWAR 5).<br>'*I buy only organic stuff. I know the production circle is not perfect but it is better than the conventional production*' (UNIVIE 5).<br>'*I do understand that organic food is too expensive for certain people*' (BGM 5).<br>'*food has never been that cheap. We only spend 13% of our budget for it*' (BGM 5).<br>'*Irish potatoes are nutritious and palatable. I have been feeding them to my 1-year old daughter who is being introduced to food .At different times I add cow ghee to spice her food*' (TBG 5).<br><br>**'Safe food'**<br>'*If something tastes good and smells good, you can assume that it is good. Most of the time you can rely on your senses*' (BGBM 1).<br>'*My biggest worry is the use of antibiotics in meat. In future there will be resistences againt antibiotics*' (UNIVIE 2)<br><br>**'Healthy and balanced diet'**<br>'*Now for me it is very important to buy products with low glicemic index, because I have gestational diabets now. And unfortunately it is very difficult to get such products*' (UNIWAR).<br>'*Junk food are cheap, attractive for young people, flavourful and tasty, designed to create addiction*' (BERG 8).<br><br>**'Weight control'**<br>'*You're not hungry if you eat less, it's just a question of habit. I think we all have a problem with this…but you can eat less. This is because we have too much access to rubbish food*' (UNIWAR 3).<br><br>**'Feeling well in one's self'**<br>'*I also practice praying for myself alone before a meal, noticing directly how the water runs down my mouth and I come down inside and become calmer and more aware of the food*' (SBZH 7). |

*Table 7: Categories and representative quotes aligned with Food 2030 Priority 1 and Sustainable Development Goal 3.*

In terms of combating hunger, the most important elements highlighted were 'access to food', 'food cost', 'nutritious food', 'food insecurity' and 'urban gardens' (tables 8 and 9). Over a quarter of the entries came from Greece (BBGK). As seen by the frequency with which categories occur (table 8), 'access to food' was considered the most important element contributing to hunger alleviation with TBI reports emphasising concerns for the availability of food in the future and mentioning reduced access to resources (such as food plants) as a challenge. Other issues raised were the lack of appropriate cultivations, marketing barriers and not knowing from where to buy food. The 'cost of food' was of particular concern and the feedback given pointed towards certain types of food that are expensive for many people to purchase (organic food featured strongly among these) and the higher cost of nutritious food. The value of nutritious food –for example, for children, students, people with poor health and those who cannot prepare their own food– was highlighted as an important factor that could contribute to tackling hunger. A number of factors that cause food insecurity were

identified such as economic crisis; the low food security index (combination of affordability, availability and quality); and the threats posed by globalisation and wars. Urban gardens and their contribution to the ability of people to achieve small-scale production and to handle their own consumption also emerged as important (see also table 11 for more on 'urban gardens'). It is worth mentioning that, in the case of African diaspora communities in Belgium, the nutritional qualities of alternative protein-rich food like insects was highlighted. Furthermore, TBI reports from Uganda mentioned that local farmers value the longevity of specific types of plant crops, such as cassava, as these can last longer after harvesting.

| **SDG 2: Zero Hunger – aligned with Food 2030 priority 1** | |
|---|---|
| **Category** | **Frequency** |
| Access to food | 31 |
| Food costs | 18 |
| Nutritious food | 17 |
| Food insecurity | 15 |
| Urban gardens | 11 |
| Physiological | 4 |
| Longevity of food crops | 2 |

*Table 8: Frequency of occurrence of the categories aligned with SDG 2 and Key Priority 1.*

**Priority 1: *Nutrition for Sustainable and healthy diets***

| **SDG** | **Categories and Illustrative quotes** |
|---|---|
| **'End hunger, achieve food security and improved nutrition and promote sustainable agriculture'** | **'Access to food'**<br>*'Due to the fact that the world population can't be fed nowadays, I think it will be a problem in future. But I'm positive that science can help a lot'* (UNIVIE 1).<br>*'Americans and Europeans are selfish. I don't think that we can provide food for the whole world. We can't do it even now, I think it will get worse'* (UNIVIE 1).<br>*'I think it won't be a question of enough food but a question of fair distribution'* (UNIVIE 3).<br>'*Poverty in Bergamo affects many age groups, children, adults expelled from the world of work, pensioners with minimum pensions and immigrants*' (BERG 3).<br>'*The interests of large corporations are too much taken into account. There are patents on food and seeds*' (BGBM 1).<br><br>**'Food Costs'**<br>'*Organics are so expensive in Greece*' (BBGK 1).<br>'*Vegetables are so expensive in the UK*' (RBGE).<br>'*Buying fish is complicated. The price is too high, even the frozen*' (ULisboa).<br>'*I do understand that for some people it's financially impossible to buy only organic food*' (BGM 5).<br>'*When a label contains information about a natural, organic product, that product becomes more expensive*' (UAH 12).<br>'*We are students, so we try to save money as possible. Our slogan is only pay a euro for a product*' (UNIVIE 4).<br><br>**'Nutritious food'**<br>'*I went back to visit the exhibition with my daughter to educate her about healthy diet and life style*' (BERG 6) |

| | |
|---|---|
| | '*This is called fried, ripe plantain…And I say, it is very nutritious because it contains a lot of food values, like iron, vitamins, sugar, protein and fat*' (BMG 1).<br><br>**'Food insecurity'**<br>'*I have lived in difficult times, these times that of war and occupation, the times lots of us have lived through because of our age. In those times we were perpetually and endlessly hungry*' (UNIWAR 3).<br><br>**'Urban gardens'**<br>'*I have a big garden and produce my own food partly*' (UNIVIE 2). |

*Table 9: Themes and representative quotes aligned with Food 2030 Priority 1 and Sustainable Development Goal 2.*

The importance of making cities and other human settlements more sustainable but also more inclusive and resilient emerged through a range on feedback that emphasised the contribution of urban and community gardens, allotments and other green areas (tables 10 and 11). The common element for all these types of gardens was the opportunity they provided for people to have a space to plant food. Urban gardens (which also featured in relation to combating food poverty, see table 9) were mentioned more frequently with an emphasis placed on the variety of areas within cities where people can grow crops. Community gardens on the other hand were praised not only for their positive impact on the urban environment but also for their contribution to social aspects such as social inclusion of marginalised or vulnerable groups of people and offering community engagement opportunities.

| **SDG 11: Sustainable Cities and Communities – aligned with Food 2030 priority 1** | |
|---|---|
| **Category** | **Frequency** |
| Urban gardens | 14 |
| Community gardens | 12 |
| Allotments | 6 |
| Other green areas | 6 |

*Table 10: Frequency of occurrence of the categories aligned with SDG 11 and Key Priority 1.*

| **Priority 1: *Nutrition for Sustainable and healthy diet*** | |
|---|---|
| **Sustainable Development Goals** | **Categories and Illustrative quotes** |
|  <br>**'Make cities and human settlements inclusive, safe,** | **'Urban gardens'**<br>'*I will put a pot on the roof. I will try with raised bed with herbs on the balcony*' (UBG 4).<br>'*Urban gardening also means climate protection (humidity, shade), harvesting without artificial fertiliser, no additional soil pollution, insect protection and gentle irrigation (water cycle)*' (BGBM 3).<br><br>**'Community gardens'**<br>'*The organic gardens give the possibility of participation to different social groups as functional diversity people or elderly people*' (UAH 2).<br>'*The community vegetable gardens are a very good meeting point to join together different actors interested in sustainable food*' (UAH 7). |

| | |
|---|---|
| **resilient and sustainable'** | **'Allotments'**<br>'*Also, I tried to use beans from the shops here, dried seeds, and I have put them in the soil. Behind my house, we have a very small patch of land, 2 by 3 meters, 6 square meters, where I can cultivate some vegetables. So we have planted some seeds of Portuguese beans there, and these beans gave us about 2 kilo of fresh beans in July*' (BGM 1).<br><br>**'Other green areas'**<br>'*I wish that it becomes legally possible to take over sponsorships for the small areas around the street trees in the city and that this is publicly promoted*' (BGBM 3). |

*Table 11: Categories and representative quotes aligned with Food 2030 Priority 1 and Sustainable Development Goal 11.*

The TBI reports compiled by the BigPicnic Partners reflected on feedback about issues that contribute or hinder the possibilities for decent work and economic growth (tables 12 and 13). The responses focused mainly on sustainable food production. More specifically, the most important categories were: the availability of local food that can boost local economy and local producers; addressing the environmental impact of food production so that existing economic pressures can be tackled and sustainability can be achieved; improving the socio-economic position of producers (particular small producers); and pursuing fair trade. Comments that referred to sustainable food consumption, although far fewer, focused on the consumption of local products for the benefit of local economy and the importance of considering the ecological footprint. In addition, there were some comments that called for more effective assistance and better working conditions for people in the food industry (particularly farmers, gardeners, food growers). For example: (i) in Uganda there have been calls for more government assistance to help provide local farmers with safe transportation and storage equipment and other materials, (ii) the African diaspora in Belgium highlighted the importance of new opportunities for African farmers, and (iii) in Italy the need for fair prices for food producers of the South was underlined.

| **SDG 8: Decent Work and Economic Growth – aligned with Food 2030 priority 1** | |
|---|---|
| **Category** | **Frequency** |
| Sustainable food production | 26 |
| Sustainable food consumption | 9 |
| Assisting farmers | 6 |

*Table 12: Frequency of occurrence of the categories aligned with SDG 8 and Key Priority 1.*

| **Priority 1: *Nutrition for Sustainable and healthy diet*** | |
|---|---|
| **Sustainable Development Goals** | **Categories and Illustrative quotes** |

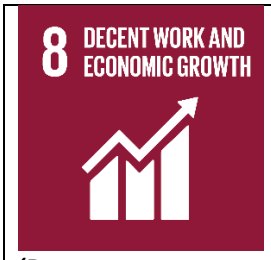
| | |
|---|---|
|  <br>**'Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all'** | **'Sustainable food production'**<br>'*Both conventional and organic farming are under massive economic pressure, which means that high yields must be achieved in all circumstances*' (BGBM 2).<br>'*Agriculture is caught between the need to protect the environment and the need to produce cheaply. The solution lies in reasonable prices for agricultural products that would reduce production pressure*' (BGBM 2).<br>'*There are very few young people that want to start as a farmer. And it is important that we can motivate and stimulate farmers to innovate, by showing them new economic models like CSA (Community Supported Agriculture). It is very important that we help the young farmers to look at different economic models that will help them to earn some money*' (BGM 5).<br><br>**'Sustainable food consumption'**<br>'*Consumption of local products to promote local economy*' (UAH 2). |

*Table 13: Categories and representative quotes aligned with Food 2030 Priority 1 and Sustainable Development Goal 8.*

Findings related to the availability of clean water and its sustainable management focused on issues surrounding the production of food with the majority of concerns centred around the impact of pesticides, fertilisers and other dangerous elements on ground water pollution (tables 14). Other comments expressed criticism with reference to the amount of fresh water used in agriculture and food production.

|  **Priority 1: *Nutrition for Sustainable and healthy diet*** | |
|---|---|
| **Sustainable Development Goals** | **Categories and Illustrative quotes** |
|  <br>**'Ensure availability and sustainable management of water and sanitation for all'** | **'Food production'** and **'amount of water used in food production and agriculture'**<br>'*Meat production is not environmentally friendly and releases gases. The water consumption is also large*' (UiO 4).<br>'*How much CO2 is emitted and H2O is used to produce food or drinks*' (BERG 1). |

*Table 14: Categories and representative quotes aligned with Food 2030 Priority 1 and Sustainable Development Goal 6.*

Surprisingly, gender equality featured low in the TBI studies carried out by all 15 botanical gardens. This could partially be explained by the fact that the particular themes of the activities covered by the TBI reports did not directly address such issues. Furthermore, the low frequency could - at least to some extent - also be attributed to the composition of the groups who participated in these

activities. This lack of occurrence in the data collected by the BG Partners does not necessarily imply that gender inequality issues are less pertinent to food and food security issues. Four TBI reports mentioned the importance for the recognition of the time spent on domestic (unpaid) work that is related to buying and preparing food while the observation that in the professional cooking sector male chefs still significantly outnumber female chefs was highlighted by the Balkan Botanic Garden of Kroussia in Greece.

| **Priority 1: *Nutrition for Sustainable and healthy diets*** | |
|---|---|
| **Sustainable Development Goals** | **Categories and Illustrative quote** |
|  <br>**'Achieve gender equality and empower all women and girls'** | **'Recognition of the time spent on domestic (unpaid) work'**<br>*'Although roles are changing, women in many cases still hold the roles of domestic care, in addition to making it compatible with their work outside the home. In recent years we have tried to make a change in this sense that has not been very beneficial for women, since they work twice and barely get recognition'* (UAH 12).<br><br>**'Male chefs dominate professional cooking sector'** |

*Table 15: Categories and representative quote aligned with Food 2030 Priority 1 and Sustainable Development Goal 5.*

### *5.2. Circularity and resource efficiency of food systems*

Key priority 3 featured prominently in the TBI report findings. Nearly a quarter of the total entries (250/1,214) addressed the responsible production and consumption of food in the context of the necessity to achieve the circularity and resource efficiency of food systems (table 16 and 17). Nearly all of the BG Partners (13/15) had entries in this category. 'Sustainable food production' was the most frequently occurring of these categories (accounting for nearly 32% of the entries) followed by 'sustainable food consumption', 'marketing' and the 'reduction of food waste'. Other significant categories included 'how to make choices', 'convenience/easy access to shopping place' and 'circularity/recycling' (which accounted altogether for over a quarter of the entries).

| **SDG 12: Responsible Consumption and Production – aligned with Food 2030 priority 3** | |
|---|---|
| **Category** | **Frequency** |
| Sustainable food production | 79 |
| Sustainable food consumption | 33 |
| Marketing | 29 |
| Reduce food waste | 25 |
| How to make choices | 22 |
| Convenience/easy access to shopping place | 22 |
| Circularity/recycling | 21 |
| Trust/ mistrust | 10 |
| Fits the season | 9 |

*Table 16: Frequency of occurrence of the categories aligned with SDG 12 and Key Priority 3.*

When considering sustainable food production, the importance of fair trade and organic products was particularly highlighted with several references to their positive impact. Specific approaches to agricultural activity and farming practices were also underlined in TBI studies carried out in Uganda where, for example, participants identified possible solutions for smart agriculture and the problems created by poor storage of food. The overall environmental impact of agricultural production was also acknowledged with comments identifying potential threats, e.g. from pollution. Other significant aspects included locally produced food and the significance of adequate political support with appropriate regulations and policies for food production.

Around 13% of the entries in this category identified certain possible actions on the part of the consumers for achieving sustainability. The most frequently mentioned actions were choosing to buy local food products, re-considering the consumption of meat and opting for a vegetarian diet. The marketing of food (appearing in nearly 12% of the entries) was deemed very important for responsible production and consumption particularly as it emphasises products that are visually appealing and because it helps establish certain food trends. However, several references were made to the misleading nature of current food marketing practices. The reduction of food waste was also deemed important in 10% of the entries with TBI reports acknowledging how responsibility lies with both individuals as well as the wider food sectors. Reducing food waste by recycling was highlighted by four of the 15 BG Partners. The way people make their choices about food was also seen to impact on sustainable production and consumption and to this end better awareness of which of the available options are more environmentally friendly appeared highly important. The convenience of having fast and easy access to shopping places with minimal effort also emerged from the findings. Finally, the feeling of mistrust that the consumers can develop for the producers was seen as a parameter that can negatively impact on more responsible attitudes towards sustainability (while the building of trust was deemed as a positive aspect).

**Priority 3: *Circularity and resource efficiency of food systems***

| Sustainable Development Goals | Categories and Illustrative quotes |
|---|---|
| 12 RESPONSIBLE CONSUMPTION AND PRODUCTION<br>**'Ensure sustainable consumption and production patterns'** | **'Sustainable food production'**<br>'*Most people think that organic means not sprayed…we are far more advanced and we care for plants, we have biological formulas, but we can even spray… using plant ferments (liquid manures), I think people weren't aware of this earlier*' (UNIWAR 3).<br>'*You can spray on with fertilizer and waste water. Then you get big volume. So there is no doubt that Norway has had an agricultural policy where quantity has gone before quality. And it's not sustainable. Because you thin out the soil, and there is not much nourishment in it. It is not sustainable*' (UiO 1).<br>'*Politicians should finally promote organic farming and punish those who damage our ecosystem*' (BGBM 3).<br>'*I think it's important that we keep our own production, that we don't import what we can produce ourselves*' (UiO 1).<br>'*Food production should be environmentally friendly; farming in a way that no pesticides are required (e.g. from mixed crops). Agriculture should take into account the species-appropriate treatment of creation (soil, plants, animals, water), the conservation of resources, responsible handling of the soil*' (BGBM 1). |

| | |
|---|---|
| | **'Sustainable food consumption'**<br>'*Consumers should consume more local products and thus less food would have to be imported and exported*' (BGBM 2).<br>'*Buying on the local shop of your neighbourhood, because the owner is also your friend*" (UAH 12).<br>'*More meat-free alternatives, which are more environmentally friendly*' (SBZH 5).<br><br>**'Marketing'**<br>'*Marketing offends me, it hurts me, it attacks me as consumer*' (UAH 12).<br><br>**'Reduction of food waste'**<br>'*People won't buy stuff going past the expiry date, stuff that looks nice and tempting, so lots of good food is thrown away, even though it's perfectly OK to eat*' (UiO 1).<br>'*We are saying that we can't feed the world without GMO, but currently we waste about 30-40% food produced globally. So, why do we need GMO? Wouldn't it be more useful to better distribute the food we already produce?*' (UNIWAR 5).<br><br>'**How to make choices'**<br>'*Conscious food shopping - where does food come from?*' (SBZH 4).<br>'*I think we should all go through a slaughterhouse to see what it means to eat meat*' (UAH 9).<br><br>**'Convenience/ easy access to shopping place'**<br>'*Access to sustainable food must be easy*' (SBZH 4)<br><br>**'Circularity/recycling'**<br>'*We waste too much food in Norway. Although we have source sorting, not everybody respects that. For example, food waste can be used for fuel on buses. Recycle everything!*' (UiO 4).<br><br>**'Trust/distrust'**<br>'*I don't buy dairy from any farmer I don't know, only from farmers I know. So that I can see all the products this person brings, not only for me, I look at the bags they use, the jars, everything*' (UNIWAR). |

*Table 17: Categories and representative quotes aligned with Food 2030 Priority 3 and Sustainable Development Goal 12.*

### *5.3. Climate smart and environmentally sustainable food systems*

Key priority 2 of the Food 2030 was aligned with SDGs 13 (Climate Action) and 15 (Life on Land) and accounted for slightly over 1/10 of the overall entries (tables 18 and 19). In terms of the impact of food systems to climate change and the importance of environmentally conscious actions, the majority of the participants either considered climate change as a factor negatively influencing food production (e.g. this was very much stressed in the case of Uganda) or they mentioned ways in which food production can be improved (e.g. reducing pollution and carbon emissions) so as not to negatively impact the earth's climate. The impact of transporting food was singled out as a separate theme and most comments criticised the vast amount of imported products.

| Priority 2: *Climate smart and environmentally sustainable food systems* | |
|---|---|
| **Sustainable Development Goals** | **Categories and Illustrative quotes** |
|  **'Take urgent action to combat climate change and its impacts'** | **'Threatened food production'**<br>'*I think if the world population keeps growing and people eat so much meat it will be a big problem because of the greenhouse gases*' (UNIVIE 5).<br>'*What is creepy is that we do not take care about the Earth and that we postpone doing something about climate change…We import a lot of food. We have very little production of our own food…*' (UiO 2).<br>'*I grow Irish potatoes but with the recent trend of climate change they are easily affected by pests and require a lot of spraying and maintenance which makes it expensive to grow compared to other crops like yams ,cassava, and sweet potatoes which are not sprayed*' (TBG 5).<br><br>**'Influence by food transport'**<br>'*This salmon (ed. note related to a picture of a salmon wrapped in plastic) contributes to climate change because it travels around the world to be packed in China*' (UiO 4). |

*Table. 18: Categories and representative quotes aligned with Food 2030 Priority 2 and Sustainable Development Goal 13.*

The TBI reports produced by the BG Partners identified the diversity in agricultural practices as well as the diversity in food plants as important contributors to promoting the sustainable use of land and its various ecosystems and to protecting the biodiversity of species. Diversity in agricultural practices was linked with the importance of careful selection of crops, climate smart and organic agriculture. TBI reports compiled by Tooro Botanical Gardens in Uganda in particular included very specific measures that would be recommended. In terms of the importance of upkeeping a diversity of food plants the integration of new edible species in the home cuisine and having a greater food variety were deemed most prominent.

| Priority 2: *Climate smart and environmentally sustainable food systems* | |
|---|---|
| **Sustainable Development Goals** | **Categories and Illustrative quotes** |
|  **'Protect, restore and promote sustainable use of terrestrial ecosystems,** | **'Diversity of agriculture'**<br>'*Without bees we would have less plant biodiversity, not only food plants but wild plants as well. 1 bee hive can pollinate 200 trees, 2 people can pollinate 20 trees*' (BERG 4).<br>'*Industrial-oriented agriculture causes the decline of small-scale farming*' (BGBM 1).<br>'*It is this with monoculture perhaps that in our time it becomes very industrial… there is much of the same in the same place*' (UiO 2).<br>'*I have grown cassava since child hood and it is one of the most preferred food crops in our family, we even don't waste anything of the cassava I have a piggery* |

| | |
|---|---|
| **sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss'** | *project and I use the cassava peelings, branches and leaves to feed my pigs which has reduced expenditures on my piggery Project*' (TBG 5).<br><br>**'Diversity of food plants'**<br>'*The landscape needs to become more diverse and we need more plant diversity to feed the insects*' (BGBM 2).<br>'*Due to climate change, we may not have cocoa plants in 50 years. We must stop global warming if we want chocolate the rest of our lives*' (UiO 4). |

*Table 19: Categories and representative quotes aligned with Food 2030 Priority 2 and Sustainable Development Goal 19.*

### *5.4. Innovation and empowerment of communities*

The least frequent key priority of the Food 2030 policy was 'Innovation and empowerment of communities' (priority 4) which was aligned with SDG 16 (Peace, Justice and Strong Institutions). Most of the comments that emerged from the TBI reports as relevant to community empowerment underlined the importance of being involved in decision-making about food issues (tables 20 and 21). This involvement was identified as important particularly with regard to the impact on social issues (e.g. social welfare and justice) as well as to Responsible Research and Innovation (RRI). The opportunities for co-creation and construction of knowledge were also deemed significant with examples including the dialogue between scientists and various members of the public through research programmes, activities and science cafés. Other aspects mentioned by participants included the preservation of knowledge from local actors and the role of food in relation to memory and the expression of national identity.

| **SDG 16: Peace, Justice and Strong Institutions – aligned with Food 2030 priority 4** | |
|---|---|
| **Category** | **Frequency** |
| Decision-making about food issues | 15 |
| Construction/co-creation of knowledge | 8 |
| Knowledge from local actors | 6 |
| National identity | 5 |
| Memory | 4 |
| Empowerment through building local relationships | 1 |

*Table. 20: Frequency of occurrence of the categories aligned with SDG 16 and Key Priority 4.*

| **Priority 4: *Innovation and empowerment of communities*** | |
|---|---|
| **Sustainable Development Goals** | **Categories and Illustrative quotes** |

| | |
|---|---|
|  <br>**'Promote peaceful and inclusive societies for sustainable development, provide access to justice for all and build effective, accountable and inclusive institutions at all levels'** | **'Decision-making about food issues'**<br>'*It is necessary more awareness of the social decision of food and not only of the function of feeding*' (UAH 3).<br>*"Sometimes, answers are right there in front of you, it's just what you choose to do with them...I would suggest to people to stand up and speak up; using your intrinsic value as your voice"* (UL 2).<br><br>**'Construction/co-creation of knowledge'**<br>'*We are all millennials or around millennials, we're threatened by computers, this is our last chance to do something normal. That's why we set up the cooperative garden in Jazdow*' (UNIWAR).<br>'*Science cafés and co-creation are really useful tools for teachers*' (UAH 11). |

*Table 21: Categories and representative quotes aligned with Food 2030 Priority 4 and Sustainable Development Goal 16.*

### *5.5. The cultural dimension of food*

The outcomes of the TBI reports make a strong case for the cultural and social values attributed to food as the notion of food as cultural heritage emerged distinctively. This is a parameter that has been to great extent omitted by the prevalent European and global policies that deal with food and sustainable development but is strongly linked with the growing awareness and recognition of intangible cultural heritage by UNESCO[8]. The activities undertaken by the 15 Partners of the BigPicnic covered a wide range of themes surrounding food and security and it is worth noting that cultural and social values attributed to food were identified both directly and indirectly in more than 40 TBI reports and nearly all of the botanical gardens (13 out of 15).

The most prominent categories that emerged from the TBI reports with regard to the role of food as cultural heritage were 'traditional eating', 'migration' and 'cultural diversity in food use' and these were followed by 'food stories/memories' and the 'social context of eating' (see tables 22 and 23).

| Culture and Food | |
|---|---|
| **Category** | **Frequency** |
| traditional eating | 30 |
| Migration | 26 |
| cultural diversity in food use | 23 |
| food stories/memory | 17 |
| social context of eating | 13 |
| cultural diversity in food systems (transport, production, processing, distribution & logistic) | 7 |
| political values | 4 |
| Identity/lifestyle | 4 |

[8] 'The Convention for the Safeguarding of Intangible Cultural Heritage' was adopted by the UNESCO General Conference on October 2003 and entered into force on April 2006. Today the relevant *Representative List of the Intangible Cultural Heritage of Humanity* contains various elements ranging from the preparation and making of kimchi (Korea) or lavash bread (Armenia) to the Belgian beer culture, the French gastronomic meal, the Mediterranean diet and the Arabic or Turkish coffee traditions and many other examples.

| | |
|---|---|
| religious values | 3 |

*Table 22: Culture and Food Heritage: an overview of the categories that emerged from the analysis ordered according to frequency.*

The role of 'traditional eating' in defining how people can approach food safety appeared to be very important. Within this context examples were given of specific types of food that people are familiar or culturally attached with because they grew up eating them and certain types of plants or dishes that are often associated with special situations (events, celebrations, rituals) that are familial, regional or national. In the context of Italy and bread making in particular, participants emphasised also the importance of a dialogue and a relationship of trust between consumers and bakers/sellers (BERG 5). The notion of seasonality and the link between territory and culture, e.g. in the appreciation of the Mediterranean diet in Italy, seemed also to be valuable.

**'Traditional eating'**
'*And that [Kola ceremony], for us, gives us the occasion to celebrate the Harvest Festival that is celebrated in Rwanda, at the first of August every year. So we also have a Harvest Festival with 1 kilo of beans, cultivated in Asse*' (BGM 1).
'*Cooking is an action of sharing with friends, parents, children*' (BERG 8).
'*Kahunga can also be prepared and eaten as solid food, for example this is our staple sauce as Bakonzo tribe, we prepare sombe and bundwe (casava flour) as a special meal for the visitors*' (TBG 5).
'*I, at times, mix cassava flour with millet flour to make Kalo (food) which is eaten with ferinda (bean sauce) as a staple meal in the Tooro culture*' (TBG 5).
'*Well, we're foreign, we're from Sudan, so we often eat Sudanese food. Which is usually meat*' (UL 1).
'*A lot of these plants listed in the notebook are related to my childhood*' (BERG 2).
'*In the past, food was fermented in order to preserve it for the winter. This is also an important aspect for today. This allows us to manage our consumption towards seasonal and regional foods*' (BGBM 1).

In the context of diaspora communities, access to ingredients from the home country was deemed very important as it is part of the cultural identity. The findings were derived predominantly from projects undertaken by the Botanical Garden Meise (APM) in Belgium in collaboration with members of the African community living in the country. Indeed, people of African origin are missing the ability to buy and use certain food crops that are either not available in the Belgian shops or are available but lack the necessary quality and affordable price. As a result, these people also felt that they should be more in control of the relevant food market. In Edinburgh, food was seen as a medium for communication that enables members of the diaspora to create social contacts with Scottish people and improve their knowledge of the English language and local accent. In a similar manner, African immigrants in Belgium saw food as a way to 'reconnect' with the home country particularly since they also felt concerned about the agrofood sector and the economic situation of farmers in the African continent. The preservation of the knowledge of traditional food preparation was also valued by the African diaspora of Belgium while comments from Poland addressed the necessity of people living in foreign countries to adapt their food habits as a consequence of adapting their wider lifestyles.

**Migration**
'*…And I told her I am Iranian - rice is like coffee for you. Everything is rice*' (RBGE 2).
(about the cost of moving to a vegetarian diet) '*And I have a problem, they [organic vegetables] are very expensive*' (RBGE 2).

'*We arrived in Belgium in September 1998, and again we started looking for beans. We went to the supermarket, but they didn't have any dried beans. We looked for them in small shops but there were no beans, only the white beans in pots but not the real beans we knew*' (BGM 1.
'*I miss one thing – home-made food from my garden. I miss food I produced in my home garden*' (UNIWAR 3).

| **Culture, Food and Migration** | |
|---|---|
| **Category** | **Frequency** |
| Access to ingredients (for home / country food) | 11 |
| Communication | 2 |
| Knowledge about how to prepare food eaten in my home country | 2 |
| Adapt lifestyle/way of living due to migration | 2 |
| Memory | 1 |
| Cultural habits | 1 |
| Time | 1 |
| Money | 1 |
| Health | 1 |
| Food as a way to 'reconnect', repair | 1 |
| Identity | 1 |
| Concern about (food) situation in country of origin | 1 |

*Table 23: Culture, Food and Migration: a breakdown of the categories that emerged from the analysis in order of frequency.*

The findings clearly indicate that the diversity in relation to food cultures affects the way people use and consume food. Comments from Spain emphasised how closely connected the environment is to gastronomic culture and that people should relish both their own culinary traditions but also the diversity within individual countries. The importance of diversity among local kitchens was underlined in the Greek context as well. In Bulgaria, participants demonstrated a clear interest in the preservation of traditional uses and recipes of edible plants. Another aspect that emerged was that the choices people make in terms of what they eat and what they do not eat is linked to the food they grew up with.

**Cultural diversity in food use**
'*We have a really delicious and diverse gastronomy*' (UAH 2).
'*It's a food I grew up with*' [Congolese lady] (BGM 2).
'*…visiting the Botanical Garden and seeing the pear labelled as strange food, it was a bit weird…this is part of the things that remind me about my childhood and one of my favourite food memories*' (BGM 1).
'*it's important to communicate and share tradition and culture*' (BERG 8).

Food appears to have strong associations with specific memories and stories that people keep and remember. Most of the feedback about this topic revolved around the decisive role of childhood memories in defining attitudes towards as well as knowledge about food. In Poland, food triggered nostalgic thinking about home (e.g. grandma's baking) and specific tastes that are now lost but also comparisons whereby food was perceived to be tastier in the past and people who had experienced hunger would hold greater respect towards food (UNIWAR). In Vienna (Austria), the knowledge of the older generations about food and nutrition was deemed significant in influencing decisions but was considered both an asset and a burden (UNIVIE 1 and 2). In both Italy and Spain, the lack of specific food memories from childhood were linked with a lack of knowledge about specific types of plants. Finally, findings from Hannover and Greece acknowledged the senses (e.g. taste/flavour,

smell) as an important trigger for food memories as people automatically remember eating things in a specific way at a certain point in time.

**Food stories/memories**
'*I'm back in my home!*' - Statement of an immigrant from Kosovo smelling lemon balm (SBZH 1).
'*When Grandma was baking these breads, and buns. But I think it is rather impossible to recreate these tastes, these smells, but I would like to feel them again*' (UNIWAR 3).
'*When thinking about my childhood I always remember eating tomatoes from my granny's gardens*' (UBG 1).
'*And you have the rain, the sound that the rain is making on the roof and you're sitting with your family, talking about everything and nothing of importance, it's just, you know, the ambience, sitting with your family, the feeling*' (BGM 1)
'*young generations don't know that the walnut is a fruit*' (BERG 7)

Food was demonstrated to have a specific value in the context of social interaction, the importance of sharing food and eating with others. The majority of the comments highlighted how pleasant and useful it is for communities to be connected through occasions that involve making or eating food together. In the very specific context of eating insects, addressed in Belgium by the Botanical Garden Meise, it was observed that some food habits are often defined by social norms (whether or not our family or peers eat something or not) as parents and grandparents had a strong influence (sometimes positive other times negative) on whether the children would taste or not taste insects. In the case of Poland, the social pressure and obligation of knowing someone personally was considered a contributing factor to producing and offering good quality food.

**Social context of eating**
'*I would say good nutrition has something to do with ethics, with health and enjoyment. But it can also be community-building and it can enliven a party wonderfully, because it also has that, it brings people together*' (SBZH 2).
'*Eating is a social activity that joins people together*' (UAH 2).
'*Understanding the lunch time as a moment of fun and enjoyment*' (UAH 8).
'*If we buy them [berries] from someone we know (…) this allows for honesty, because the person has to try to produce something good, honestly, no cheating*' (UNIWAR 4)

The importance of cultural diversity in food systems (including the transport, production, processing, distribution and logistics of food) was also emphasised. It was stressed that the differences in the environmental conditions in various locations impact also on the different ways of handling food. In the case of the African diaspora in Belgium, the production and consumption of insects was seen as part of the food heritage along with the ability to grow one's own food or the habit of foraging. In Uganda, traditional ways of storing crops, like the traditional Enguli granaries, were considered as useful for tackling contemporary food storage problems.

**Cultural diversity in food food systems**
'*…In Nigeria I was walking with my cousin in the village and she saw a shrub with some leaves and she said 'Yes you can eat this' and I tried it. And that would never happen in Belgium*' (BGM 1)

Finally, it is worth mentioning how food choices for different people were seen to be impacted by cultural traditions that are interlinked with identity/lifestyle, religious and even political values.

**Identity/lifestyle and religious values**

'*My whole life is about food..,When I prepare breakfast, I already think about the dinner*' (UNIWAR 1).
'*Meat plays a big role for us because of the festival of sacrifice*' (SBZH 5).
'*I wish that German supermarkets would sell halal meat*' (SBZH 5).

### *5.6. Food and Governance*

According to the European Commission, 'Governance' is a significant dimension of Responsible Research and Innovation (RRI).[9] Governance was identified from the preliminary data gathered by the 15 project Partners as a potentially significant theme and therefore was brought to the attention of all Partners during the training for the qualitative analysis of the data so that subsequent TBI reports could reflect on any relevant aspects. Indeed, the issue of food and governance emerged in over half of the TBI reports (38 out of 71) and occurred 119 times in the coding of the data conducted by the project Partners. The three most important aspects highlighted by the available data –accounting for more than half of the comments made by participants– touched upon: (1) the importance to regulate food costs, (2) the strong ethical considerations underlying food safety decisions and approaches on a political level, and (3) the need for political measures on both national and international level. The following table (table 24) summarises all the categories that emerged from the food and governance topic.

| **Food and Governance** | |
|---|---|
| **Category** | **Frequency** |
| Food costs | 25 |
| Ethics | 23 |
| Political measures (national and international) | 21 |
| Civic society (grass roots movements) | 14 |
| Environmentally friendly production & consumption | 12 |
| Collaboration among institutions | 10 |
| Food sovereignty | 5 |
| Research as a medium for innovation and infrastructure | 5 |
| Taking responsibility | 4 |

*Table 24: Food and Governance: a breakdown of the categories that emerged from the analysis in order of frequency.*

'Food costs' was the most significant aspect that participants highlighted in the various TBI reports. In most cases this was related to a call for more effective taxes and regulations for the cost of food in the relevant market. Findings from Hannover (Germany), for example, consisted of demands for a revision of pricing policies while in Italy concerns were raised about increasing production costs. The need for a more careful allocation of subsidies and subventions according to environmental standards was also raised in both Germany (Hannover) and Belgium. Most of the other comments around food costs came from Bulgaria where the importance of legislation to support urban gardens and local community gardening and to promote edible plant conservation and biodiversity was raised.

**Food costs**

[9] In a recent report, the term was defined more broadly as '*all processes of governing, whether undertaken by a government, market or network, whether over a family, tribe, formal or informal organization or territory and whether through laws, norms, power or language*' (Stilgoe & Lindtner 2018: 14). This term was also considered to mean '*attempting to shift science and innovation systems from a narrow focus on innovation towards democratically defined societal challenges*' (Stilgoe & Lindtner 2018: 2).

'*School catering in Germany is still subject to 19 percent value-added tax. The political demand should be: we go down to the reduced VAT rate of 7 percent*' (SBZH 2).
'*Adapting prices to transport routes: the further a foodstuff has to be "driven", the more expensive it becomes*' (SBZH 4).
'*Meat price is too low compared to vegetable products*' (SBZH 5).
'*I wish, science would have more influence in politics and global BigPlayers should be restricted and disempowered*' (UNIVIE 1).

The second most significant category within the food and governance theme was 'ethics'. Findings from both Italy and Greece pointed towards the necessity to support a social solidarity economy while participants in activities run by the Bergamo Partner were concerned about working conditions of people involved in the food industry. Other reflections brought forward concerns about animal welfare, the quality of meat products and the importance of support for vegan and/or vegetarian diets. Comments expressed predominantly in Poland criticised the role of political lobbying in terms of the controversial issue of GMO products. The need for politicians to act as role models in all of the aforementioned topics underlined most of the references derived from the TBI reports.

**Ethics**
'*Solidarity meals and the relationship with operators and volunteers give dignity to people in difficulty*' (BERG 3).
'*Bergamo is the first city in Italy for the number of people active in volunteering*' (BERG 3).
'*Is work in the fields based on the workers' mistreatment*?' (BERG 7).
'*We should be more attentive to the neighbour, often we ignore the problems of people living in the same building*' (BERG 3).
'*Low quality meat is exported from Holland to Africa. There it is sold so cheap it destroys local markets*' (UNIVIE 1).
'*It is indecent to sell and buy a kilo of cutlet for 3,99 €*' (SBZH 4).
'*Well, one of the rather principal worries I have is about patenting of genetic material...Which means a privatisation on a specific area is happening. Of course, we always mention Monsanto, but you can name others. The breeders' right or the patenting of genetic properties, has the function to earn money back, if you invest, but it can also mean protectionism*' (UL 2).

The majority of the comments that addressed the need for more effective political measures on a national and international level came from the University of Alcalá de Henares (UAH) in Spain. Their participants specifically called for measures to reduce pesticides, protect pollinators, promote urban gardening, regulate food-related issues within the university itself and promote pacts and agreements that support sustainability. All of these topics reflect the specific themes that were addressed by the projects and activities of this specific Partner. A significant part of the data also was derived from the findings of the School Biology Centre of Hannover (Germany) which focused on the importance of more careful legal regulation of food labelling, packaging and advertising particularly for products that contain large amounts of unhealthy elements such as sugar and fat.

**Political measures (national and international)**
'*Sometimes, political positioning determines a lot the decisions of the policy makers about food security*' (UAH 2).
'*The policy makers of the cities are really influential in the good functioning of urban vegetable gardens*' (UAH 7).
'*It is more difficult to change administrative structures than political will*' (UAH 12).
'*No 'no added sugar' advertising if ingredients contributing to the sugar content are used*' (SBZH 3).
'*Make "healthy" more attractive*' (SBZH 3).

Some of the TBI reports contained comments that raised the significance of civic society and grass roots movements for decisions on the political level. Findings from Greece highlighted the contribution of such movements towards a social solidarity economy and to Community-supported agriculture while findings from Hannover, Bergamo and other Partners stressed how the voice of the public and the non-experts should be louder and more influential.

**Civic society (grass roots movements)**
'*non-experts should be heard because they have worries. They are mostly overlooked, that shouldn't be the case*' (UNIVIE 1).
'*Participate in demonstrations or organise them yourself*' (SBZH 5).
'*Solidarity food operators should establish a relationship of human trust with the needy, taking care of relationships*' (BERG 3).

Certain TBI reports featured comments about the political influence on environmentally friendly production and consumption. Initiatives that had a sensitivity towards the potential impact of agriculture, production, product packaging and transport were highlighted with comments from Norway for example referring to the Svalbard Global Seed Vault and from Spain (UAH) mentioning urban agroecology. In addition, findings from Greece emphasised the importance of crops that have low requirements in terms of water, nutrients and soil quality.

**environmentally friendly (production & consumption)**
'*The Svalbard Global Seed Vault is, after all, a quite monumental statement in relation to just that* (ed. note: regarding preventive measures)' (UiO 2).
'*Public bodies should give courses on how to eat fresh products (how to cook them)*' (UAH 9).

The findings from the University of Alcalá de Henares (UAH) featured almost exclusively in the references to the importance of collaboration among institutions in order to achieve more effective governance. These comments emphasised the need for closer connections between consumers and producers, extensive collaborations with schools, regional initiatives, local producers and between universities as well as dialogue between experts. Again, these reflections mirrored, to a great extent, the projects undertaken by the UAH such as, for example, the creation of a discussion group for promoting better food catering facilities at the university.

**Collaboration among institutions**
'*Promoting the creation of gardens at schools of Alcalá and trying to promote a network*' (UAH 4).
'*Establishing a group of experts (scientists, managers, beekeepers…) to create a commission that meets and makes decisions*' (UAH 10).
'*Science must be heard more, there are many findings in research that could be implemented!*' (SBZH 4).

The findings derived from the University of Warsaw, Poland, had a particular focus on food sovereignty as participants in the activities of the botanical garden commented on the importance of having their own land and their own production, on the value of a consolidated cooperation among farmers and the need to not overlook the national/regional interest for the sake of global measures. These opinions pointed to the right of the public to access food produced through sustainable methods and to their right to define their own food and agriculture systems.

**Food sovereignty**

'*Our garden is rather small but we have it all: black currant, red currant, raspberry, pear. That is small piece of land but we have everything*' (UNIWAR 3).
'*Why farmers are not consolidating in our country (Poland)*?' (UNIWAR 2).

Reflections from participants engaged at the University of Alcalá de Henares (UAH) emphasised the contribution of research as a medium for innovation and infrastructure. It was felt by the relevant Partner that these findings were aligning with Sustainable Development Goal 9 (Innovation and Infrastructure).[10] Comments touched upon the importance of more investment on research and particularly on research for food security and the production of healthy food. Furthermore, promoting academic research on agroecology was also seen as important along with establishing a greater dialogue between citizens and researchers.

**Research as a medium for innovation and infrastructure**
'*I think research in food security should be used to do healthy food*' (UAH 1).
'*It is important to consider possible manipulation in food safety research projects*' (UAH 1).

Finally, some of the comments expressed in the TBI reports stressed that politicians, policy makers, the markets, and other authorities often avoid taking responsibility for the lack of measures or appropriate actions for the common good.

**Taking responsibility**
'*Before the citizen can act, the policy makers and businessmen must facilitate the work*' (UAH 1).
'*Of course, the administration should take care of the plants, the soil needs to be changed, I take care of my garden, but all the common space needs to taken care of by the administration, and the administration should also request people take care of their gardens*' (UNIWAR 6).

As mentioned before, research supported by the European Commission has recognised 'Governance' as a significant dimension of RRI (EC 2015) and, within this context, a certain categorisation/typology of forms of governance has emerged. Table 25 outlines the so-called MoRRI typology for governance which includes six categories. One could argue that several of the categories that emerged from the TBI reports call for action on a political and societal level that would promote 'educational governance', 'deliberative governance' and to some extent 'agonistic governance' (in accordance with the above MoRRI typology). Although the need for a more careful political regulation of food costs was the primary finding of the food governance theme (and therefore could be linked with necessity of market governance whereby the public participates as customers and consumers) the TBI reports appear to have identified informed citizenry, public engagement on decision-making and public opposition (e.g. in relation to the hotly debated topic of the GMOs) more extensively.

[10] Sustainable Development Goal 9 (Innovation and Infrastructure) aims to 'build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation' (UN SDGs 2019).

| |
|---|
| 1. **Discretionary governance:** Policies in this category are made without explicit interaction with 'the public'. Governance is presented primarily as a matter for government, which is seen as serving universal goals of progress.<br>2. **Corporatist governance:** This involves a formal recognition of differences of interest as an input to negotiation. As negotiation takes place within a closed or highly regulated space, the decisive feature of this mode is the admission of stakeholders.<br>3. **Educational governance:** This assumes that policies for science and technology have foundered on the shoals of public ignorance. Hence, it is necessary to create an informed citizenry.<br>4. **Market governance:** Science and technology are best regulated by demand and supply. The value of science comes from the surplus value created through its commercialisation and contribution to the generation of wealth. The public participates as customers and consumers.<br>5. **Agonistic governance:** This form of governance occurs in a context of confrontation and adversity. The storage of nuclear waste in the UK is a case where policy seems to have stalled in the face of public opposition: opposition to GM foods has also taken agonistic form.<br>6. **Deliberative governance:** This rests on the assumption that open debate and engagement can create a satisfactory foundation for decision-making. In this mode, the public are not consumers of science, but rather 'scientific citizens'. |

*Table 25: A typology of governance (EC 2015: 10 - adapted from Hagendijk & Irwin 2006).*

## Annex 4: Food choices survey summary findings

### 1. Introduction

During the External Review of the project in June 2017 it was suggested to complement the largely qualitative studies carried out as part of TBI with a large-scale survey that would focus on food choices. However, BigPicnic is a Cooperation and Support Action (CSA) and not a research project. The focus of this quantitative survey was therefore not on doing research on food choice in Europe but on developing a better understanding of qualitative data collected by BG Partners and to see whether a larger number of BG visitors will support qualitative findings.

### 2. Method and reason for selecting a particular set of factors for this survey:

The Eating Motivation Survey (TEMS), published by Renner, Sprösser, Strohbach and Schupp in 2012, is a confirmatory factor analysis with fifteen factors for food choice and 'yielded a satisfactory model fit for a full 78 items representing 15 factors' (Renner et al., 2012, p.117).

For the BigPicnic Survey 7 factors were chosen based on evidence qualitative data has uncovered.

These factors were *Sociability*, *Social Image*, *Social Norms*, *Traditional Eating*, W*eight control, Traditional Eating* and *Natural Concern. Sociability* encompasses social reasons for food choice; *Social Norms* comprises food choice to meet others' expectations; the factor *Social Image* is characterized by the consumption of food to present oneself positively in social contexts; the motivation to choose food items low in fat or calories to control one's body weight is captured by the factor *Weight Control*. *Traditional Eating* depicts choosing foods out of traditional and circumstances related reasons; Ethical aspects of food choice are captured by the factor *Natural Concerns* which assesses the preference for natural foods from fair trade or organic farming (Renner et al. 2012).

BigPicnic data suggested that there might be another factor influencing food choice which has not been addressed in the TEMS-survey so far. This one was paraphrased as *Migration* and asked whether or how aspects of not being born and grown up in a particular country affect food choice.

While TEMS item blocks prove themselves quite reliable and valid (Cronbach's range from .60 to .73) already the item block for *Migration* has not been tested so far. Items were formulated by the QM-Team to get a first insight into how important a migration background might be when it comes to food choice.

Although all 15 TEMS factors would have been equally interesting to look at, we decided to go for those seven factors only as they were well justified by qualitative data collected in BigPicnic. Experience in botanic gardens has shown that visitors are not very excited to fill in a three page questionnaire after visiting an exhibition or participating in a workshop or science café. The BigPicnic questionnaire was one and a half pages long. However, even that size was not suitable for some visitors, as reported back by BG Partners. A couple of questionnaires handed in by BG Partners were not filled in completely and thus were not included in this study.

TEMS items have been tested in Germany and were published in English. Thus the selected questions were already available in these two languages. BG Partner translated the BigPicnic

questionnaire version into another 5 European languages. Translation is always a source of error, which needs to be considered whenever data is presented as if the source is equal.

### 3. Sample

1189 people filled in the questionnaire after visiting a BigPicnic exhibition, workshop or science café in a particular Partner country. Topics addressed in these learning experiences were related to food in a broad sense. In addition a sample size of 290 questionnaires was filled in by visitors of BGCI's International Congress on Education in Botanic Gardens Congress in Warsaw 2018 or via an online questionnaire format offered on the BigPicnic website (www.bigpicnic.org ). These questionnaires form a distinct group called International (INT). All others are marked in relation to the country were they were collected.

### 4. Findings

The TEMS Study has a sample size of 1040 participants with an age distribution (younger adults n = 725; older adults n = 314). This is quite similar to the sample covered by the BigPicnic survey (see Fig.1). About 40% of the BigPicnic survey participants were between 20-39 years old, another 40% are 40- 60 years old.

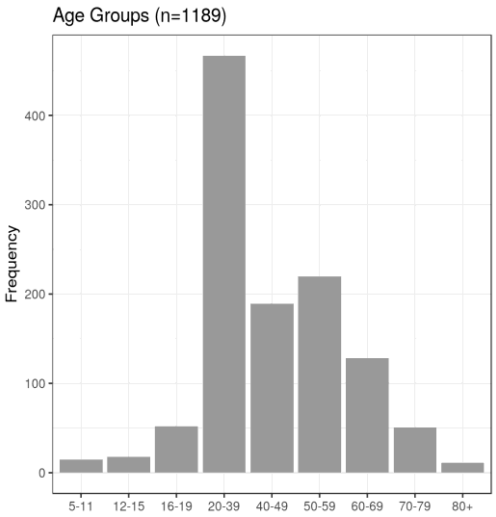



Fig 1: Distribution of age amongst all survey participants

Predominately higher educated people (highest level of education = college or university) filled in the survey in most Partner countries. The statistical distribution amongst middle and high-educated participants was quite similar in most Partner countries (fig.2.). In Belgium almost exclusively higher educated people took part. About a quarter of the survey participants are still in education.

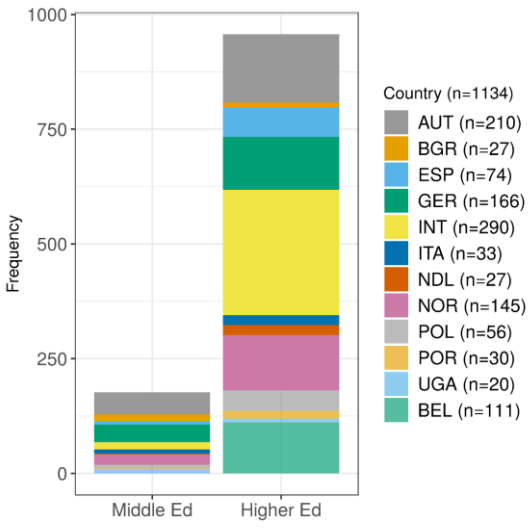



Fig.2: Distribution of level of education amongst survey participants in each country

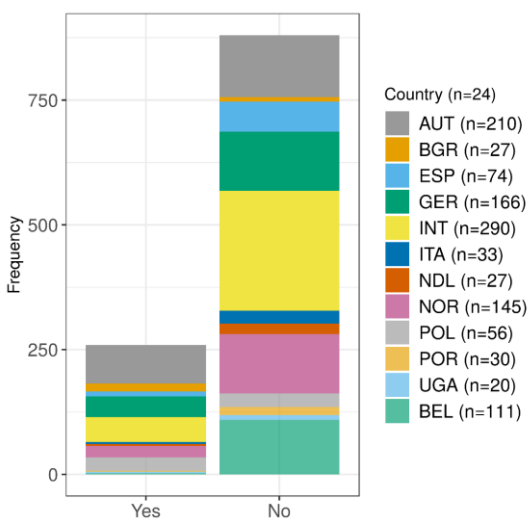



Fig. 3: Distribution of people still in education or not amongst survey participants in each country

The international group (INT) is characterized by a higher percentage of higher educated women while in general more than twice as much women than men filled in the questionnaire (Fig.4 and 5).

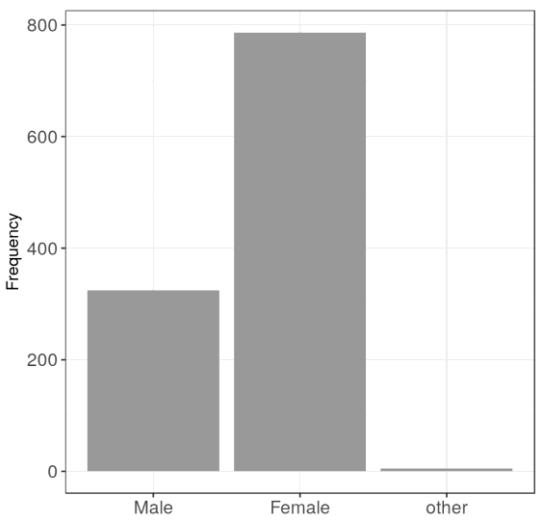



Fig. 4: Distribution of sex amongst all survery participants

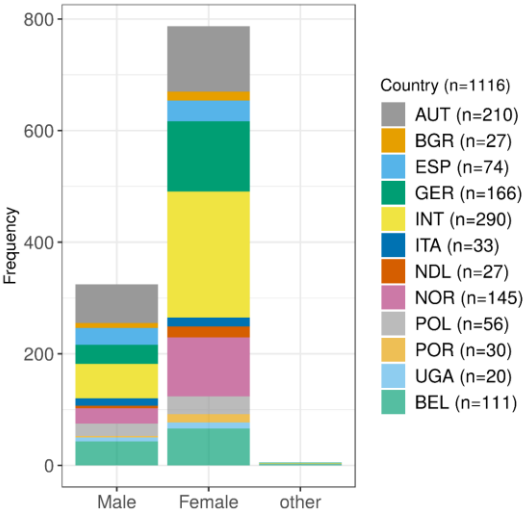



Fig. 5: Distribution of sex amongst all survery participants

When looking at how people ticked boxes in relation to the 7 food choice factors neither education (Fig.6) nor gender (Fig.7) appear to make a difference.

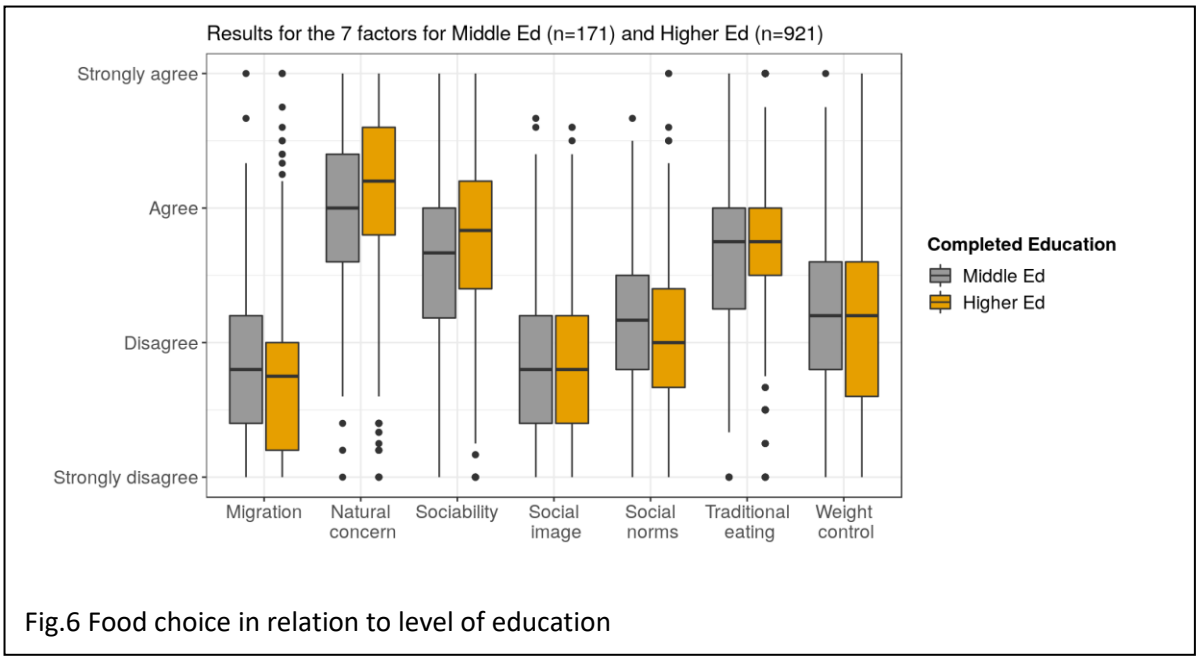



Fig.6 Food choice in relation to level of education

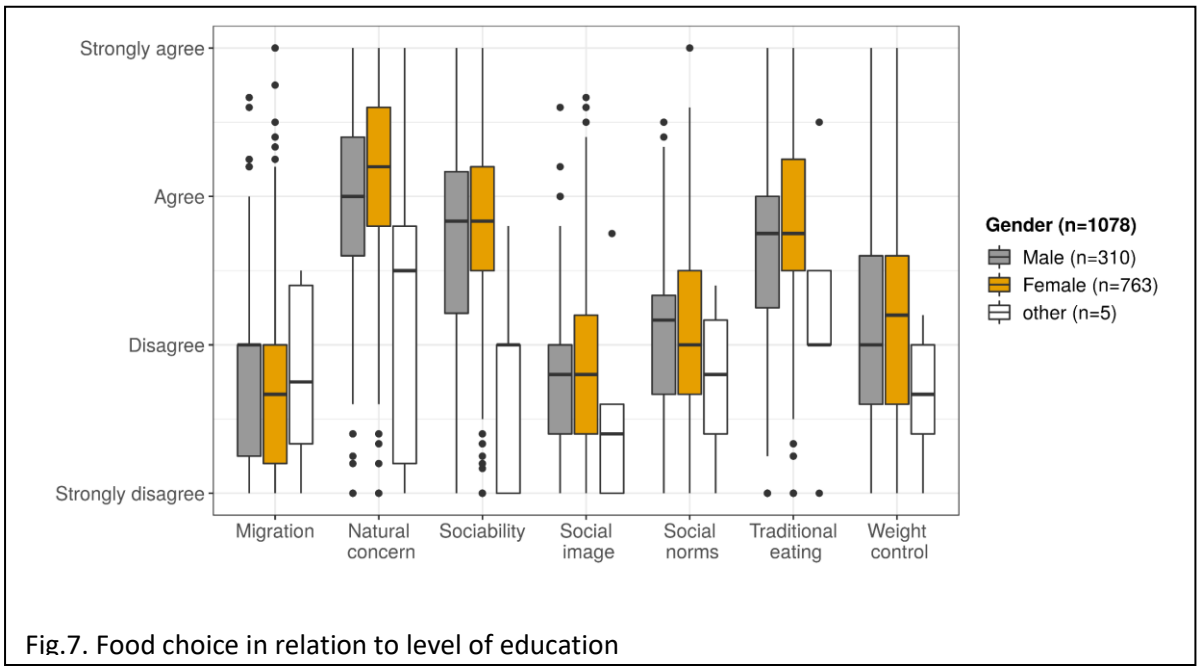



Fig.7. Food choice in relation to level of education

*Natural Concerns* appears to be the most agreed factor out of those offered in this survey (Fig.8.). Most people either agree or strongly agree with statements related to preferences for 'natural foods' from 'fair trade' or 'organic farming' or 'environmentally friendly food'. *Sociability* as well as *Traditional Eating* is also relevant. People agree that they 'Eat what they eat' because 'it makes

social gatherings comfortable' and 'enjoyable' as well as 'it belongs to certain situations' and 'family traditions'. *Social Norms* and *Weight Control* appear to be less important factors.

The *Social Image* and *Migration* context is not considered important. Most participants either disagree or strongly disagree with *Social Image* statements such as 'particular food is chosen because others like it' or 'it makes me look good in front of others'.

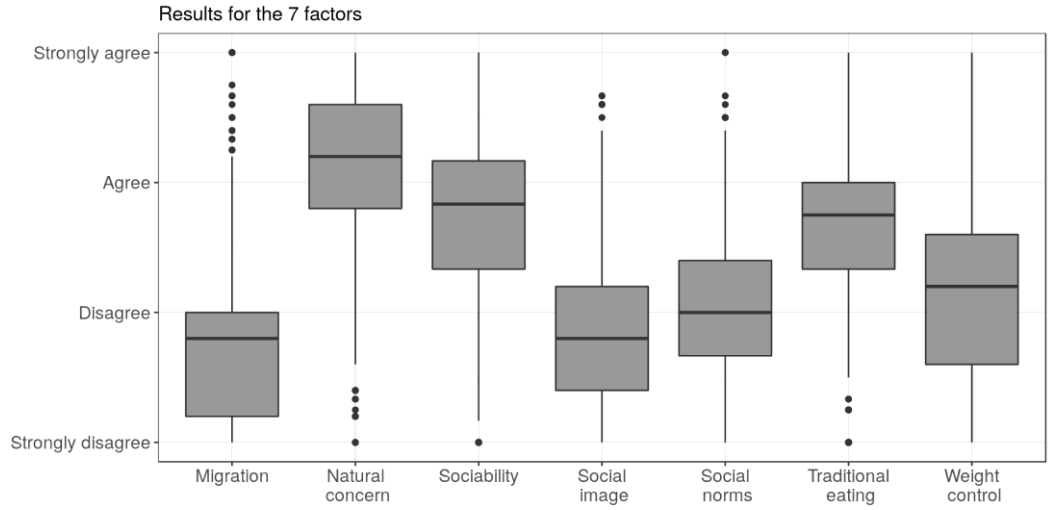



Fig.8. Factors for food choice chosen by all survey participants.

Most people disagree or strongly disagree with statements such as 'I cannot buy ingredients I need in the country I currently live' or 'my food habits changed since moving to the country I currently live'.

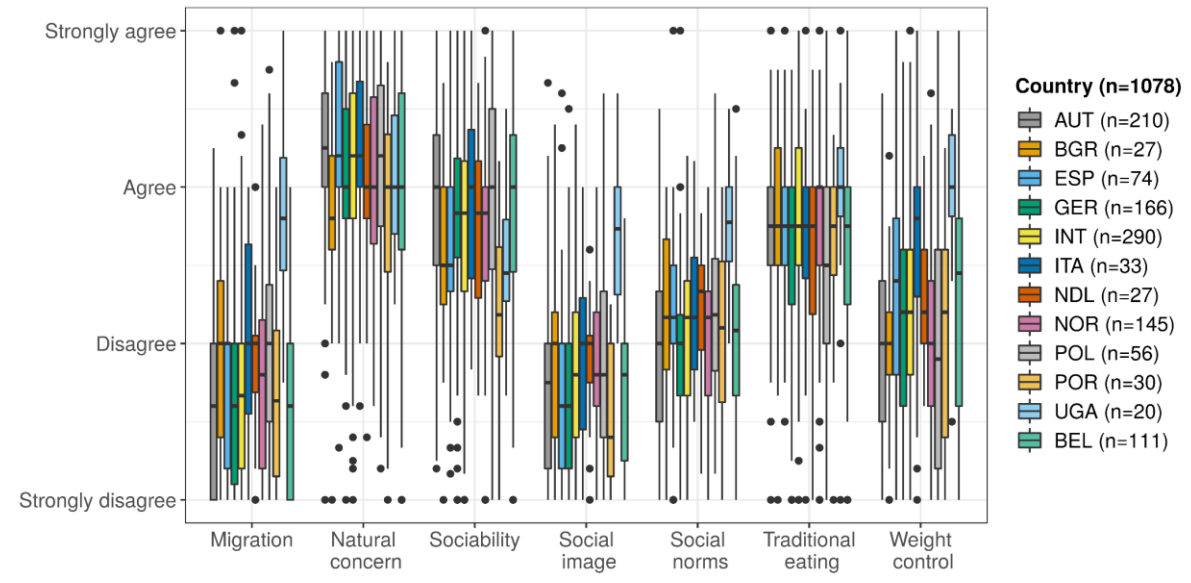



Fig.9. Food choice in relation to the country in which the survey was conducted.

People with migration background who participated in BigPicnic co-creation teams emphasized food as part of their cultural identity. However, this aspect is not important for survey participants. Either this particular group of people was not well represented amongst visitors or did not engage in this survey because of language or cultural barriers.

Fig. 9. shows the results accoding to the country in which data was collected. INT is data collected via the international BigPicnic website as well as during an international conference. Thus for these questionnaires the natioanality of participants is unknown.

Country results show that for each individual factor, the score is statistically significant dependent on the country (chi² independence test) in which the survey was conducted. This signficance is also due to the INT- questionnaires, which suggest that the context in which the questionnaire is filled in has an impact on how people tick the boxes.

## 5. Summary:

Renner and colleagues (2012) suggest in reference to their sample: 'Being rather homogeneous in terms of cultural background, political values, and religious beliefs, this sample might have restricted variance in political values, religious beliefs, and traditions`'. BigPicnic data suggest that this limitation has to be considered. The BigPicnic sample is multinational and -cultural. Thus, this survey adds a new perspective to data collected by the TEMS group earlier.

The focus of this survey reflected the overwhelming evidence generated through the qualitative studies that identified the central role food plays in developing and sustaining personal and collective identities. Food as cultural heritage came up as an overarching theme during the co-creation sessions, in particular.

Survey results collected in 11 countries (n= 1189) suggest that the country as well as the context in which the survey is conducted has an impact on how people classify the importance of the selected factors Migration, Natural Concern, Sociability, Social Image, Social Norms, Traditional Eating and Weight Control.

Yet, there is hardly any mention of it in food security policies at the European (e.g. Food 2030) and global level (e.g. SDGs). Raising the profile of food heritage was seen as one of BigPicnic's key contributions, especially on a policy level (see also policy recommendations: https://www.bigpicnic.net/resources/bigpicnic-recommendations/ ).

## Annex 5: Brief summaries describing the 15 BigPicnic Partners that compiled TBI reports for their activities (information derived from BigPicnic website).

**Botanical Garden of the University Vienna Austria**

universität wien
Botanical Garden

The Botanical Garden of the University Vienna was founded in 1754 as a Hortus Medicus and is today a core facility of the Faculty of Life Sciences. Education, research and collecting of species are the main goals of the garden, as well as raising awareness of the importance of biodiversity and ex-situ protection of species. Their mission for the BigPicnic project is to embed the term Food Security in the public consciousness, and raise awareness of and interest in the origin of our food in order to achieve a change of lifestyle. To broaden their audiences, senior citizens and their grandchildren (primary school), university students, and young adults (14-25) will be their main target groups for engagement.

**Botanic Garden Meise Belgium**

Plantentuin Meise

Situated close to Brussels and spanning 92 hectares, this botanic garden has an international reputation. Their mission is to increase and disseminate knowledge about plants & fungi and to contribute to biodiversity conservation. They have a long tradition of collaboration with several African botanic gardens and research about food crops important for Africa. Botanic Garden Meise will develop activities around four main topics. The first focus is 'sustainable catering' - how can organisations make their catering more sustainable and meanwhile inform and sensitise their clients about sustainable food? The second focus, called 'your food – our food' will bring Belgians of different cultural backgrounds together to discuss and learn about each other's food traditions and food security problems. A third focus, 'So sweet', explores the role bees and pollination play in our food security. Finally, a fourth focus will explore traditional and innovative ways of food production and transportation.

**University Botanic Gardens of Sofia University "St. Kliment Ohridski" Bulgaria**

UNIVERSITY BOTANIC GARDENS
УНИВЕРСИТЕТСКИ БОТАНИЧЕСКИ ГРАДИНИ

The University of Sofia is the leading centre of higher education in Bulgaria and is an embodiment and a continuation of centuries of cultural and educational tradition in the country. The University Botanic Gardens of Sofia University "Saint Kliment Ohridski" are represented by three gardens in three locations – the cities of Sofia and Varna, and the town of Balchik. Their primary task is to expand knowledge about the plant kingdom and to carry out activities on ex situ conservation of rare and endangered plant species. Their mission for BigPicnic is to provoke discussion on the importance of eating local and seasonal food versus eating exotic fruits and vegetables all year round. Through their outreach activities and exhibitions they aim to engage with families (parents and children), school classes, people who are interested in and want to learn more about plants, elderly people, and people with disabilities.

**School Biology Centre Hannover Germany**

SCHULBIOLOGIE ZENTRUM HANNOVER
global bis molekular

The School Biology Centre Hannover (SBZH) is part of Hannover City Council's school department. Their main focus is on education for a sustainable development, providing environmental and natural science lessons for school classes on the centre's grounds. They also offer training courses, advice,

and resources to support teachers to develop lessons on plants, animals, materials and instruments for investigations and experiments. SBZH's mission for BigPicnic is to become the main location in their region where information and assistance are provided for schools, teachers and parents on healthy food and sustainable food production. Through BigPicnic activities and outreach exhibitions, SBZH aim to engage with pupils aged 4-18, parents and grandparents, teachers and refugees.

**Botanic Garden and Botanical Museum, Freie Universität Berlin** **Germany**

BG BM | Botanischer Garten & Botanisches Museum Berlin

The Botanic Garden and Botanical Museum at Freie Universität Berlin cultivates more than 20,000 different plant species from all over the world and is focused on the earth's natural plant diversity. They document this diversity in their collections, record and explore it in their research projects, present it in their Museum and contribute to its protection and sustainable use. They plan to develop a sustainable and innovative program for BigPicnic, which will be a model for their future education programme in terms of new methods and approaches to knowledge transfer. Their aim is to bring together young and old people, as well as local allotment holders, to talk about older generations' experiences of food scarcity and current attitudes toward food.

**Balkan Botanic Garden of Kroussia** **Greece**

Balkan Botanic Garden of Kroussia

The Balkan Botanic Garden of Kroussia (BBGK) is dedicated to both ex situ and in situ conservation of native plants of Greece and the Balkans, with the aim of developing species-specific propagation and cultivation methods that can be used for the sustainable exploitation of Important Plant Species and their possible reintroductions into the wild. BBGK raises the public's environmental awareness of their native plants by organising activities and projects for citizens and schools. For the BigPicnic project, BBGK seeks to raise public awareness of Greek native and/or endemic species with special nutritional properties that are not broadly used or exploited. Their target audiences cover a range of people responsible for preparing food for others, including parents, nutritionists, physicians, policy makers, and industry.

**Bergamo Botanic Garden "Lorenzo Rota"** **Italy**

Orto Botanico di Bergamo Lorenzo Rota

Bergamo Botanic Garden is a municipal institution founded in 1972. It promotes conservation, research, education related to plants as well as social and cultural activities such as exhibitions and conferences. In 2015 it increased its collections with the 'Valley of Biodiversity' -a section of the botanic garden 2km away from the historical section of the Upper Town, completely dedicated to food plants. Their mission for BigPicnic is to disseminate knowledge related to food security to change food habits and lifestyles, and to create awareness on food security and biodiversity. They intend to reach new and different types of audiences with their outreach activities, focusing on teenagers, students, garden visitors (in particular home-makers), urban farmers, and urban citizens.

**Hortus botanicus Leiden** **The Netherlands**

Hortus botanicus LEIDEN

Hortus botanicus Leiden has been part of the University of Leiden for 426 years, making it the oldest botanic garden of the Netherlands. Since its foundation the Hortus has been carrying out scientific research and public outreach and education related to their world renowned collections, including orchids, carnivorous plants, ferns, bulbs and many others. Their mission for the BigPicnic project is to raise peoples' awareness of what they are eating; focussing on edible plants, where they come from, and

the impact their production has on the environment. Through their BigPicnic outreach activities Hortus botanicus Leiden aim to engage with their regular garden visitors as well as new target groups, including young families that do not currently have a connection to the garden.

**Natural History Museum, University of Oslo Norway**

UiO : Natural History Museum
University of Oslo

The botanic garden, founded in 1814, is a part of the Natural History Museum of the University of Oslo. With a plant collection of around 5,500 species. The garden seeks to increase public awareness of the importance of plant diversity through research, education and plant conservation. Through their BigPicnic activities and exhibitions, the botanic garden at the University of Oslo aims to put sustainability on the public agenda, making it just as important a consideration as health when people choose their food. Their target audiences are university students and young adults, new immigrants, pre-school and primary school teachers, and local neighbourhood residents.

**University of Warsaw Botanic Garden Poland**

The University of Warsaw Botanic Garden, established in 1818, unites research, public education and management of plant, herbaria and botanical illustration collections. All of these resources offer great experiences and opportunities for engaging the public with plants and facilitates understanding of the complex connections between plants and people. The greenhouses, with their collection of tropical and subtropical edible plants, together with the collection of medicinal and edible plants from the northern hemisphere, are extraordinary places that offer the public direct contact with edible plants as well as engaging them with both local and global issues on food security. Their mission for the BigPicnic project is to raise awareness about food security amongst citizens, inviting people to share knowledge about food and the method and consequences of its production, to experience the pleasure of ethical food and to participate in local change. Their target audiences will be middle class people who have a preference for upmarket food, local farmers and their families, current garden visitors, seniors, citizens, and university students.

**National Museum of Natural History and Science, University of Lisbon Portugal**

mnhnac
MUSEU NACIONAL DE HISTÓRIA NATURAL E DA CIÊNCIA
UNIVERSIDADE DE LISBOA

U LISBOA
UNIVERSIDADE DE LISBOA

The National Museum of Natural History and Science at the University Of Lisbon is a centre of education, science and culture in the heart of Lisbon. Although its location has hosted teaching institutions since the early 17th century, the Museum has its origins in the Royal Museum and Botanic Garden of Ajuda, created in the 18th century. Apart from exhibitions, visitors can enjoy a diverse programme of activities aiming at stimulating curiosity and understanding about biodiversity, nature and science, as well as developing a close relationship with their visitors. Their mission for the BigPicnic project is to build and lead a network of key organisations that can engage local target audiences with the Mediterranean diet, beginning with a co-created exhibition entitled Grow Locally, Cook Healthily. Botanic garden staff will collaborate with key local groups to broaden and involve wider audiences, including elderly people, botanic garden neighbours, families, Lisbon University students/communities and local schools.

**The Royal Botanic Garden of Madrid Spain**

MINISTERIO DE ECONOMÍA, INDUSTRIA Y COMPETITIVIDAD
CSIC

The Royal Botanic Garden of Madrid is both a botanic garden and a research institute. Belonging to the Spanish National Research Council since 1939, it carries out plant research, conservation and education. The garden has been historically involved in introducing and growing food crops in the Iberian Peninsula, and will now be enhancing the role it once played in food production by communicating the challenges of food security to the public. Their mission for BigPicnic is to empower their audiences to make informed decisions about food. Through their co-created exhibitions and activities, the

Royal Botanic Garden of Madrid aim to engage with students and teachers (both primary and secondary), the university community (students, teachers and researchers), people from socially excluded groups and the general public.

**Juan Carlos I Royal Botanic Gardens, Alcalá de Henares University Spain**

The Juan Carlos I Royal Botanic Gardens keeps documented collections of almost 8000 different species of plants, with four main objectives: Scientific research, flora conservation, botanical/environmental education and recreation. The botanic garden has a wide variety of plants, including an important number of edible plants at their organic vegetable garden. By participating in BigPicnic, Juan Carlos I Royal Botanic Gardens hope to empower their audiences to make informed decisions about food choices and share knowledge by promoting debate about food security. They intend to collaborate with organisations that have shared audiences and objectives such as other departments of Alcalá de Henares University, nearby schools and cultural places, environmental education organisations and agricultural groups. They will improve and build new relationships with local communities including botanic garden and university staff and volunteers, neighbours and citizens of Alcalá de Henares, as well as local restaurants, hotels, farmers, producers and retailers.

**Tooro Botanical Gardens Uganda**

Tooro Botanical Gardens (TBG) is a community owned organisation founded in 2001 as a centre of excellence in growing and maintaining living plant collections from the Albertine Rift, for conservation, scientific research, education, horticultural and aesthetic purposes. TBG has an edible plant garden and a practical training centre for food plants for different purposes including the "food security/hunger crops" section which demonstrates a range of food security solutions that people can use at home. Participating in BigPicnic has helped TBG to reach out to a wider range of people through mobile food security campaigns under their slogan "kick food insecurity out of Uganda". Through BigPicnic activities, they aim to connect with farmers, food vendors, students and local communities as they endeavour to increase food availability and accessibility, and reduce food wastage at all levels of the food chain.

**Royal Botanic Garden Edinburgh United Kingdom**

The Royal Botanic Garden Edinburgh (RBGE) was founded in 1670 as a physic garden. It is now a world-renowned centre for plant science, horticulture and education and extends over four gardens (Edinburgh, Benmore, Dawyck and Logan) boasting a rich living collection of plants. For the BigPicnic project, RBGE's mission is to work with target communities to address the problem of food poverty in Scotland, and to explore why many of the people of Scotland have a poor diet, which impacts on their health and well-being. They seek to engage with families from areas recognised by the Scottish Government as Areas of Multiple Deprivation (AMD), people undergoing challenges due to life problems such as homelessness or disconnection that affect their access to food, and those interested in helping them with 'bottom up' solutions and input to policy changes.

## Annex 6: Brief summaries of the five BigPicnic Partners that have been involved in the project co-ordination, the International Consolidation group, the evaluation and co-creation.

**Botanic Gardens Conservation International (BGCI) United Kingdom**

BGCI *Plants for the Planet* BGCI is the world's largest plant conservation network, with over 600 members, linking botanic gardens around the world in a shared commitment to save threatened plant species and raise awareness about the importance of plants. Their mission is 'to mobilize botanic gardens and engage Partners in securing plant diversity for the well-being of people and the planet'. BGCI's highly regarded education programme has been running for over 20 years and focuses on information sharing, knowledge transfer and capacity building for plant conservation and sustainability. Since 2010 BGCI has been encouraging botanic gardens worldwide to focus on their social role. BGCI acts as project co-ordinator for BigPicnic, using their broad management expertise to facilitate communication between Partners and to ensure the project runs smoothly. Their responsibilities include operational management, developing and managing communication platforms, monitoring and executing project plans, co-ordinating all meetings, ensuring compliance with legal and ethical requirements, and acting as the main link with EU officers.

**University of Innsbruck Austria**

The University of Innsbruck, Austria, covers a broad range of research and teaching areas and includes a Science Education Research group, which offers high-quality accreditation programmes for science teachers. This teaching activity is complemented by research in the fields of education theory, classroom practice, subject-specific teaching and teachers' professional development. Additional focus is put on research into science learning outside the classroom and at the botanic garden in particular. As part of the BigPicnic project, BG Partners will be developing and delivering a series of Science cafés, debates and discussions in local venues or at Partner sites such as community centres, cafés, pubs or village halls, or any other site which is universally accessible and appropriate to audiences. The University of Innsbruck are leading on the development and evaluation of these events, as well as assisting in monitoring Partners' institutional development.

**Institute of Archaeology, University College London United Kingdom**

UCL INSTITUTE OF ARCHAEOLOGY The Institute of Archaeology (IoA) at University College London (UCL) is a long-established international leader in the discipline, as well as one of the world's leading centres of expertise for research and teaching in the fields of museum studies, conservation, cultural heritage studies, and public archaeology. One of the UCL Institute of Archaeology's missions is to promote best practice and support professional development in museums and other cultural organisations. In the BigPicnic project, IoA staff are involved in training botanic garden professionals to develop, carry out and make use of their own evaluation studies, using a TBI approach to evaluation. They are responsible for overseeing the evaluation processes carried out by Partners during the project, supporting them through evaluation training, and developing a reflective TBI practice approach.

**WilaBonn Germany**

WILA Bonn

WilaBonn's mission is to provide scientific knowledge for citizens in an open, action-oriented and participatory way, bringing civil society issues and interests into scientific discussion and promoting the co-creation of knowledge among civil society organisations and researchers. WilaBonn gives special emphasis to the topics of civil society & sustainability, environment & health, as well as the labour market. They also run their own education centre supporting professionals on such issues as communication, education and gender. For BigPicnic, WilaBonn coordinates the International Consolidation Group, collating and producing the final reports on the BigPicnic project findings for policy makers and key stakeholders. WilaBonn also supports the communication and connection to international research and innovation activities, projects and Partners.

**Waag Society The Netherlands**

waag society

Waag Society - institute for art, science and technology – researches and develops creative technology and methods for social innovation. Over the past 22 years, the foundation has developed into an institution of international stature, a platform for artistic research and experimentation, and has become both a catalyst for events and a breeding ground for cultural and social innovation. Waag Society is an expert Partner in the field of co-creation and is training BG Partners of BigPicnic to provide their target audiences with a participatory design role in the food security debate. For this purpose, Waag Society introduces its 'Users as Designers' philosophy, a co-creation methodology and various co-creation tools and strategies. A collection of best practices can be found at co-creation.waag.org. The website was made by Waag Society especially for heritage professionals that aim to explore the possibilities and challenges of co-creation. Co-creative methods start from the idea that everyone is an expert on one issue or another, first and foremost on their own life. The best practices on the site showcase different contexts to illustrate the diverse range of application of the methods. To facilitate the co-creation process, Waag Society has developed several toolkits and instructions that can be found at waag.org/en/our-toolkits.

## Annex 7: Types of projects undertaken by the 15 botanical gardens and relevant TBI questions addressed.

| Name of botanical garden | Project title | Type of project | TBI questions addressed |
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| APM | African diaspora co-creation: 'The Face behind the food' | Co-creation | **Q1:** How do people in migration deal with their 'food memories' from the situation they left, and how do they reconnect to the new situation? **Q2:** What can help people undergoing (forced) migration to cope with 'lost' foodways, and to feel at ease in the new situation? |
| | Eating insects: "Edible insects here and there" exhibition | Exhibition + science café | **Q1:** What makes people reject or accept entomophagy? **Q2:** What information is needed to help people to have a better understanding of the possibilities, advantages and disadvantages of eating insects? |
| | Food and the Garden Staff | Organisational change | What are our colleagues' preferences for a warm lunch and why do they make certain choices? |
| | African diaspora Agrofood Forum | Co-creation | **Q1:** What is the connection between African diaspora people and the agrofood situation on the African continent? **Q2:** How do African Diaspora people evaluate their situation when it comes to access of the food of their preference? **Q3:** What is the situation of the African Diaspora food market in Belgium? |
| | Science Café: "Is organic food better?" | Science café | 'Is organic food more sustainable, healthy, tasty?' |
| UiO | Herb Garden Day & MatBeat events | Co-creation | How do people/consumers relate to sustainability when buying vegetables? |
| | | | What context do people see between biological diversity, climate change and food security? |
| | Exhibition: "*The future is now – young people's views on climate and food in a time of climate change*" | Exhibition | What kind of climate suggestions do people have to the supermarket chains? |
| | | Co-creation for exhibition | How do young people relate to food in connection to climate change? |
| UBG | Travelling exhibitions in University Botanic Garden (urban gardening) | Co-creation for exhibition | What would motivate people to grow their own edible plant and how does this relate to the way they perceive 'food'? |
| | Travelling exhibition "Traditional or little-known edible plants", World Disco Soup Day 2017 – International Slow food event. | Co-creation for exhibition | How should we design our travelling exhibition on "Traditional or little known edible plants" in order to catch visitors attention? |
| | Travelling exhibition "Traditional or little-known edible plants" | Co-creation for exhibition | What is the key advantage that the Botanic garden can provide in relation to the topic "Traditional or little known edible plants"? |
| | Science café at University Botanic Garden Sofia (urban gardening & edible plants | Science Café | "What do you need to know to start urban gardening with edible plants?" |
| RBGE | Digital storytelling project about food poverty | Co-creation + exhibition creation | What does the participant get from the process of creating a digital story? |
| | | | What does the participant think adversely affects a healthy diet for them? |
| CSIC | Science Beer: alternative food supply chains, is it possible? | Science Café | "How do you think buying groups can be more efficiently spread to engage more public?"<br>"How can you guarantee that producers are not using fertilizers, pesticides or other agrochemicals?" |

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| | | | "How are your products distributed to the consumers?"<br>"How can we make farmers aware of the implantation of good agricultural practices?"<br>"Are there enough local producers for such a growing individual demand?"<br>"Can our demand of alternative models really make a change in our territorial organisation?" |
| | Expo Big Picnic – outreach exhibition | Exhibition creation process | Was a panel exhibition useful to capture visitors' interests around Food Security? |
| UAH | Outreach Exhibition about BigPicnic project and food security issues + Workshops about honey extraction and croquettes, vegetable garden visits and storytelling. | Exhibition | (Q1) Do the visitors understand the meaning of food security?<br>(Q2) What aspects are the most important for people in relation to food security and why? Which ones are less important, and why?<br>(Q3) Have the workshops been useful to convey the message of the Big Picnic project?<br>(Q4) Are the visitors paying real attention to the exhibition of panels? (contrasting with the results of the outreach exhibition of Madrid) |
| | Outreach Exhibition: Workdays of Urban Agriculture and Food Security | Exhibition | (Q1) What are the benefits of community gardens?<br>(Q2) How to improve institutional strategies to promote the implementation of urban and university gardens?<br>(Q3) What design, management and organisation alternatives should be considered? |
| | Science Café: "Sustainable food on campus" | Science Café | (Q1) What impedes us from making better decisions about the food we eat?<br>(Q2) How to get a more sustainable catering service in the UAH?<br>(Q3) How can we get a better -"rich, fair and clean"- diet for members of the university community?<br>(Q4) What are the main criteria that we have to take into account for the specifications document for a sustainable collective catering service at UAH? |
| | Science Café: "Cisnerian Gardens and Teaching Innovation" | Science Café | (Q1) What expectations do we have with an organic garden (Cisnerian Gardens) at University?; (Q2) How are we going to organise and schedule the activities at the organic garden? |
| | Science Café: Quality of breakfast | Science Café | Can we raise awareness about the daily breakfast on students with special needs by doing a co-creative science café? |
| | Science Café: Gastronomy as a commitment with nourishment. Milan Urban Food Policy Pact and Big Picnic: Biodiversity, landscape and territory on the plate | Science Café | (Q1) What do the attendees know about food security, the Milan Urban Food Policy Pact and Big Picnic project? (Q2) Which topics explained during the science café are more important for the attendees? |
| | Science Café: Urban Agriculture and Food Security | Science Café | What design, management and organization alternatives should be considered? |
| | Science Café: Family nourishment at home | Science Café | How to improve our decisions about nourishment at home? |
| | Digital science café on sustainable feeding | Science Café | What are the possibilities of feeding us in another way more convenient for us and for the planet? |
| | Science Café, Brihuega: "Pollinators: an essential resource at risk" | Science Café | (Q1) What could or should we citizens do to alleviate the problem of disappearance of pollinators?; (Q2) What could or should professionals, beekeepers, farmers, researchers, traders, chefs do?; (Q3) What could or should local or national political leaders do? |

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| | Science Café: Food security, science cafés and co-creation applied to primary school students. | Science Café | How can we run co-creation activities and science cafés in Primary School? |
| | Science Café: three steps on the food cycle: buying, cooking and throwing waste. | Science Café | (Q1) How can we get a more safety and sustainable food for every person on the planet…in the supermarket? (Q2) How can we get a more safety and sustainable food for every person on the planet… in the kitchen? (Q3) How can we get a more safety and sustainable food for every person on the planet…on the food waste? |
| BBGK | 7 co-creation eye-glasses | Co-creation | Is the "7 co-creation eye-glasses" tool appropriate for developing tools for increasing people awareness for Greek native and/or endemic species with special nutrition properties? (Greek superfoods) |
| | "Aromatistas" portable exhibition: Greek Medicinal Aromatic Plants as Superfoods | Exhibition | Are people aware that some Greek Medicinal Aromatic Plants can be considered as superfoods? |
| | Reverse science café on nutrition using Kahoot software on smart phones | Science Café | Are primary and secondary school teachers aware that the learning process is much depended on nutrition? |
| UL | Science Café #01: Vanilla | Science Café | "how can the Science Cafés content and format be improved to meet its goals as well as visitor needs?" |
| | Science Café #02: Grains | Science Café | How do our visitors think that science can help to feed the world population in a healthy and sustainable way?<br>Sub-question: how do they think they can help to solve this problem? "how can the Science Cafés content and format be improved to meet its goals as well as visitor needs?" |
| TBG | Focus group activity with secondary schools: Crop production and climate change | Co-creation | How is climate change linked to food production? |
| | Food crop sustainability: focus group activity with farmers | Co-creation | Which food crops promote food crop sustainability in Mabwe village? |
| | Food accessibility: focus group activity with child development centres | Co-creation | Does communities get enough and safe foods? |
| | Engaging with food vendors in market centres | Co-creation | Do food vendors selling both fresh, cooked and dried foods have access to them, is their transportation and storage facilities that are secure? |
| BERG | Food Labelling – an interactive notebook for the visitors of the temporary exhibition 'Big Picnic: Safe, Responsible, Biodiverse Food' | Exhibition | What do visitors think is indispensable information that should be showed on a food label? |
| | Temporary exhibition: 'Big Picnic: Safe, Responsible, Biodiverse Food'. Testing the Plant Biodiversity knowledge | Exhibition | What is visitors' knowledge in edible plants biodiversity? Which plant have visitors eaten in their life? |
| | "Let's talk about the food that feeds the city of the poor. With those who help, observe and have already done a lot", World Café. | Science Café | What are the perceptions of poverty in Bergamo, its connection to everyday food and what is the city doing? |

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| | Are consumers, beekeepers and farmers aware about their daily life habits impact, the ecological impact and the relationship among bees and pesticides? | Science Café | Are consumers, beekeepers and farmers aware about their daily life habits impact, the ecological impact and the relationship among bees and pesticides? |
| | Science Café – Let's talk about bread. | Science Café | What do consumers, bread makers, producers and farmers know about the whole bread production supply chain? Which relationship there is between them? |
| | Temporary exhibition: 'Big Picnic: Safe, Responsible, Biodiverse Food'. Evaluate the impact | Exhibition | How can we improve the way we communicate the exhibition themes to our public starting from what visitors think of the work done until now? |
| | "Eat, Feed, Take Care" – Science café | Science Café | What do people know about food? (what people don't know and would like to know, how is it possible to know) |
| | Let's Talk about food. With food producers and consumers and with those watching and studying our behaviours. Science Cafè | Science Café | What is the people perception and what they know and think about food traditions, what affect people food habits and how people usually cook? |
| UNIVIE | Superfoods: Who needs them? | Co-creation for science café development | How can we collect data on learnings from events or guided tours? How can we get participants to share their opinions openly? |
| | Sugar and future of food | Co-creation for exhibition development | What are the young people's thoughts about future and what role do they see in science? |
| | NMS workshop co-creation: "Questions for the scientist" on food nutrition and future food production | Co-creation | Which topics of food security are relevant for that age group? |
| | "Power (of) plants": professional training course for elementary school educators | Co-creation | How can we engage audience to share worries about food, food safety? |
| | General co-creation session: regional and seasonal food vs exotic food. | Co-creation | What topics do people interest and how shall we plan the co-creation sessions according to the participants? Find topics for upcoming events and exhibition |
| | Co-creation first series: what is food security? | Co-creation for science café development | How can we reach out to visitors and keep them interested in the topic, so they will take part in a series of events |
| | "Diversity on your plate": Outreach exhibition family day | Exhibition impact | Are there activities for all age groups offered at the exhibition and do different age groups take part in activities together? |
| | Food waste: Co-creation | Co-creation for science café development | Are people aware how much food waste they produce? How do they share their knowledge? What are their views on Science/scientists, who should be invited as expert for a Science café? What is the impact of this event and what are the lessons learned? |
| | Outreach exhibition family day: ethical and ecological challenges in agriculture, food and consumer behaviour | Exhibition | What do people think about their consumer behaviour and what opinions do they have about food, food security, agriculture? |
| BGBM | Science Café with fermentation workshop - More food sovereignty: | Science Café | (Q1) How useful is fermentation for the future nutrition?; (Q2) What current developments in food supply are the participants concerned about? and |

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| | preserving food with fermentation | | what issues should be addressed by politics and science? |
| | Science Café with workshop: Bees and biodiversity in urban and rural areas | Science Café | (Q1) What can agriculture do to conserve biodiversity?; (Q2) Why did not more visitors attend the event? |
| | Science Café: Save the world with the tomato on the balcony? | Science Café | (Q1) Can we change the world with urban gardening?; (Q2) What can decision-makers do to promote green cities? |
| SBZH | Working with the backpackers: sustainable nutrition, vegetable food. | Co-creation | Are participants interested in the practical elements we offered? |
| | Science Café / Panel discussion: Between ethics, health and enjoyment - what is ´good´ nutrition? | Science Café | Between ethics, health and enjoyment - what is good nutrition? |
| | Science Café 'food labelling' (with ´Rucksack Schule´) | Science Café | Q1: What could contribute to consumer-friendly food labelling? Q2: What should society do to prevent so many overweight people in Germany? |
| | Science Café 'Morning Pint' | Science Café | Q1: What can politics and science do for sustainable agriculture and nutrition? Q2: What can we as consumers do for sustainable agriculture and nutrition? |
| | Science Café 'eating cultures and meat consumption' | Science Café | How can we achieve a different approach in relation to our current high meat consumption, taking into account cultural realities? |
| | Science Café on 'sustainable nutrition' | Science Café | What possibilities do we have as consumers, but also as potential (future) decision-makers in our profession, to contribute to more sustainability in terms of food? |
| | Science Café ´Mindful eating – for the conscious handling of food' | Science Café | Can mindful enjoyment help to appreciate food more? |
| UNIWAR | Biologists Night: Science Café test run | Science Café | (Q1) What do young people know about one of the most stable plants in their diet?; (Q2) What do young people answer when asked about where they buy their food, what do they pay attention to when buying food and what do they eat? |
| | "What is the real cost of our food": science cafés | Science Café | (Q1) How can we present the scientific, social and ecological context of using GMO technologies in a way that would be relevant for our audience? (Q2) What questions do participants ask about GMO? – so in other words how is GMO perceived in Poland and what is the level of awareness about GMO in Poland? (Q3) What questions do participants raise about GMO and food? What do people think of GMO products in their food? Are they aware of regulations on GMO products in Poland and the EU? |
| | “Przy Stole” [By the Table] film. | Co-creation | (Q1) How does the person interviewed talk about food?; (Q2) How does the person interviewed talk about the change in outlook /perception regarding food?; (Q3) How can we incorporate the real needs of people, what they say about food into our project and understanding of food? |
| | Interview with Zbyszek: changing approaches to food | Co-creation | (Q1) How does the person interviewed talk about food?; (Q2) How does the person interviewed talk about the change in outlook/perception regarding food? |
| | What is GMO?: Science cafés. | Science Café | (Q1) How can we present the scientific, social and ecological context of using GMO technologies in a way that would be relevant for our audience? (Q2) What questions do participants ask about GMO? |

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| | | | – so in other words how is GMO perceived in Poland and what is the level of awareness about GMO in Poland?; (Q3) What questions do participants raise about GMO and food? What do people think of GMO products in their food? Are they aware of regulations on GMO products in Poland and the EU? |
| | SM Szwolezerow Composting Workshops | Co-creation | (Q1) What are the main objections to community composting?; (Q2) How do people connect urban gardening and composting with their food security? |
| | Dożynki (Harvest Festival) for urban community gardens Warsaw | Co-creation | (Q1) What are the key issues faced by urban gardeners in Warsaw?; (Q2) What questions do the general public have about urban gardening and composting?; (Q3) Why do residents create and join urban gardens? |
| ULisboa | Science Café, "What about sustainable food?" | Science Café | Q1: What are the perceptions of general Portuguese public (adults) about healthy meals? Q2: What sustainable choices do they make? Q3: Are there changes in such perceptions promoted by the session? Q4: Do participants worry about waste? |
| | Science Café, "Healthy & Food: a difficult union?" | Science Café | Q1: What are the perceptions of general Portuguese public (adults) about healthy meals? Q2: What sustainable choices do they make? Q3: Are there changes in such perceptions promoted by the session? |
| | Science Café, "Healthy Food: what future?" | Science Café | Q1: What are the perceptions of general Portuguese public (adults) about healthy meals? Q2: What sustainable choices do they make? Q3: Are there changes in such perceptions promoted by the session? Q4: What are the main concerns about sustainable consumption? |
| | Science Café, "Sustainable food: what about waste?" | Science Café | Q1: What are the perceptions of general Portuguese public (adults) about healthy meals? Q2: What sustainable choices do they make? Q3: Are there changes in such perceptions promoted by the session? Q4: What are the main concerns about sustainable food and waste? |
| | Science Café, "Food: and the sustainable consumption?" | Science Café | Q1: What are the perceptions of general Portuguese public (adults) about healthy meals? Q2: What sustainable choices do they make? Q3: Are there changes in such perceptions promoted by the session? Q4: What are the main concerns about sustainable consumption? |

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UAH 7. Science Café: Urban Agriculture and Food Security. Alcalá de Henares University, Royal Botanic Gardens, Madrid (Spain).

UAH 8. Science Café: Family nourishment at home. Alcalá de Henares University, Royal Botanic Gardens, Madrid (Spain).

UAH 9. Digital science café on sustainable feeding. Alcalá de Henares University, Royal Botanic Gardens, Madrid (Spain).

UAH 10. Science Café, Brihuega: “Pollinators: an essential resource at risk”. Alcalá de Henares University, Royal Botanic Gardens, Madrid (Spain).

UAH 11. Science Café: Food security, science cafés and co-creation applied to primary school students. Alcalá de Henares University, Royal Botanic Gardens, Madrid (Spain).

UAH 12. Science Café: three steps on the food cycle: buying, cooking and throwing waste. Alcalá de Henares University, Royal Botanic Gardens, Madrid (Spain).

UBG 1. Feedback from local communities for future travelling exhibitions in University Botanic Garden (urban gardening). University Botanic Gardens, Sofia (Bulgaria), 30/03/2017.

UBG 4. Feedback for science cafés at University Botanic Garden Sofia (urban gardening & edible plants). University Botanic Gardens, Sofia (Bulgaria), 01-27/09/2017.

UiO 1. Herb Garden Day & MatBeat: People relate to sustainability when buying vegetables. Natural History Museum, University of Oslo (Norway), 24/09 & 15/10/2017.

UiO 2. Biodiversity, climate change and food safety. Natural History Museum, University of Oslo (Norway), 24/09/2017.

UiO 4. Food and Climate Change. Natural History Museum, University of Oslo (Norway), January-February/2018.

UL 1. Science Café #01: Vanilla. Hortus Botanicus Leiden (Netherlands), 28/04/2017.

UL 2. Science Café #02: Grains. Hortus Botanicus Leiden (Netherlands), 26/05/2017.

ULisboa. Cópia de BigPicnic analytical categories: Excel spreadsheet. National Museum of Natural History and Science, University of Lisbon (Portugal).

UNIVIE 1. Science Café spreadsheet. Botanical Garden of the University Vienna (Austria), 10/10/2017.

UNIVIE 2. Science Café spreadsheet. Botanical Garden of the University Vienna (Austria), 23/10/2017.

UNIVIE 3. Science Café spreadsheet. Botanical Garden of the University Vienna (Austria), 15/11/2017.

UNIVIE 4. BSE Science Café – Regionales. Botanical Garden of the University Vienna (Austria), 22/05/2018.

UNIVIE 5. BSE Science Café - Lebensmittelsicherheit (Food safety). Botanical Garden of the University Vienna (Austria), 29/05/2018.

UNIWAR 1. Biologists Night: Science Café test run. University of Warsaw Botanic Garden (Poland), 12-30/01/2018.

UNIWAR 2. "What is the real cost of our food": science cafés. University of Warsaw Botanic Garden (Poland), 05/2018-03/2019.

UNIWAR 3. “Przy Stole” [By the Table] film. University of Warsaw Botanic Garden (Poland), 06/2018-01/2019.

UNIWAR 4. Interview with Zbyszek: changing approaches to food. University of Warsaw Botanic Garden (Poland), 06/2018-01/2019.

UNIWAR 5. What is GMO?: Science café. University of Warsaw Botanic Garden (Poland), July - December 2018.

UNIWAR 6. SM Szwolezerow Composting Workshops. University of Warsaw Botanic Garden (Poland), 25/03-25/05/2018.