Title: **BREAD – Building REsponsibility And Developing Innovative Strategies for Tackling Food Waste**

1. Knowledge needs

Avoiding food waste – which is an economic, social, political and most importantly moral problem – is at the heart of the food sector's societal responsibility. While the goal of reducing and avoiding the wasting of food is broadly accepted, the questions how best to do it, with what tools, at what costs, and who is responsible for conducting and overseeing responsible innovation in the food sector – require reflection. This project seeks to build up the necessary knowledge about effective and efficient solutions that the Norwegian food sector can implement, adopting a broad governance perspective to the grand societal challenge of food waste. For this, we propose to work across scales and look at responsible innovation on the level of policies (providing the context in which innovation occurs), at the level of companies, and finally, at the business/consumer interface.

The alarming food waste scale puts the issue among the most pressing global problems. It has been estimated that at least 30% of the food grown worldwide is lost before or wasted while reaching the consumer (FAO, 2015; GO-Science, 2011). Saving 50% of the food wastes would allow "nourishing more than 1.6 billion people, which is the double of the number of undernourished people estimated by the FAO" (Cross & Gasim, 2018: 386), and the issue becomes even more critical as the world's population keeps growing. Given the already existing and anticipated resource scarcity, wasting food is a fundamental **moral problem**, raising the question of societal responsibility of the economic actors involved, as well as public administration overseeing it. The difficulty in solving it lays partly in the geography of global food: from the perspective of the global North, where most food is wasted, hunger appears a distant issue. But applying a more systemic and resource-nexus way of thinking quickly shows that the land, water, labour and other resources unlocked by food waste avoided in a country like Norway can have a direct positive effect on the global situation (Rasul & Sharma, 2016). On top of the unquestionable ethical challenge, food waste presents a big **economic loss** and causes a great **environmental impact** from the handling and treatment process. In the anticipated transition towards a more sustainable bioeconomy, food waste needs better handling and treatment as it is an organic material that has value in multiple applications (Otles et al., 2015).

The total amount of **food waste in Norway** for the entire value chain (processing, wholesalers, retailers and consumers) was 355 000 tonnes or 68.7 kg per inhabitant in 2015 (Stensgård & Hanssen, 2016b: 3). It is worth 20 billion NOK and equals 978 000 tonnes of CO_2 equivalent. The ambitious goal set for 2010 to 2015 to reduce food waste by 25% was not met, and some parts of the value chain even increased food waste. In the period from 2010 to 2015 wholesalers were the only sector of the food chain that had not reduced, but actually increased food waste by 16% (ForMat, 2015: 35). Most supermarkets (52%) do not donate food and often throw unsold edible food to garbage containers (Capodistrias, 2017). It is important to note that in 2015, 61% of food waste was generated by households, 21% by producers, 1% by wholesalers and 17% by retailers (Stensgård & Hanssen, 2016a). What can be done to accelerate the industry's and national actions targeting food waste? What are the mechanisms linking governance and company practices with outcomes?

Among the recently identified public policy problems, food waste looks relatively 'benign'. It does not appear to be 'wicked' problem (Rittel & Webber, 1973), as it relates to stable value chains and concurring, identifiable market failures, although it is complex and hard to measure. Importantly, there is an almost universal agreement among all stakeholders that wasting food is morally, economically and socially wrong, and so in principle, tackling food waste should only be about methods and speed. Reality is more complex, with a range of different actors, institutions, consumers with **diverse underlying assumptions, interests and perspectives** on food waste dilemmas and irreducible uncertainties. This is reflected in the academia, where different food waste definitions and concepts exist, related to gradual values in food waste avoidance and eventual treatment, as in the Food Waste Hierarchy (Papargyropoulou et al., 2014). There is a pressing need to overcome the **fragmented and scattered understanding of food waste** as a grand societal challenge. This requires gathering new data but also bringing together different categories of stakeholders.

This fragmentation and divergence in perspectives is also visible in the way stakeholders in the food sector perceive societal responsibility. That is an important obstacle, because ultimately it is the business actors in the food industry who posess most important tools to tackle food waste, and so their practices of **Corporate Social Reponsibility (CSR) and responsible innovation are key to addressing this grand societal challenge**. Having reviewed 600+ papers on CSR, Aguinis and Glavas (2012,) identify "the need to understand underlying mechanisms linking CSR with outcomes, [and] the need for research at micro levels of analysis (i.e., individuals and teams), [as well as] for methodological approaches that will help address these substantive knowledge gaps" (Aguinis & Glavas, 2012). The BREAD project seeks to respond to this call for **a new kind of research** on societal responsibility, by studying the mechanisms linking public policy and governance with

companies' practices and consumer expectations towards corporate responsibility for food waste reduction. Our study will be conducted at **three levels**: of policies, firms and on the meeting point of individual consumers and food industry actors. On each level, we seek to engage various stakeholders in interactive learning models, to overcome the anticipated challenge of different and possibly conflicting perspectives on social responsibility for food waste. Whereas gathering data on the available policy and governance tools, as well as companies' experiences in social responsibility activities is a necessary foundation for a deeper learning process, there is also a second type of knowledge gaps that BREAD seeks to address. These are **epistemic and theoretical**. Efforts at comparative analyses which can help to move from description to effectiveness analyses identifying causal factors – are still scarce (for an early example of this direction see (Principato, 2018; Szulecka et al., 2019)). Moreover, there is **little theoretical reflection on the way responsible innovation can be realized in food sector**, what are the normative implications of responsibility among the different actors, and what responsible innovation should mean at the level of firms that can contribute to food waste reduction (e.g. technological, service, organizational innovations), as well as policies which can enhance it (see section 3).

2. Objectives

Reducing food waste is one of the Sustainable Development Goals and hence a focus on food waste fits perfectly into the scope of SAMANSVAR, and industry-NGO-academia collaboration in this area is needed. The **primary objective** of the BREAD project is producing a comprehensive diagnosis in order to unlock capacities for responsible innovation in the Norwegian food sector. The ultimate result of this should be increased effectiveness and ambition in food waste reduction. The primary objective can be split into four operational **secondary objectives**, which are to:

- Explore existing European regulation to stimulate policy innovation and expand experimental governance in Norway's food sector;
- Promote the integration of RRI and CSR through 'best practices' at the company level;
- Work out innovative solutions to food waste by involving citizens in reflecting on the societal responsibility of food sector companies as well as consumers;
- Initiate a broad and lasting learning process across levels, opening up a broader reflection and scrutiny of assumptions and values, and gathering insights from the project to theorize the possible drivers of responsible innovation in the food sector.

The project seeks to develop **transdisciplinary research** on the frontiers of innovation studies, public policy and governance studies, environmental science, sustainability studies and philosophy and to train **young researchers** by engaging three researchers on junior/postdoctoral level. The project will contribute to **two types of innovations**; a) on the level of policies, innovations related to goal-oriented policy change which through the use of new legislation, regulation and new governance approaches (e.g. public-private) may increase the effectiveness of food waste reduction nation-wide; b) Socio-technical innovations at the level of firms, focusing on changing the practices and procedures to reduce food waste.

3. Frontiers of Responsible Research and Innovation

There is a growing interest in research tackling the 'Grand Challenges' of sustainability in the health, food, energy and water systems (Stilgoe, 2013). Bessant identifies 'sustainability' among three emerging challenges along the innovation frontier (Bessant, 2013: 17). It will "force business to adopt greener approaches if they are to retain a social license to operate" (Ibidem: 18). This is related to minimizing waste through "doing what we do better" and "differently". Our response to this call lies in **Responsible Research and Innovation (RRI)** which is relatively new as a policy measure and received significant attention only after 2011 (Delgado & Åm, 2018). It is necessary to understand that it is not a fixed solution but rather an **open-ended process** of collaborations performed in transdisciplinary fashion. The Rome Declaration on Responsible Research and Innovation in Europe defines RRI as "the on-going process of aligning research and innovation to the values, needs and expectations of society" (European Union, 2014).The **paradigm shift** from a simple linear model of research/society relations to an interactive model with multiple levels, actors and sectors necessitates a significant **change in defining responsibility**, from "fault", "risk" or "safety" to future-orientation, proactiveness, collectiveness and pluralism (Arnaldi et al., 2016). This implies a reconfiguration of **innovation** as a means for achieving a society and economy-wide transition towards more sustainable modes of production and models of living. Schot and Steinmueller note an emergent third framing of transformative innovation policy called 'transformative change', needed to align to social and environmental challenges. It is related to Sustainable Development Goals, "calling for greener production, increased social justice, a fairer distribution of welfare, sustainable consumption patterns and new ways of producing economic growth" (Schot & Steinmueller, 2018). Giuliani notes that this framing is vague about the role of companies, and that "we need to consider more

deeply what is the role that companies can play in facilitating or even hindering transition" (Giuliani, 2018: 1580). This shifts the focus to corporate behaviour.

A key normative theme which cuts across these understandings of innovation for transition is the responsibility for change. **Corporate Social Responsibility** is a well-established approach internalized in business and industry practices, articulated already in the 1950s. Carroll's classic definition (1979) is that "corporate social responsibility encompasses the economic, legal, ethical, and philanthropic expectations that society has of organizations at a given point in time" (Carroll, 2016: 2). While economic and legal responsibilities are "required by society", ethical responsibilities are "expected by society" and philanthropic responsibilities are "desired by society" (Carroll, 2016: 5).

The recent paradigm shift towards responsible innovation depicts it as a collective endeavour, it is a holistic approach with **co-responsibility** of research, industry, authorities and citizens (Owen et al., 2013: 46). It aims at assisting all types of stakeholders, including the industry, "to move research and innovation initiatives to a responsible manner for tackling grand challenges" (Yaghmaei, 2016: 294). The emerging thinking on Responsible Innovation helps scientists to define their public value and provide foundations for adequate policies (Stilgoe, 2013). Responsible Innovation can be broadly defined as "a collective commitment of care for the future through responsive stewardship of science and innovation in the present" (Owen et al., 2013: 36). In 2015, the European Commission published a report dedicated to the promotion and monitoring of RRI indicators (European Commission, 2015).

Owen et al. propose a **framework for Responsible Innovation** based on **four dimensions** of collective and continuous commitment to be anticipatory, reflective, deliberative/inclusive and responsive (2013: 38). **Anticipatory** relates to the possible impacts (intended and unintended) in all economic, social and environmental aspects. **Reflexivity** addresses the necessity of grasping a bigger picture, reflecting on motivations, assumptions, risks and dilemmas. **Inclusiveness** calls for open dialogues and debates, engaging diverse stakeholders and stressing the need of co-responsibility. Finally, **responsiveness** relates to adaptive learning and dynamic capabilities. The four dimensions are commonly present in defining Responsible Research and Innovation (e.g. RCN framework for Responsible Innovation). Specific tools can be applied for addressing the different dimensions (Van de Poel et al., 2017: 12, Stilgoe et al. 2013).

There are only a few studies that look at the socially responsible behaviours of the food industry to reduce food waste. A recent study from Australia warns about practices of shifting the responsibilities in the value chain, by lowering food waste selectively, contributing to the increase of food waste elsewhere in the supply chain (Devin & Richards, 2018). A study from Italy finds innovative CSR practices enabled farmers market organizations to reduce food waste, fight poverty and improve public health (Moggi et al., 2018).

Unlike RRI, CSR has been deeply integrated into organizational structures, policies and practices and received lots of academic "acceptance, enthusiasm and proliferations" in many disciplines (Carroll, 2016: 7). Therefore, RRI is often linked to the well-known notion of CSR. The two approaches "share an emphasis on companies' responsibilities towards social goods as well as on stakeholder engagement" (Gurzawska et al., 2017: 4). RRI originates from the policy world and addresses both actual and potential, as well as present and future impacts, while CSR might be seen as a self-regulating mechanism, concerned mainly with the present impact on the community and environment (Gurzawska et al., 2017: 4). However, RRI has a narrower scope as it concerns mostly the research and innovation activities of the organizations, and not all aspects such as labour conditions or appropriate business conduct. RRI as a relatively recent concept has been integrated more extensively in academic and policy circles, but is yet to be systematically included in the innovation processes of companies where its implementation is "still in its infancy" (Van de Poel et al., 2017: 14). There is also not much scientific research on the RRI implementation by the private sector (Gurzawska et al., 2017). This can be achieved in integrating RRI into the CSR strategies and in the general business strategy (Van de Poel et al., 2017). The BREAD project seeks to intensify the reflection of Norwegian stakeholders on societal responsibility, and to integrate RRI thinking into food sector companies' existing CSR practices. The already institutionalized CSR policies and practices provide an entry point for RRI integration, but a broader context of national policies for enhancing responsible innovation has to be taken into account. That is why we propose to look at three levels of analysis, and to integrate them in a joint learning process.

4.Tasks, approaches and methods

The BREAD project seeks to identify the obstacles blocking responsible innovation in the food sector and point out innovation potentials that can be unlocked. For this, we ask four specific **research and innovation questions** guiding the study, corresponding to four Work Packages (see below):

1. How can European regulatory experiences enhance responsible innovation in Norway's food sector? **[WP1]**
2. How can best CSR practices & RRI experiences be scaled-up? **[WP2]**

3. How can consumer perceptions of (co)responsibility in the food sector inform companies responsible innovation? **[WP3]**
4. How to integrate all RRI dimensions to unlock multidirectional learning and food waste reduction innovation? **[WP4]**

Research design: Methods and data collection: The study will use various data gathering techniques, such as document analysis, interviews and participation in meetings and seminars. On top of these, to achieve a multistakeholder learning process across levels, instead of static one-way analytical methods we put more emphasis on interactive and innovative research tools, including learning workshops (WP1 and 2), citizen forums (WP3), as well as consensus conference process and cyclical exchanges with a group of "critical friends" (WP4). The details of our approaches to tackling the different research and innovation questions are described under each work package below. Designing of the workshops and events will be done using the Engage2020 Action Catalogue, an online decisions support for finding the best tools available for inclusive research methods, as well as the longstanding process expertise of the researchers from Østfoldforskning. The Engage2020 catalogue consists of 57 methods and 32 criteria. e.g. consensus conferences, group interviews with a co-design session, stakeholder working groups, etc. (ActionCatalogue, 2018).

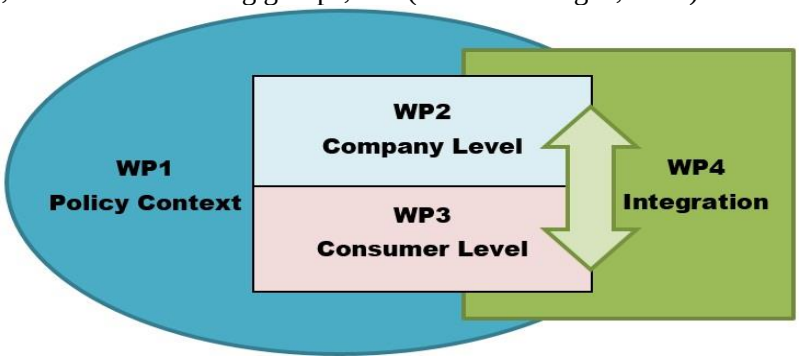

Figure 1 - BREAD Work Packages - topics and interactions

The BREAD project is divided into **five work packages**: an administrative **WP0**, led by the PI with the assistance of TIK administration, and overseeing the project's coherence, timing, user engagement and deliverables; as well as four research WPs 1-4. Work Packages 1-3 adopt different levels of analysis, with **WP1** focusing on the policy and regulation context for responsible innovation in the food sector, **WP2** looking at the level of companies, their policies and practices, and **WP3** investigating the consumer/business interface. **WP4** focuses on Integration, grafting the cross-cutting themes of RRI and CSR into a coherent response to the grand societal challenge of food waste, and helping advance RRI in the Norwegian (and European) industry and academic analyses beyond the food sector (see Figure 1).

Table 1 - Alignment of the RRI framework with BREAD levels of analysis & Work Packages (marked by colors corresponding to Fig 1)

Levels of analysis	Dimensions of RRI			
	Anticipatory	**Inclusive**	**Reflexive**	**Responsive**
Policy	Taking into account the longer-term target, as well as increased societal and environmental pressures	Involving policymakers, industry, NGOs & academics in a learning process	Aimed at localizing international experiences	**Integration** of the activities in the first 3 dimensions to unlock a broad and lasting learning process in the spirit of RRI
Companies	Challenging firms to consider their responsibility regarding food waste by 2030 & beyond	Working horizontally across sectoral actors and vertically across company hierarchies	Critically considering existing company practices	
Consumers	Raising consumers awareness (of food waste) and firms (of consumer attitudes) to grasp future challenges	Academic and civil society partners creating a forum for citizens to provide bottom-up stimuli for the industry	Helping firms gain directionality in R&I processes with consumer feedback	

The **four dimensions of Responsible Research and Innovation** identified in Section 3 are embedded in the WPs. **Anticipation** is important for WP1 on policies, for WP2 on companies (here a special anticipatory exercise is planned for one company workshop) and in WP3 on consumers. **Inclusion** is a fundamental aspect in building the consortium. We cut across two groups working on TIK (innovation and STS studies), involve a national sustainability research institute (Østfoldforskning), an international partner with cutting-edge expertise on CSR (REMARC) and Norwegian non-academic actors from the industry (MatVett) and civil society (FIVH tbc). **Reflexivity** and **responsiveness** cut across all WPs. WP4 Integration is envisaged as an interactive multi-stakeholder reflection process, building on cyclical meetings with a Norway-based group of "Critical Friends"

and a "Consensus Conference" which will be led by experienced Østfoldforskning experts over a two-year period, achieving unique learning process opportunities.

WP1 will be initiated first, so that its results can feed into WPs 2-4 work already during the research process. WPs 2 and 3 will be developed in close cooperation, facilitated by much institutional/personal overlap as well as the work of a TIK based postdoc (to be selected in an open call), who will divide time equally between them. This will enable addressing the **cross-cutting themes of CSR and RRI** both from the perspective of companies' internal work and their interaction with consumers.

WP1 – Policy learning for food waste governance

National and broader (European – EU/EEA, and UN global sustainability regime) policies and regulations create the environment in which companies can realize their societal responsibility. It is important to understand that the right policies can stimulate and direct private sector research and innovation, and food waste reduction targets constitute a fundamental governance tool which mobilizes actors and helps to hold them accountable/evaluate their actions overtime. The question is however what policy and regulatory tools can best stimulate waste reduction – enhancing innovation across levels, but also which of them are potentially best for the Norwegian local context? To answer this, we need to first engage the **policy and regulatory landscape**, bringing forward the approaches already taken by food sector reform *leaders* and *followers* across Europe. Most data gathering will be conducted by TIK (PI) with research assistance, but country experts will be also be identified and invited. The case selection will be developed at an early stage, following a preliminary research of recent policy developments in Europe. The comparison will focus on 8-10 country cases from across Europe, providing a representative set for different groups (North/South, East/West, kinds of regulations, e.g. voluntary agreements, nudging, information based, market based or regulatory, based on (Principato, 2018)). Following **a structured comparative study** of existing and planned food waste policies in key European countries (EU/EEA), evaluating their effectiveness to date (as an overview of "what works"), the researchers will invite Norwegian stakeholders to a **policy learning workshop**, where top European researchers on this topic (e.g. L. Principato, U. Rome & C. Bradshaw, U. Leeds) could also be invited. Its focus would be to identify instruments that can enhance effectiveness of the Norwegian industry's responses to food waste, with the aim of feeding them into the national policy debate. The dual goal of this WP is addressing the project's secondary objective n.2, in an interactive policy learning workshop informed by our research, as well as addressing important empirical and theoretical gaps. Our findings will be gathered in a country food waste regulation reports, which would help establish food waste regulation as an emerging topic in public policy studies and take this issue area, now analysed mostly nationally, to a new level. **WP leader:** Julia Szulecka (PI), TIK. **Participants:** Fulvio Castellacci (FC), TIK; Elisa Giuliani (EG), REMARC.

WP2 – Company level responsible innovation in the food sector

This WP will include **interviews** with companies participating through Matvett (the industry association project partner). These structured interviews will mainly focus on two issues: their **CSR policies**, their views on their own **food waste reduction practices** in the light of CSR and participation in the Matvett network, and an identification of the most important scientific uncertainties/research needs relevant to their production. To link up to WP1, the companies will also be asked about their perception of relations between the policy context and their food waste. Following this diagnosis, the WP aims to make companies familiar with CSR and RRI, develop "Guidelines for food sector CSR", combining existing experience of Norwegian companies with an external vantage point provided by the project researchers, and also engaging NGOs. It will also amount to **a research programme**, to be followed up in subsequent research proposals by Østfoldforskning, TIK or other national or international research communities with competence in food waste, life cycle assessment, and the circular economy, and potentially also by industry funding and public funders such as the RCN. Matvett's secretariat, leading the WP, will serve as a network organisation and in the second phase, two participatory research workshops will be conducted with the willing companies (ca. 60 members):

1) one were the BREAD research team will present the concept of RRI and ask the companies representatives to reflect on their innovation activities in the light of RRI;
2) another in the form of an anticipatory exercise where the BREAD team will facilitate the companies' reflection on food waste in 2030 (the target year) and beyond.

WP Leader: Anne-Grete Haugen (AGH), MatVett; **Participants:** Ellen-Marie Forsberg (EMF), Østfoldforskning (ØF); Postdoc and PI at TIK; EG and postdoc at REMARC.

WP3 – Responsible innovation on the consumer/company interface

This WP will be focusing on how food industry actors through RRI activities can enhance **bottom-up initiatives** on the interface between retailers and consumers to reduce food waste. Particular focus will be given to using new technologies (e.g. apps) for connecting actors and resources. To engage broader groups

and gain bottom-up feedback on the way industry's role and responsibility is perceived by consumers, **Citizen Forums** will be organised in Fredrikstad, Oslo and Pisa where interested young people are invited to engage with food waste researchers, companies and policy makers, in particular eliciting values and creative ideas for reducing food waste. The forums held in Norwegian cities will be organized in collaboration with the NGO partner, with the additional aim of **raising societal awareness** of food waste, and through the BREAD platform MatVett partners as well as small and medium-sized food companies (not part of the MatVett network) will also have an opportunity to engage the broader public with their CSR activity. The anticipated results of this WP will provide the team with crucial information on societal perceptions of food waste, to be summarized in a report/policy brief, as well as fuelling further synthesis in WP4. **WP Leaders:** EG, postdoc and/or Matteo Corciolani at REMARC; **Participants:** Postdoc, Ana Delgado (AD), PI at TIK; NGO partners.

WP4 – Integration

The Integration WP is focused on learning processes across levels and with opening up discourses to broader reflection and scrutiny of assumptions and values. It will involve three main activities:

1) The ProjectSTEP group/Internal RRI: Seeing that RRI should also hold for the research process in the BREAD project, we will establish a group of **'Critical Friends'** from different stakeholders and expert communities to ensure the reflexivity and responsiveness of the project consortium. It will be based on the ProjectSTEP model utilised in the Assisted Living RRI project, described in (Forsberg & Thorstensen, 2018) and initially justified in (Forsberg et al., 2016). The members of the group will be invited from the following organisations: MatVett member companies (e.g. Orkla, Tine, Gilde; Rema 1000, Coop), the Food Banks, NGOs, the Ministry of Food and Agriculture, EAT, Norwegian University of Life Sciences, Nofima, etc. Representatives from the SAMANSVAR program of the RCN will be invited to participate in the group, in order to involve the RCN in the learning processes of the project (and they will also be invited to other project events). The ProjectSTEP Critical Friends group will meet the project team twice a year and for practical reasons we will invite only Norwegian members. From the very beginning the group will challenge the assumptions and plans of the project, and in a true RRI spirit, the research and development design of this project should be responsive to input from this group (and other stakeholders).

2) An international **Consensus Conference** conducted over two years will bring the three levels together: the policy level, the industry level and the consumer/NGO level. This will be conducted based on the Consensus Conference model used in the Horizon 2020 PRINTEGER project on research integrity (as elaborated in the Working with research integrity – guidance for research performing organisations: the Bonn PRINTEGER Statement (Forsberg et al., 2018), using a Delphi process, with one physical consensus conference meeting at the end. The outcome of this process will be a **consensus statement** on how to effectively reduce food waste, transforming policy into practical advice based on the experience of the consensus conference participants. The participants, approximately 20 persons, will represent a mixture of researchers, industry, innovation funders, NGOs and policy makers from a range of European countries.

3) Engaging with the **RRI/CSR network project**: As planned in the SAMANSVAR programme, RRI/CSR projects will engage in broader learning processes. We appreciate this opportunity to open up the work in the BREAD project to the other consortia in the network. TIK is a founding member of the network and the project will engage in and contribute to network activities by attending network meetings and collaborating on dissemination (such as a website for all RRI/CSR research projects). We will also invite one participant of other nodes in the network into the group of 'Critical Friends'. **WP Leader:** EMF at ØF; **Participants:** Postdoc & PI at TIK.

5. Organisation and project plan

Year	2019				2020												2021												2022							
Months	IX	X	XI	XII	I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII	I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII	I	II	III	IV	V	VI	VII	VIII
WP0																																				
WP1																																				
WP2																																				
WP3																																				
WP4																																				

Table 2 - Gantt chart of the project's TIMEFRAME: 36 months 1.09.2019 – 31.08.2022

The roles of the academic partners in the project have been described under the WP descriptions in section 4 and their qualifications are described in section 8. **Matvett AS** is an institutionalized partnership platform established for the purpose of food waste reduction and led by representatives of the Food and Drink section of the Confederation of Norwegian Enterprise (NHO), the Norwegian Grocery Sector's Environmental Forum (DMF), the Grocery Producers of Norway (DLF), and the Norwegian Packaging Association. It ran the *ForMat*

project between 2010-2015 and is now running *KuttMatsvinn2020.* Matvett will be important for mobilising the companies involved in the project and interviewing them from WP 2, as they have established long term collaborative relations with them and have a deep understanding of the conditions for the companies' efforts in the food waste field. The **REMARC** centre at the Univ. of Pisa is important because of their broad CSR and sustainability expertise and for contributing to the international aspects of the process in WPs 1, 2 and 4.

6. Costs incurred by each research-performing partner (NOK 1 000)

Research-performing partner	Payroll and indir. exp.	Equipment	Other op. expenses	Sum
TIK	6 312		332	6 644
Østfoldforskning	1 311		210	1 521
REMARC	948			948
MatVett	1 081			1 081

7. Other collaboration

The BREAD project will involve a **civil society partner**. 'Future in our Hands' (FIVH) is the country's largest non-governmental actor in the food waste debate and continues to provide expertise and advice on the subject. FIVH was approached by the BREAD team with an invitation but could not formally confirm participation in WP3 at this stage. However, they will be invited to project activities in WPs 3 and 4. Other potential collaborators include Food Banks, TooGoodToGo, and Kutt Gourmet.

8. Importance for national knowledge base

The Norwegian food industry was the first actor to pay closer attention to the food waste problem. Already in 2008, when hardly any media attention was discernible, the food-retailing sector proposed a pre-project on food waste. Soon afterwards, the grocery-wholesaling giant NorgesGruppen 'challenged' the Confederation of Norwegian Enterprise (NHO) to create a comprehensive project to start tackling food waste, and to examine problems with overly strict expiry-date marking, as well as the environmental and economic impacts (Szulecka & Strøm-Andersen, 2019). Despite the fact, that the industry actors are actively dedicated to the food waste reduction issue, the pace of food waste reduction is slow. A comparison with Denmark is telling: Scandinavia's food waste reduction champion adopted a different strategy, driven by the NGO 'Stop Spild Af Mad' (Stop Food Waste) and featuring a much stronger civil society involvement supported by the media, businesses, top politicians and other influential actors (Szulecka et al., 2019). This brought extraordinary effects and a 25% food waste reduction in merely five years (Stop Spild Af Mad, 2018). Denmark's example shows that cross-disciplinary and cross-sectoral synergies and broader collaboration can help the Norwegian companies to find better and more adequate solutions for tackling food waste.

For this reason, the BREAD project brings together the Norwegian food sector's network organization established for tackling food waste – MatVett, and three research partners, while an NGO partner will be confirmed if the project is granted support. The **research partners** responsible for the BREAD project have the necessary qualifications and competences to serve as intermediaries between stakeholders, gather relevant new knowledge and deliver cutting edge analyses which will enable more effective dealing with food waste. **TIK Centre for Technology, Innovation and Culture** at the Univ. of Oslo is the country's leading hub for innovation studies, sustainability research and RRI analyses. TIK has grown substantially in recent years, and has more than 50 employees, two Master programmes and a PhD programme. It received a very positive evaluation in the SAMEVAL research assessment exercise, pointing to its high quality and high impact research activities. TIK also has strong experience with dissemination activities and valuable exchange with user partners and policy developers. As a partner in the NFR financed (2015-19) project SusValueWaste, TIK has developed important expertise in food waste reduction governance, and the BREAD project will directly build on that legacy. TIK is currently involved in three RRI projects: ReDig (BIOTEK2021), COMPARE and HAPPY, the latter receiving support from the SAMANSVAR programme.

Østfoldforskning (ØF) is the national research institute with the longest portfolio of food waste research projects, having collaborated with industry and policy makers in the field since 2008 and has a 30-year long history of R&D in sustainable innovation and life cycle assessment. ØF has a large network in the field both in Norway and abroad, as well as a deep understanding of challenges, uncertainties and future prospects for effective food waste reduction policy and research. Its director, E-M. Forsberg is a renowned expert on RRI. Together with TIK, ØF has participated in the SusValueWaste project. ØF is based in the south-east of Norway and has a staff of 27, with a mixture of research staff with technical-scientific and social science background. A key project participant from ØF has a long-standing position in the RRI field as a project leader of both a major RCN SAMANSVAR RRI project and the Horizon 2020 RRI-Practice project.

The **Responsible Management Research Center (REMARC)** at the Dept. of Economics & Management, Univ. of Pisa (Italy) conducts research on responsible management and sustainable development and to have an impact on managers, policy makers and other stakeholders. One of its three focal areas of this interdisciplinary hub is Communicating and Practicing Corporate Social Responsibility, and the Center's director, E. Giuliani is a CSR expert, while the team also includes specialists in consumer communication (M. Corciolani). Through its research, REMARC works towards strengthening responsible management practices and finding ways to reduce business-related harmful impacts on society, the environment and human rights at large. REMARC is part of the Sustainability Centres Community (SCC), hosted by the Network for Business Sustainability (NBS), and member of the BHRights Initiative. Its involvement in the BREAD project would help the planned Norwegian virtual **research centre for Responsible Research and Innovation and Corporate Social Responsibility** become better nested in broader international networks.

The project will contribute to **long-term, national competence-building** in the food waste area, by developing cutting-edge expertise on CSR and RRI in food waste reduction policies and practices, by expanding the CSR and RRI knowledge base in industry innovation and in the food sector, enhanced development of CSR as integrated into the involved companies' core activities, and by building academic capacity on RRI. As described in section 1, there is currently a need for strengthening expertise and capacity in these fields, both in Norway and internationally.

9. Relevance for Norwegian industry

Food sector companies, united in the MatVett network (bringing together ca. 60 industry partners) will benefit from the BREAD project in several ways. WP2, concentrated on the industry and CSR practices, will provide them with inductively derived "best practices" – drawing on lessons from existing CSR initiatives in the Norwegian as well as other contexts, with the possibility of replicating them, following the BREAD CSR Guidelines report. The report itself will be developed in an iterative process engaging the industry, with a workshop giving sector representatives a chance to interact with researchers, including the internationally renowned CSR experts at REMARC Pisa, as well as a workshop presenting RRI as a paradigm. Furthermore, the project brings possibilities of networking, and learning between stakeholders. Last but not least, collaboration with a multinational academic team can help Norwegian industry actors gain a broader perspective – in geographical terms as well as by challenging naturalized assumptions about the sectors societal responsibility. Additional benefits can be economic (reducing costs, working on new products), environmental (reducing GHG emissions, efficient use of resources), benefits for company image both inside the enterprises and to the general society. The BREAD project will also actively seek to contribute to the broader Norwegian discussions of CSR and RRI in other industrial sectors. The CSR "Guidelines" report, when published and disseminated, can potentially serve as a reference point for other similar learning processes in other sectors. WP3 with its focus on bottom-up initiatives can also show new ways of approaching the "waste-to-value" issue on consumer level.

10. Other socio-economic benefits and contribution to sustainable development in society

The ultimate aim of this collaboration is to support the food waste reduction implementation and its speed – a goal in which broader public good is set as the paramount benchmark. Of the one hundred+ targets operationalising the Sustainable Development Goals (SDGs), few are as clearly spelled out as Target 12.3 on food loss and waste: policymakers globally should "by 2030, halve per capita global food waste at the retail and consumer levels and reduce food losses along production and supply chains, including post-harvest losses" (SDG, 2015). Norway and EU member states committed to meeting the SDG "including a target to halve per capita food waste at the retail and consumer level by 2030, and reduce food losses along the food production and supply chains" (European Commission, 2018). Food waste reduction is also related to the circular economy principles. The BREAD project will directly contribute to Norway's efforts in achieving this SDG Target, by both providing usable policy advice and responsible research solutions and raising broader societal awareness of food waste.

11. Dissemination and communication

The BREAD project is initiated to bridge different categories of stakeholders, to increase public awareness of food waste and solutions to tackle it, and to work closely with the proposed Norwegian national hub for Responsible Research and Innovation. That is why dissemination and communication and Work Package 4 focusing on Integration will play a key role. **Communication** between project partners will be coordinated by the PI, assisted by the postdoc at TIK. Meetings with the industry partner as well as the potential NGO partner are facilitated by the fact that all are based in Oslo. Communication with the international partners will be conducted via bimonthly skype calls to avoid unnecessary and costly travel. Project events will also be used for internal communication and coordination purposes: this includes the learning workshop in WP1 and 2

workshops in WP2 as well as the WP3 Citizen Forums and the final event. **Dissemination** – focused on engaging broader industry audiences as well as the general public in Norway and beyond – will be achieved through several means. Firstly, several of the planned **events** have dissemination as an important purpose. The policy learning workshop will present the results of WP1 comparative research to a broad audience (authorities, business, NGOs, etc.). The Citizen Forums in WP3 will allow for awareness raising and outreach. The final event is designed to present the findings from individual WPs as well as the broader conclusions of the project generated in WP4. The BREAD **project website** would preferably be part of the RRI Hub website, which allows for increasing resonance, and would contain a regularly updated news section. Each new report and academic paper will be accompanied by a short **executive summary** on the website, as well as a **blogpost** underlining the most important findings. TIK and ØF will disseminate project news through their normal dissemination channels (social media, website, etc.). **Op-eds** in Norwegian and international media are planned. WP1 and 2, focusing on **specialist audiences**, will also see all the results and experiences shared on the relevant **forums and networks** (e.g. Matvett's website, EU Platform on Food Losses and Food Waste (FLW), EU REFRESH project promoting action against food waste, bringing 26 partners from 12 European countries and China). Additionally, TIK can organize a PhD course on RRI (such course has already been organized during the 2017 summer school) and build on empirical illustrations from the project. The international research partner and the Critical Friends will also strengthen the dissemination of the project's results. Finally, the project's deliverables, including its core academic output, are listed in the Table 3 below.

*Table 3 - Project deliverables. Outlets marked with * are Open Access journals.*

WP	Deliverable	Working title/topic	Authors	Outlet
1	Article 1	Comparative analysis of European food waste regulation	PI (plus country experts)	J. of European Pubic Policy; Food Policy
	Article 2	Governance tools enhancing the efficiency of food waste reduction: a cross-European analysis	PI	JCMS: J. of Common Market Studies; Politics & Governance*
	Pol. Brief 1	What's on the menu? Policy options for regulating food waste reduction	PI, postdoc, EG, FC	Project website / Policy learning workshop presentation
	Reports	BREAD Food Waste Regulation Country Reports	Team	Project website
2	Article 3	Evaluation frameworks for CSR practices in the food sector	EG, postdoc, PI	J. of Business Ethics; Research Policy X*; Strat. Management J.
	Article 4	CSR and RRI in the food sector: Norwegian experiences	Postdoc	J. of Cleaner Production; Business & Society
	Report	CSR "Guidelines" report	Team	Published by TIK, Final Event
3	Article 5	Consumer perceptions of food waste in Norway & Italy	Postdoc, EG, PI	Ecology & Society*; Food Policy, J. of Consumer Research
	Policy Brief 2	Reducing food waste: involving consumers in responsible innovation	Postdoc TIK & Postdoc REMARC	Project website
	Article 6	From Waste to Value: RRI in Norwegian food sector	AD, PI, EMF	J. of Cleaner Production; Sustainability*, Nature Sustainability
4	Consensus Statement	How to address food waste: consensus across levels	Consensus Conference & Team	Final event
	Policy Brief 3	Responsible Innovation in Norway's Food Sector	EMF, AD, PI,	Final event

12. Ethical perspectives

The subject of food waste has a strong ethical and moral dimension, stressed particularly in our theoretical approaches of CSR and RRI. The BREAD project has an important normative driver in that it adopts the perception of food waste as not only a market failure but an ethical issue – which is uncontroversial but has to be made explicit. In data-gathering, the ethical guidelines of The National Committee for Research Ethics in the Social Sciences and the Humanities (NESH) and of the Univ. of Oslo (as well as other research partners) will be strictly followed. Researchers follow the established ethical principles for research, including treating informants with respect and secure their anonymity, and to ensure a transparent and replicable research process. The project will follow Norwegian privacy regulations and adhere to the GDPR principles.

13. Gender issues (Recruitment of women, gender balance and gender perspectives)

The research team is currently composed of 4 female scholars out of 5 named researchers, as well as one female industry partner delegate. No differences will be made due to gender in the research, networking and dissemination activities and the team will consciously avoid the use of gender sensitive language in all forms of communication. We will be applying the Guidelines for gender equality in Responsible Research and Innovation (European Commission, 2016) as one of the benchmarks. Organizational culture, substantive representation, vertical segregation, work relations, visibility of women researchers, gender perspective in research contents, gender expertise enhancement, and resources are among the highest-ranked indicators in RRI (Otero-Hermida & García-Melón, 2018).

References:

ActionCatalogue. (2018). Action Catalogue – Methods, At http://actioncatalogue.eu/search (accessed 12.2.19)

Aguinis, H., & Glavas, A. (2012). What We Know and Don't Know About Corporate Social Responsibility: A Review and Research Agenda. *Journal of Management*, 38(4), 932-968.

Arnaldi, S., Gorgoni, G., & Pariotti, E. (2016). RRI as a governance paradigm: What is new? In R. Lindner, et al. (Eds.), *Navigating Towards Shared Responsibility in Research and Innovation Approach* (pp. 23–29). Karlsruhe: ISIR

Bessant, J. (2013). Innovation in the Twenty-First Century. In R. Owen et al. (Eds.), *Responsible Innovation*. Hoboken: Wiley.

Capodistrias, P. (2017). *Norwegian supermarkets and food waste: prevention and redistribution strategies*. At https://www.framtiden.no/aktuelle-rapporter/824-norwegian-supermarkets-and-food-waste-prevention-and-redistribution-strategies/file.html (accessed 25.11.18)

Carroll, A. (2016). Carroll's pyramid of CSR: taking another look. *International Journal of Corporate Social Responsibility*, 1(1), 3.

Cross, J., & Gasim, S. (2018). Food and starvation: is Earth able to feed its growing population? *Int. J. of Food Sciences & Nutrition*, 69(4), 385-388.

Delgado, A., & Åm, H. (2018). Experiments in interdisciplinarity: Responsible research and innovation and the public good. *PLOS Biology*, 16(3), e2003921.

Devin, B., & Richards, C. (2018). Food Waste, Power, and Corporate Social Responsibility in the Australian Food Supply Chain. *Journal of Business Ethics*, 150(1), 199-210.

European Commission. (2015). *Indicators for promoting and monitoring Responsible Research and Innovation. Report from the Expert Group on Policy Indicators for RRI*. Brussels: Eur. Commission.

--- (2016). *H2020 Programme. Guidance on Gender Equality in Horizon 2020*. Brussels: Eur. Commission.

--- (2018). *EU actions against food waste*. At https://ec.europa.eu/food/safety/food_waste/eu_actions_en (accessed 1.2.19)

European Union. (2014). *Rome Declaration on Responsible Research and Innovation in Europe*, Brussels: Eur. Commission.

FAO. (2015). *Global Initiative on Food Loss and Waste Reduction*. At http://www.fao.org/3/a-i4068e.pdf (accessed 17.12.18)

ForMat. (2015). *The ForMat Project. Prevention of food waste. Final Report 2010–2015.* At http://matsvinn.no/wpcontent/uploads/2017/06/ForMat-Final-report-2010-2015.pdf (accessed 1.09.18)

Forsberg, E-M, et al.(2016). Integrated assessment of emerging science and technologies as creating learning processes among assessment communities. *Life Science, Society and Policy*, 12, 1-20.

--- (2018). Working with Research Integrity—Guidance for Research Performing Organisations: The Bonn PRINTEGER Statement. *Science and Engineering Ethics*, 24(4), 1023-1034.

Forsberg, E.-M., & Thorstensen, E. (2018). A Report from the Field: Doing RRI from Scratch in an Assisted Living Technology Research and Development Project. . In F. Ferri et al. (Eds.), *Governance and Sustainability of Responsible Research and Innovation Processes. Cases and Experiences*. (pp. 19-26). Cham: SpringerBriefs in Research and Innovation Governance.

Giuliani, E. (2018). Regulating global capitalism amid rampant corporate wrongdoing—Reply to "Three frames for innovation policy". *Research Policy*, 47(9), 1577-1582.

GO-Science. (2011). Foresight: The Future of Food and Farming: Challenges and Choices for Global Sustainability. At http://www.eracaps.org/sites/default/files/content/foresight_report.pdf (accessed 21.09.18)

Gurzawska, A., Mäkinen, M., & Brey, P. (2017). Implementation of Responsible Research and Innovation (RRI) Practices in Industry: Providing the Right Incentives. *Sustainability*, 9(10), 1759.

Moggi, S., Bonomi, S., & Ricciardi, F. (2018). Against Food Waste: CSR for the Social and Environmental Impact through a Network-Based Organizational Model. *Sustainability*, 10(10), 3515.

Otero-Hermida, P., & García-Melón, M. (2018). Gender Equality Indicators for Research and Innovation from a Responsible Perspective: The Case of Spain. *Sustainability*, 10(9), 2980.

Otles, S., Despoudi, S., Bucatariu, C., & Kartal, C. (2015). Food waste management, valorization, and sustainability in the food industry. In C. M. Galanakis (Ed.), *Food Waste Recovery* (pp. 3-23). San Diego: Academic Press.

Owen, R., et al. (2013). A Framework for Responsible Innovation. In R.Owen et al. (Eds.), *Responsible Innovation*. Hoboken: Wiley.

Papargyropoulou, E., Lozano, R., K. Steinberger, J., Wright, N., & Ujang, Z. b. (2014). The food waste hierarchy as a framework for the management of food surplus and food waste. *Journal of Cleaner Production*, 76, 106–115.

Principato, L. (2018). *Food Waste at Consumer Level: A Comprehensive Literature Review*. Cham: Springer.

Rasul, G., & Sharma, B. (2016). The nexus approach to water–energy–food security: an option for adaptation to climate change. *Climate Policy*, 16(6), 682-702.

Rittel, H. W., & Webber, M. M. (1973). Dilemmas in a general theory of planning. *Policy Sciences*, 4(2), 155–169.

Schot, J., & Steinmueller, W. E. (2018). Three frames for innovation policy: R&D, systems of innovation and transformative change. *Research Policy*, 47(9), 1554-1567.

SDG. (2015). *17 Sustainable Development Goals (SDGs) of the 2030. Agenda for sustainable development*. At https://sustainabledevelopment.un.org/?menu=1300 (accessed 4.10.18)

Stensgård, A. E., & Hanssen, O. J. (2016a). Food Waste in Norway 2010–2015. Final Report from the ForMat Project. At https://ec.europa.eu/food/sites/food/files/safety/docs/fw_lib_format-rapport-2016-eng.pdf (accessed 8.2.19)

--- (2016b). *Matsvinn i Norge 2010–2015. Sluttrapport fra ForMat-prosjektet.* At http://matsvinn.no/wp-content/uploads/2016/09/ForMat-rapport-2016.-Sluttrapport.pdf (accessed 17.11.18)

Stilgoe, J. (2013). Why Responsible Innovation? In R. Owen, J. et al. (Eds.), *Responsible Innovation*. Hoboken: Wiley.

Stilgoe, J., Owen, R. and Macnaghten, P. (2013) Developing a framework for responsible innovation, *Research Policy* 42: 1568-1580

Stop Spild Af Mad. (2018). *Stop Wasting Food*. At http://www.stopspildafmad.dk/ (accessed 13.8.18)

Szulecka, J., & Strøm-Andersen, N. (2019). Multi-level governance of food waste in Norway. *TIK Working Paper* 2019.

Szulecka, J., et al. (2019). Multi-Level Governance of Food Waste: Comparing Norway, Denmark and Sweden. In A. Klitkou, A. M. Fevolden, & M. Capasso (Eds.), *From Waste to Value: Valorisation Pathways for Organic Waste Streams in Circular Bioeconomies*. London: Routledge.

Van de Poel, I., Asveld, L., Flipse, S., Klaassen, P., Scholten, V., & Yaghmaei, E. (2017). Company Strategies for Responsible Research and Innovation (RRI): A Conceptual Model. *Sustainability*, 9(11), 2045.

Yaghmaei, E. (2016). Addressing responsible research and innovation to industry: introduction of a conceptual framework. *SIGCAS Computers & Society*, 45(3), 294-300.