The Future of Food Symposium 2021

From Recovery to Resilience

Summary Report
8th-9th September, 2021

Coventry University

Research Centre
Business in Society

Acknowledgements

The Future of Food Symposium 2021: From Recovery to Resilience was held on the 8th and 9th of September 2021. Thanks are due to the many people who made the symposium possible.

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Foreword

The far-reaching impacts of COVID-19 have reframed sustainability challenges. New problems have emerged at the same time as exacerbating existing issues. Levels of global consumption and production remain unsustainable and require urgent changes to meet carbon emission reduction targets.

Food remains at the centre of a sustainable transition. How it is produced and consumed in the future is critical to the livelihoods and wellbeing of people as well as the planet. The Future of Food Symposium was an opportunity to not only share insights into the impact of the pandemic, and timely research linked to the topic of food, but was also space to discuss what the road to recovery could look like. At the centre of the future of food is a need for a transition to more resilient pathways. In other words, to reframe, adopt and pursue more sustainable practices across society.

Following the success of the inaugural symposium at the University of Nottingham in 2019, the Centre for Business in Society at Coventry University hosted an online symposium in 2021 to continue moving the discussions forward. We invited stakeholders across business and society to present, discuss and debate how the sustainable food agenda can be progressed. Paper presentations and panel discussions were given by leading thinkers within academia, industry, the charitable sector and grassroots movements that prompted valuable discussion and debate. The event engaged with more than 180 people in total.

This report gives a summary of the key themes, keynote speakers, panel events and the tracks of paper presentations.

Contents

Summary of key themes

Over the course of the two-day symposium a number of themes were explored. These are summarised below:

Food sharing

Professor Anna Davies's keynote speech shared insight from the Share City project which highlighted the importance of food sharing activities. Food sharing has a far reaching definition as a practice at the heart of how communities come together to organise around food. Food sharing is a pathway into sharing knowledge, resources and facilitating access to food growing, all of which are important activities in moving forward the sustainable food agenda at the community level.

The role of technology in preventing food waste

The second keynote speaker, Jamie Crummie, emphasised how technology is critical in tackling food waste. The majority of people have a phone and therefore can use this as a tool to engage in food waste prevention via services like Too Good To Go. Such surplus food market-places are highly accessible and inclusive. Papers presented in track C on the theme of digital platforms as sustainable food solutions interrogated the factors enabling food sharing, examining their rapid uptake and community benefits.

The 'reality' of community food provisioning

A prominent theme of the symposium was uncovering the reality of what unfolded on the front line during the pandemic for community groups providing food to those in need. Such organisations saw a significant increase in demand. Research presented by Marsha Smith during the Fareshare event exposed the constraints that community food organisations experienced. Accompanying presentations from Fareshare Midlands and the Central England Co-op explained how they had to dramatically up-scale their resources and services in difficult circumstances.

Perceptions of edibility

During the symposium, we heard from researchers looking into how the viscerality of the body affects how we interact with food and food packaging and how in turn this influences our ability to acknowledge whether food is safe to eat. Such a topic has significant implications for tackling food waste at the consumer level. Smart labelling that uses novel materials to give consumers more information about the safety of food products was put forward as one solution.

Territory and place in sustainable food systems

Professor Moya Kneafsey's keynote address introduced the concept of territorial food systems. Here notions of place are important in how people understand and interact with food. The way in which place, and the associated landscape, connects with food holds important insights for future sustainability.

Eating together

Keynote speaker Professor Suzanne Higgs spoke about the psychology of eating with others and how this can have implications for the amount we eat and trigger wider benefits by connecting people. As societies open with the retracting of lockdown rules, it is critical for citizens to realise the benefits of eating together.

Diversity and circularity in food systems

One of the advantages of holding the symposium online was the ability for speakers around the world to present. We learnt that similar challenges are being faced across continents as a result of the pandemic and the evolving impacts of climate change. A key theme was the diversity of food systems across the globe and the different ways in which they are progressing to more circular models of operation. We must remember not to overlook the influence that food culture plays. Behaviours of purchasing, preparing and consuming food become normative in everyday life, depending upon the situational context. This means that sustainability solutions must be adaptable and culturally sensitive.

Certification and reporting

The role of labelling and logos in the food system remains a value-based and exclusive practice. This means that the value created by these labels could be better utilised for sustainable purposes. Whilst some businesses are leading the way, others could do more to better translate the key sustainability messages associated with branding into action on the ground.

Wider reaching themes

These themes summarise wider challenges that appeared throughout the symposium.

Building resilience in a changing context

A challenge that surfaced throughout several parts of the symposium was the difficulties that organisations, individuals, businesses and policy makers are facing in working towards building a more resilient food system in a changing context. The societal structures that underpin how we access and consume food are shifting and continue to shift. We are experiencing a period of structural fragility. Organisations are finding it difficult to put into place future-proof, sustainable practices within this changing context.

Disruption and exhaustion

It was clear during the symposium that individuals and organisations are working through a period of exhaustion and disruption. From community food groups to hospitality staff, to those working across retail supply chains, workers on the frontline playing a critical role in food provision are exhausted and worried about the changes and disruption that Brexit is bringing.

How informed are decision makers, how do you govern effectively?

The symposium featured two fantastic paper presentations from Professor Bryce Evans and Eleanor Boyle that gave a historical view comparing the current food system challenges with those that played out in wartime. Their insights reflected on how wartime Britain made sweeping changes to decrease the dependency on food imports that at the same time actually increased the quality of food consumed.

The far-reaching changes made in that period can be compared to the current unfolding challenges and the need to ensure that decision makers are properly informed in order to govern effectively. The disconnect between policy makers and the realities on the ground was highlighted as a significant constraint. Different forms of governance were discussed at the symposium, as well as the roles different political and corporate actors are playing in the policy decisions being made.

This is a critical time to consider the future of food

Overall, the themes above really emphasise that now is a critical time for considering the future of food. An array of challenges are building into a perfect storm threatening the global food ecosystem. We look forward to furthering debates on these themes at the next Future of Food Symposium in 2022 and reflecting upon our collective influence within the policy arena.

Opening address

Zara Sultana

MP for Coventry South

The symposium was opened by MP for Coventry South, Zara Sultana. Zarah is a prominent campaigner on issues of food poverty and food insecurity. In her speech, Zarah highlighted that despite the UK having a record number of billionaires (who have increased their wealth over the course of the pandemic), there are 10 million people experiencing food poverty in the UK.

"Everyday families across the city of Coventry and across the country struggle to put food on the table"

Zarah highlighted the challenges such families are facing, having to choose between eating or paying their rent. For Zarah, going from recovery to resilience means ensuring good decent quality food for everyone where food is not a luxury, but a universal right. Zarah emphasised the need to move beyond the idea that recovery means returning to the pre-pandemic status quo but instead recovering to a situation where there is resilience for all.

Zarah discussed how in Parliament she has been fighting for The Right For Food, which would be a legislative change written into law, the right for everyone in the country to have access to decent nutritious food.

"The case is simple, food is not a luxury, it is not an optional extra, it is a basic necessity, it is something that everyone across society must have access to. It is about guaranteeing that everyone can eat well, whatever their background is, whatever wealth they have."

Zarah explained that there are 4 key elements to The Right for Food:

1. The right to accountability – The right to food has to be real and enforceable and not just words or good intentions.

2. The right to food must be accessible so everyone can access their right to food.

3. The right to food has to be adequate in terms of decent quality and quantity.

4. The right to food must be available. The government has a duty to guarantee food security, despite what challenges the country is facing.

Zarah went on to note that there are simple means through which The Right To Food can be realised, such as universal free school meals. Community kitchens could be supported to provide dining clubs and 'meals on wheels' to the elderly. The school holidays could feature meals for children and cookery clubs. Zarah noted the need for a regulatory body to oversee The Right To Food to ensure the enforcement of such measures.

"There are no real practical hurdles to these measures, it's not unaffordable, it's not impossible, it's just a matter of political will"

Zarah pointed out the great work being undertaken by organisations in Coventry, including the achievements of volunteers at food banks and Coventry refugee and asylum centre who provide meals for some of the most marginalised people in the country.

Zarah drew her speech to a close by highlighting that if the government in Westminster were working for the Right to Food, the food insecurity situation could move from one of recovery to one of resilience where a healthier, equal society guarantees food for all.

Keynote speakers

The symposium featured four fantastic keynote speakers. Professor Anna Davies, Jamie Crummie, Professor Moya Kneafsey and Professor Suzanne Higgs. Each of the keynote speaker's addresses are summarised below.

'A manifesto for sustainable food sharing futures'

Professor Anna Davies
Trinity College Dublin

Anna Davies, Professor of Geography, Environment and Society at Trinity College Dublin, presented a 'manifesto for sustainable food sharing futures'. Discussing the findings from the Share City project, Anna explained the importance of exploring contemporary forms of food sharing mediated by IT technology. Such activities are making important contributions towards the pathway to more sustainable urban food systems. The Share City project not only documented and mapped these food sharing initiatives in over 100 urban areas worldwide, but also created a number of tools to capture their impact. The Share It platform featured qualitative and quantitative reporting tools, as well as a space to post images and videos and a networking function to connect with others.

The future has the capacity to change with important projects such as Share City moving forward and stimulating further dialogue in the road to developing more sustainable food systems

This platform has proven crucial in detailing the current invisibility of the impact of such food sharing initiatives. The current system of resource allocation means these initiatives are not valued and that whilst they may be visible locally, there is insufficient allocation of economic resources to record and expand their benefits. Anna closed her speech by giving a lasting message of hope in the 'potential for things to be otherwise'.

> Anna spoke about the importance of creating spaces for hope and new sets of practices to be exercised and experienced. The future has the capacity to change with important projects such as Share City moving forward and stimulating further dialogue on the road to developing more sustainable food systems.

Too Good To Go

Jamie Crummie
Co-founder

Jamie Crummie, Co-founder of the food-sharing app Too Good To Go, presented a powerful message that addressing food waste must be placed at the forefront of efforts to tackle climate change. Jamie opened by reminding us how our relationship with food has evolved over the course of history. We were once hunter gathers but following an agricultural boom we moved from foraging for survival to most of us having access to ample food. With this, food played an important role in culture, becoming the glue that brings us together. Jamie pointed out that

"If food is so important then why are we wasting so much of it?"

The statistics are stark. More than a third of all food produced ends up thrown away, 1.3 million tonnes globally and 9 million tonnes in the UK annually. Jamie explained the economic, social and environmental implications of this are significant. The financial cost of food waste for example is 1.2 trillion dollars. Jamie revealed that in the UK we are spending 8 times more on throwing away food than the annual policing budget. Wasting food, of course, means wasting the resources that go into growing, transporting and retailing food, which has considerable associated emissions. Tackling food waste therefore is a priority in the fight against climate change with Jamie noting that this is the most immediate, most impactful and simple action amongst other solutions.

The Too Good To Go app allows food businesses to sell unsold food at the end of service, therefore preventing food waste

Jamie noted that a significant number of people are unaware of the connection between food waste and climate change, with technology holding huge potential in bridging this gap. The company he co-founded, Too Good To Go, inspire and empower everyone to fight food waste together. By encouraging businesses and consumers to work collaboratively, Jamie emphasizes that whilst there is no one-size-fits-all solution, technology can play a leading role in facilitating change.

The Too Good To Go app allows food businesses to sell unsold food at the end of service, therefore preventing food waste. Local consumers can buy this surplus food at a great price. The 'magic bag' concept means that consumers get a surprise assortment of items they can collect at an allotted time. Jamie described this as a win-win-win concept as it is a win for the consumer in being a fun way to receive discounted food, a win for the business as additional income, and a win for sustainability as food is sold rather than being wasted.

Jamie talked through the progress of the app to date which has seen considerable uptake. Globally Too Good To Go has more than 40 million users and is now the largest B2C market for surplus food. Since its inception, more than 80 million meals have been rescued with 76% of users returning to the food outlet as paying customers, therefore being an attractive proposition for businesses. In the UK Too Good To Go work with more than 10 thousand business partners and this continues to grow.

Jamie closed by leaving a lasting message that tackling food waste should be fun and simple. Given high smart phone usage, we all have access to technology that can help fight climate change, we just need to inform people how to best use it.

Territorial Food Systems: A relevant concept for the future of food?

Professor Moya Kneafsey
Centre for Agro-ecology, Water and Resilience

The third keynote speaker was Professor Moya Kneafsey. Moya is the leader of the Community Self-Organisation for Resilience research theme at the Centre for Agro-ecology, Water and Resilience at Coventry University. Moya is well known for her work in the area of alternative food networks and short food supply chains. Her keynote address focused on bringing to the table the concept of territorial food systems and their importance to the future of food.

Moya opened by reminding us of the current crisis that is unfolding. This is a crisis brought about by climate change, biodiversity decline, soil loss, water stress, dietary ill-health and an obesity epidemic. Moya explained that the need for agriculture and food systems to deliver sustainability is now more pertinent than ever. There is a significant challenge however, in that different actors have different ideas and visions of what more sustainable agri-food systems look like. This is why Moya puts forward the concept of territorial food systems as a vital framework to recognise the full value of food.

The need for agriculture and food systems to deliver sustainability is now more pertinent than ever

Moya's explanation of territorial food systems was based on the premise that currently there are two contrasting paradigms of agriculture. First, the agri-industrial paradigm that Moya characterised through disconnection, whereby consumers are positioned at a distance from food, in a hyper-modern retail geography where local and regional character are disappearing. This was contrasted with a territorial agri-food paradigm. This is characterised by reconnection where food chain actors from producers to consumers form embedded networks over shorter distances that emphasize social and cultural aspects of the landscape. Moya was careful to note that these concepts should not be seen as a binary. Consumers participate in both, however territorial systems have unmet potential as a pathway towards a more sustainable food system.

In examining the territorial food system concept, Moya noted that this is a shift away from the conventional sector or supply side focus of the way food systems are traditionally interpreted. Instead, for territorial food systems, geographical scale is moveable depending upon the place-based context. Here governance systems should be negotiated between local actors to bring about new governance structures that better emphasize place based aspects of food. Such structures recognise the role of communities through food such as recognition of how economies are increasingly distributed, self-organised and inclusive of unpaid roles.

The rise in global temperatures and its associated impacts is causing people to look towards the agriculture sector as a leading contributor to emissions and ask if there is another, more sustainable way food systems can be organised

In framing territorial food systems in the currently climate, Moya illustrated several drivers leading towards their realisation. This includes the increasing politicisation of food whereby food sovereignty, justice and environmental movements are being pushed forward by campaign and grassroots movements. A further driver is current socio-cultural trends including the increase in the cost of living, the increase in food prices, the squeeze on SMEs and producer margins as well as greater awareness in the media of alternatives to the conventional food system.

Finally, an influential driver has been the environmental crisis, the rise in global temperatures and its associated impacts. Taken together, these drivers are causing people to look towards the agriculture sector as a leading contributor to emissions and ask if there is another, more sustainable way food systems can be organised.

> Moya closed by emphasising that accentuating the territorial nature of food systems as a future sustainability pathway is not about romanticising a re-localisation of food. Instead, we must focus on the values that we want to build agri-food systems around. It is not about building an exclusive or defensive position but instead an inclusive system that brings out the role of civil society and questions who makes decisions and at what levels to ensure the future food system is socially just.

How eating together affects consumption: implications for the future of food

Professor Suzanne Higgs
University of Birmingham

The final keynote speaker, Suzanne Higgs, is a Professor at the University of Birmingham and leads a research group concerning the cognitive and social processes involved in food intake and food choice. Suzanne's keynote focused on how eating together affects food consumption.

Suzanne outlined how researching this topic brings together a wide range of factors from those that affect what and how much we eat, such as taste and enjoyment, to external factors like price, convenience and portion sizes. Suzanne explained that the social context of eating, such as the impact of eating with others, is less appreciated and this formed the basis of her keynote address.

Suzanne's research has explored the normative behaviours that mean people eat more when eating as part of a group. This shows that social norms can be set by the behaviour of others. One study presented asked participants to rate biscuits but varied the information they saw. Participants that saw that other participants had eaten more biscuits also consumed more, showing the power of normative information.

"When thinking about health and food, it's not just about the food we are eating and the nutrients that we are getting, but thinking about the context within which we are eating and broader considerations about wellbeing and food, rather than just physical health"

There were however moderating aspects in such findings. Suzanne discussed that for participants that already consumed a lot of fruit and vegetables the impact was negligible. A important factor to consider was the extent to which the participants felt an affinity with the group in the norm message. Despite this, a further study Suzanne presented showed the potential of such messages, displaying how social norm messaging on the eating of vegetables can help reduce meat consumption.

Returning to the topic of how eating with others can increase food consumption, Suzanne explained that this finding could be helpful in increasing the consumption of healthier foods. Wider findings also showed how eating together improves social relations with people feeling more connected when they eat with others regularly.

In modelling the effect of the social influence on eating, Suzanne showed that adapting the food choices to those around us is important. People can hold stereotypical ideas about the characteristics of people that make certain food choices, with certain behaviours associated with taking up a healthier diet. Normative messaging can dissect this as a tool to encourage healthier and more sustainable eating habits.

Suzanne's explanation about the link between health and food gives great justification for the importance of social eating initiatives that can have rounded consequences to increase people's enjoyment of food and facilitate community connections. The digital side of such connections, termed 'digital commensality', has only recently started to be explored but could open a number of possibilities in better connecting people through food to allow for positive outcomes.

Suzanne closed her keynote speech by summarising three key aspects of how eating together affects food consumption. Firstly, that social influences on eating are potent and pervasive and hold huge potential in nudging people towards healthier eating behaviours. Secondly, that social norm interventions can promote more sustainable consumption. Thirdly that the positive social interactions that come from eating together are continually being redefined in accordance with evolving ideas of what eating healthily means.

Fareshare: Fighting hunger, tackling food waste

This part of the symposium featured the launch of a video and presentation of research undertaken by the Centre for Business in Society (CBiS) focusing on frontline community food support operations during the COVID-19 pandemic. The project investigated how the community food sector mobilised to meet the unprecedented need for requests for help resulting from the COVID-19 pandemic. The research partner, Fareshare Midlands, a regional surplus food redistribution charity, played a crucial role in enabling residents across Nottingham to access healthy, nutritious and safe food services.

A Screen grab from the film opening

The project was supported by Coventry University's allocation of UKRI's QR-SPF funding for innovative pilot projects.

Participants included community organisations across Nottingham that were in receipt of food from Fareshare Midlands, such as The Nottingham Social Eating Network and the Hope food bank. Staff at the Fareshare Nottingham depot were also interviewed. Participants also submitted short videos showing the 'behind the scenes' reality of what is involved in community food provision.

The project demonstrated the Sustainable Production and Consumption research cluster's ongoing focus upon the 'future of food' which is one of the major policy challenges confronting local, regional and national government in the UK currently.

Following the research presentation, Simone Connolly, Director of Fareshare Midlands, and Hannah Gallimore, Corporate Responsibility Manager at the Central England Co-op, presented their experiences of their response to the pandemic and reflected on the findings of the research.

Opening with a short film, viewers were reminded of how the COVID-19 pandemic triggered a surge in food insecurity in the UK. The causes of this were multi-faceted. Household incomes reduced due to furlough and unemployment. Schools closed making working at home challenging and some people had to shield. This meant that conventional employment, and accessing regular earned income was a challenge. Many individuals and families experienced food insecurity for the first time; further entrenching it as a problem in the UK.

Community organisations, supported by local, regional and central government and the private sector became a lifeline. The remarkable response of such organisations to feed those in need was detailed in the video of the Nottingham community food sector. In just three months 60,000 food parcels were distributed by a single community network in Nottingham. FareShare Midlands disbursed 740 tonnes of food in one month representing a 68% increase on the previous year.

However, there are vital lessons to be learned in terms of how social and physical infrastructures can be strengthened to improve the resilience of national food system support.

In just three months 60,000 food parcels were distributed by a single community network in Nottingham.

FareShare Midlands disbursed 740 tonnes of food in one month representing a 68% increase over the previous year

Marsha Smith, a Doctoral Researcher at the Centre for Business in Society and founder of Nottingham Social Eating Network presented the findings of a study looking into community food organisations response over this period. The study gave a behind the scenes look at how these organisations fostered connections and utilised resources to meet the unprecedented rise in requests for help.
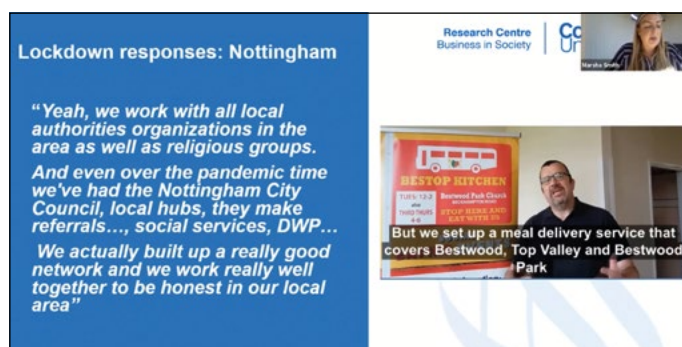
Community organisations in Nottingham played a key role in ensuring that citizens were well fed and cared for. During the pandemic they become a point of vital face-to-face contact and their pre-existing status as 'anchor' organisations with strong links into communities ensured that isolated and vulnerable people were provided with food and social contact. Despite these efforts, there has been limited formal reporting or acknowledgement of this work. There is also a significant gap in academic and practitioner knowledge about the delivery of community food services. The QR research engaged with organisations across Nottingham as well as the Central England Co-op, the local authority, and the research partner FareShare Midlands. FareShare's services provided the majority of food to community organisations in Nottingham. The study focused on what enabled and constrained community food groups and utilised film and photography alongside interviews.

Community food organisations participated in a set of caring practices that were a vital, but often unseen, form of neighbourhood level support

Marsha emphasized that the response of community organisations in providing food over this period can be understood as a form of invisible infrastructure that actually delivers more than food. Community organisations transformed their services from providing food in-person to providing food via delivery. These organisations participated in a set of caring practices that were a vital but often unseen, form of neighbourhood level support.

Their activities were heavily supported by the city council in Nottingham. The city council set up referral channels such as a centralised help line to local area, ward level managers to target food donations to those in need. The city council also facilitated the redistribution of food surpluses from catering businesses, as well as the redistribution food parcels via central government funding. Overall, in Nottingham the local authority worked in partnership with the community food sector to ensure they met their statutory commitments to provide food to those in need, as well as coordinating the response to other requests for food aid.

A slide from Marsha's presentation detailing the response in Nottingham

Marsha explained that Fareshare Midland were the key organisation that enabled this significant expansion of community food support. They worked rapidly and pro-actively to capture and distribute surplus and ambient food stocks and they opened a new depot opened in Nottingham to cope with demands for surplus food. They played an important role in authenticating community groups by providing evidence of groups working to health and safety standards, for example.
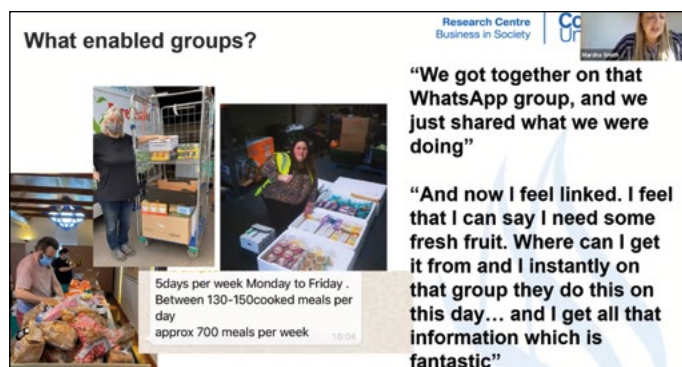
Overall, this was a picture of a community food sector mobilising by drawing upon pre-existing assets and resources, such as well-built community links, to deliver effective services. New partnerships were made such as linking with taxi services to deliver meals. Staff and volunteers went above and beyond, working longer, often unsociable hours under challenging circumstances. Marsha provided some powerful quotes to illustrate the profound contributions of the community sector.

In terms of what constrained community groups, they struggled to collect intelligence on the ground and there were challenges in understanding who exactly needed support. Statutory records were not always up to date and did not account for the rising numbers of requests for food from those not on official registers. The short dated, perishable nature of food presented a challenge in ensuring that food reached those who needed it in a safe and compliant manner. Community groups experienced problems in accessing cooking spaces with kitchens in council run buildings shut in some cases during the pandemic.

Whilst food provision operators received government funding over this period they now face a funding cliff edge in needing support to return to-face-to face food service operations

The availability of staff was a continuing issue given shielding and isolation requirements. The whole community food provision sector suffered from a lack of guidance from the government, with the rules and procedures unclear in certain instances. All those providing food were in constant fear of contracting COVID-19 and staff even faced abuse in some circumstances. Looking forward, whilst food provision operators received government funding over this period they now face a funding cliff edge in needing support to return to-face-to face food service operations.

Quotes from Marsha's presentation that illustrate what enabled community groups
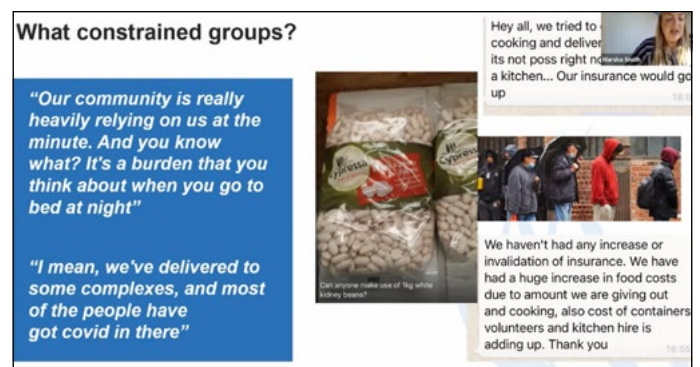
Marsha presents some of the factors that constrained the response of community groups during the pandemic

Following Marsha, Simone Connolly, Director of Fareshare Midlands, gave a presentation. Simone revealed some incredible figures demonstrating Fareshare's response. Between April 2020 and April 2021, Fareshare Midlands distributed more than 7,000 tonnes of good food, twice the previous year. This was equal to 18.5 million meals distributed to more than 600 charity and community groups. Their current operations span the east coast of England to the Welsh border. Fareshare Midlands operate 6 warehouses and receive over 100 lorry loads of food each week which is redistributed to
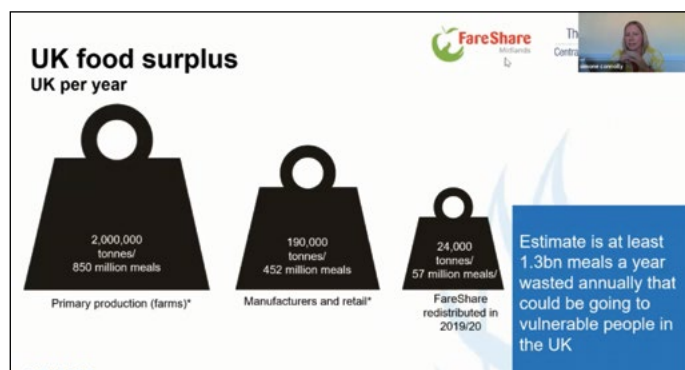
Simone gives figures on the amount of food surplus across the food supply chain in the UK

charities by 26 vehicles. Their volunteer numbers increased from 130 to 200 over the last year with Fareshare now employing 60 staff members.

Simone explained that Fareshare's purpose is twofold, to feed those in need and to help prevent food waste. There are 8 plus million people that do not have sufficient food in the UK, at the same time millions of tonnes of food is going to waste across the supply chain. Most of this is at farm level (2 million tonnes), with 190,000 tonnes wasted by retailers.

This surplus food occurs because of packaging errors, the challenges of ensuring that food with short dates are sold, and the difficulties in forecasting supply and demand. Food is also surplus to requirements due to its seasonality. Retailers operate models where they need to keep their shelves full, meaning that creating surpluses is part of their business model. Fareshare Midlands redistribute 24,000 tonnes of this, with Simone noted how they are only just scratching the surface. Fareshare has been hugely successful at creating a solution to get this surplus food to people that are supporting communities.

Simone explained that Fareshare operate in two ways:

• Firstly, Fareshare receive food from retailers and the food industry direct to their regional depot which is handled and either delivered to or picked up by community organisations.

• Secondly, Fareshare have a back of store solution in retail premises. Here links are formed with local charities which collect surpluses collated by store staff. This is funded by the retailers themselves.

Simone closed her presentation by bringing to attention the social impact of Fareshare. Simone explained that 75% of charities they deliver to say the food allows them to engage

better with their clients. Without Fareshare's food donations, 1 in 5 charities they provide to would close down. They support a range of organisations with 86% of those changing their services to provide food parcels over the pandemic period, with 25% saying the will keep this change.

Hannah Gallimore from the Central England Co-op presented next by outlining their response during the pandemic. In running through the Central England Co-op's business, Hannah explained they have 260 retail businesses. Co-op is guided by an international set of values and principles that include equality and equity that underpin equal and fare access to food.

Hannah further outlined Co-op's principles in stating that their members do not want to see good food going to waste and want to see Co-op doing all they can to mitigate the business's environment impact. The Co-op report in accordance with WRAP's Courtauld 2025 guidelines, are Carbon Trust accredited and understand that it is wrong to throw away food when there are hungry people in the community.

Hannah discussed the journey taken to reach their collaboration with Fareshare. She explained that before working with Fareshare when first starting to redistribute surplus food from co-op stores there were several problems. Firstly, relying on store staff to foster local links with charities operating in their areas was difficult, stores had different levels of engagement. Secondly, charities faced issues in collecting and storing the donated food.

In addition, the Central England Co-op were conscious that they, in some cases, were shifting their waste onto third sector organisations. The reason for this was that sometimes what was being donated was not sufficient for recipient groups to make a substantial meal for their members.

This led to working with Fareshare. Hannah explained the process through which stores transfer their surpluses so they can be handled and redistributed to community groups by Fareshare Midlands. In Co-op stores at the end of the day any surpluses are bagged, collated and checked. Next this is collected by a Co-op driver and taken to the Co-op distribution centre where it is checked. Once or twice a day this food is taken to the Fareshare depot. These surpluses then are delivered, as part of a just-in-time supply chain, to community groups within 24 hours.

Hannah pointed out that the majority of surplus food from Co-op stores is redistributed, meaning that 80% goes to human consumption. Overall, this has reduced food waste of the business by 40%. This is a significant carbon saving and a better utilisation of Co-op's logistical capacity as the empty lorries that return from stores now contain surpluses to deliver to the Fareshare depot. The financial savings from the reduction in food waste are used to offset the cost of the Fareshare partnership. Hannah discussed how the procedures undertaken sit well with Co-op's reduce to clear process.

In Co-op stores at the end of the day any surpluses are bagged, collated and checked. Next this is collected by a Co-op driver and taken to the Co-op distribution centre where it is checked. Once or twice a day this food is taken to the Fareshare depot

Hannah also highlighted the other ways through which Co-op have worked with Fareshare. For example, supporting their operations with extra logistical capacity and amplifying Fareshare's message through social media channels.

Hannah did point out some challenges experienced, such as needing to keep colleagues safe during the pandemic and the difficulties of ensuring that procedures are followed when there were high levels of COVID-related absence. In some cases returning surplus food to Farehsare does mean additional miles driven and also in the pandemic there were times when the quantity of food donated was low given the high demand for food from customers and the challenges in getting food delivered to stores.

Hannah ended her presentation by stating how the partnership model operating with Fareshare is resilient and how it has been hugely successful in delivering over 2 million meals. Hannah was quick to point out that despite Co-op only representing 0.5% of the retail market, they deliver 2% of the food within the UK redistribution market.

Brexit is having an ongoing impact on the logistical capability of surplus food redistribution. The food industry are struggling to restock their stores which at the same time is impacting how surpluses reach Fareshare depots.

The Fareshare event closed by considering some of the future challenges. COVID-19 will have a lasting impact and whilst Fareshare's capacity has expanded, questions were raised over whether this is financially sustainable in the future. Brexit is having an ongoing impact on the logistical capability of surplus food redistribution. The food industry are struggling to restock their stores which at the same time is impacting how surpluses reach Fareshare depots. Brexit also is predicted to lead to waste at borders due to new food import and export regulations.

At a community level, organisations want to start to provide in-person food services again, however funding is often lacking to do this or the food is not available. Furthermore, members of these organisations are tired, they have been working hard for 18 months and lack energy. This therefore is a danger to the future resilience of community food provision.

Looking forward Simone talked about generating public interest in the importance of surplus food redistribution. This is important going forward to maintain volunteer support. Simone introduced us to the 'Food on Plates' campaign which is a campaign to stop millions of tonnes of fresh, unsold food from being wasted, when it could instead go to charities and community groups feeding families.

Panel debate

Logos and logistics: The challenges and opportunities of certifying food production to promote sustainable consumption

This panel featured:

Anna Barker
Head of Commercial Partnerships
at the Fairtrade Foundation

Professor Alex Hughes
Department of Geography,
University of Newcastle

Richard Griffiths
Chief Executive of the
British Poultry Council

Professor Valerie Nelson
Natural Resources Institute,
University of Greenwich

Kobus Pienaar
Technical Manager for Food Security
at Woolworths, South Africa

Three key points of discussion from the panel:

1. **From value-based to volume-based:** Sustainability labelling and logos in the food system remain a value-based concept featuring on products to provide a unique selling proposition for brands and retailers. There needs to be a transition to volume-based sustainability labelling to ensure that consumers have greater choice and accessibility. This will be achieved by improving efficiencies to make sustainable food production cheaper.

2. **Sustainability provides a framework for reaping benefits:** Individual businesses or organisations that invest and are active in working to improve the sustainability of supply chains reap-long term financial benefits. However, they can in the short term be overwhelmed by systemic challenges in the overall economy especially if their efforts are not sector-wide or transnational. Governments therefore need to assume a greater role particularly in developing regulatory frameworks that support individual businesses' efforts. Regulation and standards can be jurisdictional when supply chains operate across international borders.

3. **Collaboration in certification:** Different certification programmes have their own unique standards which define their reason for existence. These come with various levels of audits which are not only time-consuming in the food production system but also increase costs to producers. An opportunity for greater collaboration therefore exists, so that there is reduced variation in the standards for certification.

Each of our panellists was asked to consider and share the opportunities and the challenges that certifying food production brings, in terms of promoting more sustainable supply. Some of the key points are highlighted below:

Opportunities

- Consumers are increasingly interested in climate change and its connection to supply chains leading to a shift of mind-set in people's preparedness to pay a premium.

- The rise of the middle class in the Global South means more disposable income is available to spend on products with a sustainable labelling premium.

- Sustainable consumption needs to be a volume-driven instead of a value-driven concept. Such a change would lead to greater consumer choice and accessibility. There is an opportunity to improve efficiencies to make sustainable food production cheaper.

- Collaborative governance whereby different countries and sectors work together with shared goals and a similar approach (multi-stakeholders) offers opportunities for improving sustainable practices. There is a need for country level legislation to resolve unnecessary competition for resources. There are opportunities not just in social movements but also in regulations that change the rules under which trade takes place.

- Sourcing locally and investing in the supply chain has proven financial return benefits for businesses. Intervention at the start of the supply chain has bigger sustainability impact than efforts at the consumer end of the value chain.

- An opportunity for greater collaboration exists so that there less variations in certification standards.

- Governments can assume a greater role particularly in developing regulatory frameworks that support individual business efforts. Regulation and standards can be jurisdictional when supply chains operate across international borders.

Challenges

- Great expectation that labels and standards make a difference but retailers are not putting prices up to pay for the cost of sustainability despite consumers (perhaps) being willing to pay the premium. If prices went up who will be able to pay?

- Labelled goods are niche and are contending with issues of distrust around whether the products are as sustainable as their labels indicate.

- Sustainability labelling and logos in the food system remain a value-based and exclusive concept that feature on products as part of a business's unique selling proposition.

- There are considerable variations between standards which although all hold a set of level of expectations, they do not all necessarily translate to more sustainable practices. Businesses at the production end of the global value chain face pressures to meet these standards with costs not being shared by lead firms.

- Consumers in places like South Africa will not pay more for sustainability. The integrity of sustainability labels is doubted as they may lack evidence of their impact. There exists a perceived lack of transparency which leads to sustainability labels being perceived as tools to increase market share rather than as transformative sustainability initiatives.

- Multiple labels and standards can be confusing to consumers. Different certification programmes have their own unique standards that define their reason for existence. These come with various levels of audits which are not only time-consuming in the food production system but also increase costs to producers.

- Businesses or organisations that invest and are active in the sustainability supply chains in their individual capacity can in the short term be overwhelmed by systemic challenges in the overall economy, especially if their efforts are not sector-wide or transnational.

Panel debate

What enabled and constrained community food groups during the pandemic?

This panel featured:

Simone Connolly
Director, Fareshare Midlands

Louise Delmege
National Food Service,
Bristol

Hannah Gallimore
Corporate Responsibility Manager,
Central England Co-op

Dr. Megan Blake
Senior Lecturer,
Department of Geography,
University of Sheffield

Ellie House
Chief Operating Officer,
Foleshill Community Centre,
Coventry

Each of the panellists were asked to consider the factors that enabled and constrained community food groups' operations during the pandemic. The key points are highlighted below:

Factors that enabled community food groups

- Money – From the government, from the food industry, from investors. The sector had a significant financial injection to increase its ability to provide food to community groups.

- Furlough and voluntary labour – People had significant amounts of time to donate to others. This was a huge supporting asset for community organisations. People contributed their project management skills that aided the rapid expansion of services.

- The ability to rapidly respond to the crisis through networks that already existed. These networks helped collaborate with new resources and services.

- The goodwill of consumers - Consumers wanting to buy extra food to donate to their local community and neighbours.

Factors that constrained community food groups

- The fact that shelves were empty - Food provisioning organisations had the funds but found it challenging to access and purchase the food that was needed. Even if people could volunteer and groups could provide services, the food just was not there to be delivered. Community groups struggled to order the quantities and variety of stock that was demanded.

- Restrictions against the sort of activities that were needed – Community organisations wanted to provide a service face-to-face but could not due to restrictions.

- Lack of investment going forward – Whilst Defra invested in the sector in purchasing ambient food, this funding is not permanent and therefore community groups are finding it hard to continue to fund their services.

- One-to-one support was withdrawn – Due to COVID-19 restrictions many face-to-face support services were withdrawn. This meant the signposting that these services facilitated to community food organisations also stopped. Instead, people were asked to phone a call centre which would then redirect enquires. For some people this insufficient, impersonal and unhelpful.

- Change in information provision – Linked to the point above, much of the third sector's support is accessed through being directed via face-to-face conversations. However, the pandemic saw this information provision move online or via the phone which was a challenge for some people. This created challenges for people facing adversity or those that had complex support requirements.

- Lower number of volunteers – In Coventry, for example, volunteers were often older people and this group were often restricted to their homes. A good example are the food banks that are run via churches.

- Lack of funding for delivery services – Whilst funding was provided for organisations to cook food, there were other organisations that specialised in delivering food and managing this logistical process that found it hard to access funding.

- Exhaustion – Volunteers put so much time and effort into helping others that their energy was eventually used up.

The panel were also asked to consider opportunities that arose over the pandemic:

Opportunities arising from how the food sector responded:

- Improvement in communications and working relationships between local authorities and third sector organisations, in particular frontline community food providers.

- Willingness to share – Evidence that people were more willing to work together and share their resources. Examples were given pre-pandemic whereby organisations were working in parallel because they operating in different areas. These geographical boundaries were lowered through the pandemic response.

- Highlighting the amount of surplus food – The pandemic response has highlighted the significant amount of surplus food that exists in the UK food system. The pandemic showed that whilst there are easier options to manage surpluses, like anaerobic digestion, in fact when organisations work together the food sector can prevent this food from being wasted and ensure it reaches people in need. This has helped remove some of the objections that food businesses have had to sharing surpluses –'it can be done and it really should be done'.

- Greater community engagement – The response has led to opportunities in connecting communities and acting together to solve food insecurity issues on their doorstep.

Would anyone like these? Collect from Bestwood Park Church, NG5 5NG?

Panel debate

Mandatory food waste reporting for Businesses

This panel featured:

Martin Bowman
Senior Policy and Campaigns
Manager, Feedback

Dr Carrie Bradshaw
Lecturer in Law,
University of Leeds

Francesca Goodman-Smith
Transform Program Leader,
Fight Food Waste CRC

In this panel debate, panellists where first asked to summarise what has led to the situation where governments are considering mandatory food waste reporting for businesses. This was followed by a discussion of the opportunities and challenges of such reporting. The panel closed with each panellist making suggestions for how mandatory food waste reporting legislation could be best implemented. Highlights of each of these discussions are offered below:

What has led us to the point where governments are considering mandatory food waste reporting for businesses?

- The complete failure of voluntary measures to lead towards food waste transparency. Whilst there has been sector wide reporting, there have been issues in how these figures can be seen as accountable. There is a lack of robust reporting in the catering sector for example as figures have been based on estimates. At the farm level there is no reliable reporting.

- In the UK only 60 businesses report their food waste to WRAP publicly.

- Some businesses in the food sector, such as Tesco, have led the way. However, this did lead to negative press and potentially to the reluctance of other businesses to report. There was a lack of businesses following suit with Tesco's example.

- The EU circular economy package requires all member states to measure food waste at all stages of the supply chain. Despite the UK leaving the EU, the UK was meant to implement the circular economy package during the transition period.

- There is increasing public attention on the issue of food waste and therefore pressure on food sector businesses to address their food waste.

Opportunities:

- Australia are just beginning the process of introducing voluntary reporting actions for businesses but hope to learn from what has happened in the UK. This is based on the premise that if you are recording and publishing food waste figures you are much more likely to reduce food waste.

- There are opportunities in how food waste figures are published, for example publishing food donation figures alongside food waste figures. Publishing food waste figures is a corporate social responsibility opportunity in how businesses can show the public that action is being taken.

- There are opportunities in the detailing of the reporting that could support further initiatives later. This moves reporting away from a tick box process to one that works alongside wider initiatives to tackle food waste, such as a roadmap as part of a management system that leads a policy or framework building process.

Challenges:

- There has been little reduction in food waste caused by businesses to date in the UK. Voluntary mechanisms have delivered a 1% per year reduction with plans for a 1.5% per year reduction from 2018 to 2030. Commentators have argued this is not fast enough.

- Food waste (or loss) from primary production is not included in current initiatives due to lack of data. Considering that food wasted from this source could be as much as in the retail, manufacturing and catering sector (3.6 million tonnes annually) then the overall rate of food waste reduction by UK businesses each year is more likely to be 0.5 to 1% currently.

- Only 60 countries publicly report their food waste figures. With a further 138 reporting, but not disclosing, their figures publicly to WRAP. Given this current situation, businesses across the food sector are likely to not be overly supportive of new reporting legislation.

- Food wasted on farms is currently locked out of the food loss index of international reporting standards for food waste. Food waste on farms is not just a developing country problem and in fact has been shown to be higher in industrialised countries.

- Implementing mandatory reporting for businesses is not sufficient as a sole strategy in tackling food waste. Whilst the idea that 'what gets measured gets managed' is key to implementing strategies to tackle food waste, the incentives must be there to ensure the follow through of addressing identified food waste. For businesses this is typically based on economic logic that reducing waste lowers costs. However, in cases where waste is the result of actions beyond the remit of one actor, the financial logic is weaker.

- Idealising reporting as a solution is a piecemeal foray into an already quite crowded and fragmented governance space.

- It is difficult to see who in the UK government has control

over the food waste issue. There is a complex mix of organisations currently responsible for tackling food waste.

- It takes time for legalisation to come in. There is a suggestion that whilst voluntary measures are being promoted, this can slow down the move to put food waste reporting in legislation. This has been seen at EU and UN level where legislative suggestions are often placed in annex documents during consultation meetings.

- There are no concrete examples of food waste reporting through legislation in practice at the moment.

Suggestions for the implementation of legislation for mandatory food waste reporting for businesses:

- The legislation must take into account farm/primary producer level waste.

- The time scale of implementation is far too slow. For instance, the consultation of food waste targets is currently estimated to be in 2026/27. This represents a 10 year delay compared to what was initially promised in the Waste and Resources strategy.

- The consultation with businesses on mandatory reporting, targets and extended producer responsibility should be undertaken immediately.

- Businesses that already record their food waste but are not making this publicly available should make this available to everyone by 2022. All other businesses should report by 2023.

- Incentives for businesses to tackle food waste from a financially beneficial perspective must go beyond single entities. The business case for reporting and tackling food

waste can only go so far. Extended producer responsibility would be required to properly account for the full economic cost business actions for example.

- Given the remit to tackle food waste falls across a number of different industry and policy bodies, it would be useful to take a step back and look for integrated and joined up processes. Currently mandatory reporting is just one piece of a very complex puzzle.

- Support for reporting should not be seen as another reason to further postpone impactful legalisation around food waste reduction.

- Reporting procedures must be verified.

- We do not need to reinvent the wheel. There are existing frameworks like the food waste hierarchy that could be enforced and food waste reporting embedded within this.

Track A

The evolving crisis of food waste from farm to fork

Key summary points:

1. Smart labels help consumers tell if food is still fresh alongside expiry dates without using their senses to help determine if food is fresh or not.

2. Food planning does not necessarily lead to a reduction of food waste. Food planning forms part of wider interconnected food management practices that can be disrupted and redirected by the unpredictability of everyday life.

3. The choice of not repurposing food is mostly influenced by health and safety concerns.

4. The stakeholders in the hospitality industry have different perceptions to food waste based on their degree of involvement with food preparation.

5. Some reasons to not waste food in the hospitality sector can be influenced by the seniority of the employee within the organisation. For example, management staff may be more concerned with reducing the economic losses associated with food waste and not the environmental or social impacts of food waste.

Paper presentation summaries:

Consumers' Perception of Smart Labels: A situated approach (Ada Maria Barone from Institute of Management Studies, Goldsmiths University of London and Jessica Aschemann-Witzel of MAPP Centre, Department of Management, Aarhus University)

Whilst many smart labelling interventions have been developed to aid the consumer in mitigating food waste with regards to edibility, they have not been very effective and there is the need for novel solutions to help consumers reduce food waste.

These innovations are placed on packaging to tell consumers if the food product is still edible. Intelligent packaging involves the entire food packaging while smart labels are just labels placed on any kind of packaging. The smart labels have a chemical component which interacts with the food composition to determine its freshness. These innovations aim to reduce the extent to which consumers depend on expiry dates and the confusion involved. These smart labels intend to extend the shelf-life of food items, reduce the effects of expiry dates on food waste generation and contribute to food waste reduction.

Results from this research shows that some consumers usually utilize their senses to decide what is fresh and what is not. Most of the participants accepted this innovation because it was easier to determine food freshness, reduce their food waste, and aided food storage overall saving them time and money. In conclusion, smart labels can influence food storage and disposal and in turn help to reduce food waste.

Planning to waste? Addressing Household Food Waste through resolving the practise of food planning (Jordon Lazell, Centre for Business in Society, Coventry University)

Whilst consumers are increasingly becoming aware of the issue of food waste, the disruptive nature of how we live means it is actually very challenging for households to tackle household food waste.

The disruptive and unforeseen nature of everyday life means that food planning, purchasing, storage and usage can take place in ways that contribute towards food transitioning into waste. The author discussed how aspects of household culture, routines and household set-up can act as a conditional influence over such disruptions. This means that suggested actions to mitigate food waste at the household level may not yield the same results for everyone.

The results of this study showed that in some cases even if consumers had a food plan, they were not always consistent in its use. Food planning is a skill that needs organisation and consumers may not have time to plan their meals. This can lead to food waste when plans are not implemented and food is eaten outside the food plan. Also, competences, standards and resources determine how effective food planning will be. In conclusion, food planning does not necessarily mean that food waste is inevitable as the wider, disruptive nature of everyday life is influential over whether food is used in time, or is unused and therefore has a higher chance of being wasted.

Consumer Edibility Perceptions – The Edibility Threshold (Annesha Makhal, Faculty of Business and Law, Coventry University)

This paper explored the concept of edibility and its relation to food waste. The paper noted that there is inconsistency and a lack of agreement in how edibility can be defined. This is important as what is classed as edible and inedible impacts how food waste is measured. Estimates show that consumer food waste could be as much as twice previous estimates.

The definition of edibility includes aspects of what is avoidable and unavoidable waste. Definitions also differ depending upon where in the supply chain food waste occurs, with the term food loss often used in primary production. The food loss and waste protocol was influential in differentiating edible and inedible food waste.

There are questions around consumer's response to this with a need to explore their perceptions of edibility. This is not a question of whether food is edible or inedible, rather it is whether such a differentiation encourages consumers to not waste food. This relates back to habits and practices and how consumers have been socialised to interact with food in certain ways.

There are implications here in terms of how date labels have caused consumers to anchor their behaviours and how consumers construct boundaries around how food is considered edible. There is a reluctance by consumers to acquire food that is near its best before date which has implications for preventing food waste

Hospitality food waste: Influencing others to prevent food waste (Natalie Pearson, University of Bath)

The hospitality industry is estimated to contribute about 920,000 tonnes of food waste annually. Food waste measurement in this industry is quite challenging due to lack of engagement from stakeholders in the industry.

The different stakeholders in the hospitality industry have different perceptions of food waste based on their different levels of involvement with food preparation. Also, these levels also come with differences in how they can influence others. For instance, business owners have high influence externally and internally. Managers have a high level of internal influence, and employees have a low level of internal influence.

Internally, the owners of these businesses can influence staff to reduce food waste by making things very clear, e.g. providing coloured bins to segregate waste. Business owners influence their suppliers, customers, and other businesses by implementing the most appropriate actions and requesting others in their supply chain to follow suit. However, certain actors in this industry would prefer not to change their operational model.

Managers can exert their internal influence by engaging with staff, offering suggestions on what can be done about food waste and providing feedback to staff higher up in the organisation.

Some of the reasons to not waste food in the hospitality sector are influenced by the level of the employees in the organisation. For example, managers may be more concerned with reducing the economic losses associated with food waste rather than the environmental or social impacts.

Identifying New Product Opportunities from food waste: Eliminating Waste in Tomato Production (Diana Salgado and Christopher Simms, Faculty of Business and Law, University of Portsmouth)

This paper focused on finding innovative uses for tomato waste. The researcher worked with a tomato producer on the Isle of Wright. Their entire growing system is biodegradable and already has a composting facility to deal with any waste. Further to this the producer has kitchen facilities for making sauces and other products from surpluses. However, despite this 580 tonnes of tomatoes each year are sent to the composting site, which is a loss of £900,000 in revenue.

The reasons why the tomatoes are wasted include:

• Vine appearance - The retail buyer requests a certain number of tomatoes to be attached to the vine when sold.

• Tomato colour and size – Some tomatoes are green or are too small to meet requirements.

• Tailing off in demand – Towards the end of the season the demand for fresh tomatoes decreases.

• Waste from condiment production such as the skins and the seeds.

Overall, 9% of what the greenhouse produces is wasted, with 5% of what the kitchen facilities produce is wasted.

The research looked at further ways of mitigating waste. This included upgrading waste into high margin products, rather than downgrading it into compost. The research process involved identifying and evaluating new product opportunities and using a framework to consider nutritional, functional and sensorial aspects of such products.

Examples included a tomato vessel made of dried tomato, making a lacquer to be used in the production of metal cans, and lycopene supplements. The barriers to these products being adopted were that consumers may not receive these new products well. A further barrier was the environmental and functional footprint of this processing.

Track B

Key issues, challenges and solutions to food and nutrition insecurity

Key summary points:

1. To solve food insecurity in India rural incomes should increase and nutrient dense food should be subsidised.

2. There were many benefits to the organisation of emergency food aid during the pandemic however such operations now face an uncertain future given the lack of funding to return and deliver pre-pandemic services.

3. The current debates playing out regarding food insecurity have a 100 year plus historical context in the UK. State intervention into the provision of food during wartime supported social eating spaces.

Paper presentation summaries:

Are nutritious diets affordable to people from various states of India? An exploratory study. (Chandorkar, S., Bahadkar, P. and Pareek, S. The Maharaja Sayajirao University of Baroda)

If India wants to achieve SDG2 there needs to be a provision of healthy and sustainable diets. When comparing the EAT-Lancet Diet versus the current Indian diet there is a disconnect. The EAT-Lancet diet (estimated cost of $2.84 per day) exceeds the capacity of individuals in many low-income countries.

With this context in mind, the research team presented three questions:

1. What is the cost of usually consumed diets across states in India?

- The cost of diet was highest for men living in urban areas ($0.71). In rural areas, the cost of a usually consumed diet was highest in Kerala and lowest in Madhya Pradesh. The highest cost of diet increase was due to the inclusion of food from animal origin and the lowest cost was due to low dietary intake.

2. Do current diets meet the minimum dietary diversity score for women across various states in India?

- No, their research evidenced how in urban areas only 39% of diets met the minimum dietary diversity score, in rural areas this figure fell to 25%. This indicated food insecurity amongst women.

3. What will be the cost and affordability of energy only diet, macronutrient diet and nutritious diet amongst the Indian population?

- Research suggests that energy only diets and macronutrient diets was affordable to the entire population, yet these diets fail to fulfil nutritional requirements. Nutritious diets, mixed and vegan, was found to be affordable to 92% of the population. Vegetarian/ovo-vegetarian diets, however, was only affordable to 15% of the population.

To address some of the findings from the research questions, the researchers suggest that rural incomes need to be improved, nutrition sensitive agriculture needs to be promoted, nutrient dense foods should be subsidized, and unhealthy foods should be taxed. Only then will India be able to achieve SDG2.

Innovation and change in the provision of emergency food aid during the pandemic. (Mulrooney, H., Bhakta, D. and Ranta, R. Kingston University and London Metropolitan University)

The presentation focused on the CResCID project and the provision of emergency food aid during the pandemic. Five key developments in the provision of emergency food were identified:

1. Emergency food aid infrastructure. One of the main changes has been the unofficial designation of FareShare as the main distributor of surplus. This has simplified and clarified the process of receiving surplus food.

2. Increased coordination between food hubs, partnerships, charities, and local government. Pre-pandemic there were issues of duplication of activities, however the pandemic has led to centralisation and coordination of efforts. This has resulted in the sharing of resources, funds, grants, and volunteers.

3. Increased food delivery. Before the pandemic 'meals on wheels' provided hot food to vulnerable people, this has been extended during the pandemic. As an example, Brighton provided 400 meals a week pre-pandemic. During the height of the pandemic approximately 5000 meals were delivered each week.

4. Thinking beyond the provision of emergency food aid. There has been an increase in activities supporting cooking and culinary knowledge, and organisations working to address the root causes of food insecurity.

5. New social enterprises which are shifting away from traditional food bank models. Rise of community supermarkets which operate on a subscription/payment model. Tying in with circular economy, working with local producers and distributors.

Why has this happened?

- Increased coordination between organisations, local networks are becoming much more established. New volunteers due to the furlough scheme, with different skill sets and knowledge. Increase in community support in terms of donations or resources. High profile interventions. Greater local and national government involvement, particularly in terms of funding.

What will the future bring?

- Less clear if the changes are sustainable in the long-term. Organisations and charities are raising concerns regarding whether they will be able to continue the beneficial changes brought about during the pandemic.

What are they concerned about?

- Lack of funding; changes to the volunteer base; whether the demand for food aid will increase or decrease; and underlying problems left unresolved.

Feeding the People in Wartime Britain: Lessons for contemporary food policy. (Evans, B. Liverpool Hope University).

This presentation evidenced that the debates that we are currently having regarding the provision of emergency food are at least 100 years old. The paper drew upon examples from both the First and Second World War to highlight how the food insecurity has been previously addressed, and what lessons could be learnt for contemporary food policy.

First World War:

At the start of the First World War there was little state intervention into the provision of food. The experience of war brought about increased poverty and food insecurity. To address this the state appointed a 'food controller' to oversee national food provision. Much like current debates, politicians were nervous about how much the state should contribute. During the war community social eating practices were developed, driven by working-class women. These initiatives, such as national food kitchens, were supported by the government and developed to be open to everyone to eat socially and communally. However, from 1918-1919 the Government withdrew support for these communal eating activities. Once the emergency condition ended, the state withdrew its financial support.

Second World War:

As in the First World War, the government stepped in to support social kitchens and moved away from the soup kitchen model. They were designed to be attractive communal eating spaces where everyone, regardless of social status, could participate. Buckingham Palace loaned out paintings to these social eating spaces to make them more attractive and welcoming to the wider population. Furthermore, the government insisted that these initiatives occupy premium retail spaces – unlike today.

In comparison to present day, during both World Wars the state had a much greater role in working to address food insecurity. It is important to remember that emergency eating has been undertaken previously, and that there are lessons to be learnt from past experiences.

Track C

Digital platforms as sustainable food solutions

Key summary points:

1. Whilst there has been a rise in the number of food sharing platforms for profit in Brazil, they face a number of problems going forward. These include the stigma attached to sharing and eating surplus food, issues with food safety and a failure by businesses to see such activities as economically and environmentally beneficial.

2. Food sharing via digital platforms fail because of a number of reasons such as people not keeping to the agreed pick up time, breakdown in communication, technological challenges in using the app, the nature of the food posted and unethical practices, amongst other reasons.

3. Food sharing activities can take several forms and involve not just sharing food but skills, resources and spaces to enable food growing and food eating. The SHARE-IT platform benefits food sharing activities by allowing them to understand their impact and collating information to facilitate funding applications and networking possibilities.

4. Food waste reducing platforms can aid retailers in ensuring that short date, perishable items are bought by consumers. When advertised certain product categories are more influential than others in ensuring the food is bought.

Paper presentation summaries:

Barriers and Challenges from Food Waste reducing Platforms: the Brazilian case (Oroski de Almeida F. and Fujimoto, M., School of Chemistry, Federal University of Rio de Janiero).

In the last 5 years there has been a significant rise in the number of food waste reducing platforms. Such entrepreneurial innovations are important because food waste is high in Brazil. Such innovations have the potential to be hugely successful because of high smart phone usage and challenges with food insecurity. However, most food system actors are not confident in donating surplus food.

The study aimed to find the barriers faced by Brazilian innovators reducing food waste by surplus redistribution platforms. A qualitative approach was followed using case studies that met the criteria of a digital platform sharing food for profit already operating. 4 cases were utilised.

Through undertaking a content analysis, 13 barriers were unearthed. These were:

1. Stigma around food surpluses and leftovers – Challenges around how consumers know the food is good to eat.

2. Food safety – the food is close to the expiry.

3. Most food system actors do not see food waste reducing strategies as an economic opportunity.

4. Most food system actors see food waste as part of their current business model and fail to see the benefits of preventing food from being wasted rather than just reducing the waste material.

5. Businesses fail to record how much food they are wasting.

6. There is a lack of technological competence.

7. There is a lack institutional support to boost sustainable and circular businesses models.

8. Current businesses models for surplus redistribution fail to meet people in need.

9. The digital platforms must ensure that the prices are fair, affordable and attractive.

10. There is low engagement from consumers in the food waste issue.

11. There is low engagement from commercial partners in the food waste issue.

12. Proving that there is economic remuneration in tacking food waste is difficult – This is important to get partners on board.

13. Parties are disconnected in the food system – This means that matching supply and demand is difficult.

The most important outcome from the research is that the entrepreneurs see the business as an opportunity to create social impact. These businesses do not want to be seen as a discount platform.

Co-creating value from failed experiences in the sharing economy (Vanja Ljevar, Georgiana Nica-Avram, John Harvey, Ines Illodo Branco, Samanthika Gallage, James Goulding of N/Lab, University of Nottingham)

Consumer food waste accounts for about 50% of food waste in the UK and could be the same for other high-income countries.
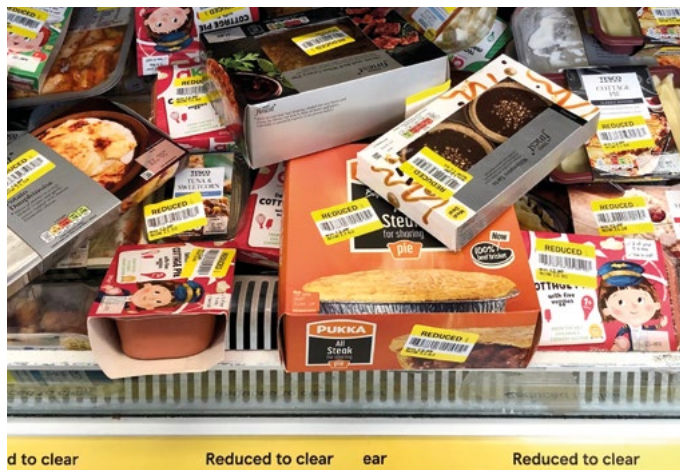
So, to meet the Paris Climate agreement and the SDG target, consumer food waste requires attention. Therefore, structures have to be in place to select food we consume and how the food is disposed.

OLIO is a food sharing platform that has built up more than 4 million users globally. Almost 17 million food portions have been shared using this platform so far and it is growing rapidly. It has a familiar social media interface with news feeds and user profiles. There is also a medium for users to communicate and arrange how food sharing can happen. People interact with each other on the app. Supermarkets also redistribute food using the app in a bid to reduce food waste and food insecurity.

The paper presented focused on where food sharing fails and how users can get a better experience using the app. Challenges faced include people not keeping to agreed time to pick up food, distance between the parties, breakdown in communication and messaging, cancellation of pickup, multiple requests to respond in a short time, manners of the users, difficulty in using the app, fear of trolling because of the social media format of the app, the nature of food posted, and unethical behaviour like stealing from the property of a user.

A complaints classifier was developed to identify people who were having the issues stated above with using the app.

SHARE – IT: Barriers and opportunities for reporting on the sustainability impacts of food sharing initiatives (Alwynne McGeever and Anna Davies, Trinity College Dublin)

SHARE – IT is a free, online tool where any food sharing activity can measure their sustainability impact. Various food sharing initiatives have been developed which assist with growing food together, eat food together or redistribute surplus food. These exist in the form of community gardens and kitchens, community supported agriculture and surplus food redistribution centres.

For this research, food sharing refers to the resources, spaces or skills linked to encourage the growing or consumption of food. Such sharing activities are organised in different ways including charities, non-profit organisations, for-profit organisations, cooperatives, informal groups, clubs, associations and networks. Food sharing can also take different forms and may operate by selling, collecting, gifting, and bartering.

SHARE-IT has benefits like helping food sharing communities assess their impacts. For example, allowing sharing initiatives to track their carbon footprints, reduce avoidable and unavoidable waste, understand how accessible their services are, how many jobs they are creating, how their activities promote health and wellbeing, how they are having impacts on people's food budgets and their risk management. Further information can also be produced such as strategic planning aspects of progressing with sustainability, fulfilling civic responsibilities and identification of food sharing communities within various cities for networking.

With the information on the SHARE-IT platform, food sharing communities' gain more popularity, are better supported in funding applications, hold a greater understanding of how their activities are in line with the SDGs, and aid strategic decisions based on sustainability indicators. Local authorities can use SHARE – IT to monitor and report progress on SDGs and link this to the national sustainability agenda. Food retailers can use SHARE – IT to reduce food waste and show the impacts of Corporate Social Responsibility.

SHARE-IT is in its prototype stage now and looking at how the platform can become self-sustaining by attracting investors. There are three potential market segments, which are the food sharing communities, public/local authorities that provide policies and funding to create an enabling environment for food sharing to thrive and food retailers that donate to these food sharing initiatives. Questions asked were if they require sustainability reporting? Does SHARE-IT meet that need? And are they willing to pay for SHARE- IT?

This has not been fruitful yet and there are fears for its future after the research funding is exhausted.

Interplay of Supermarkets and Food Waste reducing platforms: Role of Product Categories (Shantanu Mullick, Coventry University; Neomie Raseens, (Eindhoven University of Technology); Mohammad Rizky Nur Imam (Eindhoven University of Technology)

Food waste is a significant cost to supermarket businesses and their suppliers. Tackling this waste is a significant economic opportunity. Consumers also want to see the places where they shop tackling food waste given the topic's increasing public attention.

The main initiatives supermarkets use to prevent food waste are last minute discounts. Perishable products must be sold by a certain date with discounts given when products are near or on their use-by/sell-bydates. One of the limitations with this strategy is that only customers inside the supermarket can see such discounts. As an alternative, food waste reducing platforms have joined forces with supermarkets. Consumers that live near supermarkets then hear about these discounted items via an app. One of the benefits to supermarkets is that a consumer's store visit to purchase discounted food is likely to also lead to the additional purchasing of products.

However, there are a number of issues that supermarkets need to overcome in participating in the food sharing platform. These include the additional duties by staff to list items on the

platform, every item must be listed separately. Each item also requires staff to enter a number of data categories, such as product type, date of expiry etc. Further work is also required if mistakes are made. Staff must also ensure that consumers receive the food they have agreed to collect. Supermarkets are also at risk of being fined if they are found selling out of date food in their stores.

The aim of the research was to assess which data input categories are most effective in disseminating food via digital platforms. The study utilised panel data on 10 retailers over 52 weeks covering 160,000 perishable products. This activity was measured at the store-week level. This data was modelled in terms of category views via a mixed effect model.

The findings give the effectiveness of uploads by category type. The findings show the supermarkets should focus their efforts to upload last minute product items on the categories that are most effected. Also, that increasing the time that items are available on the digital platform can have a strong impact on the number of platform views.

Track D

Alternative experiences of producing, consuming and eating

Key summary points:

1. Community Support Agriculture schemes saw a rise in participation during the pandemic and scaled up their operations in response to increased demand. CSAs facilitated the distribution of food to those in need and provided volunteering opportunities.

2. During wartime the British government intervened in the food system, reducing the reliance on imports and encouraging less wasteful and healthier food behaviours. Lessons can be learned from this in how we manage the modern day food system.

3. Rural resilience is an important concept for smaller scale, agro-ecological farmers in Brazil who are seeing their ways of working encroached upon by larger agri-business.

4. Diversity is an important concept when considering the sustainability of food systems. There are a number of different cross cutting dimensions that can be considered. Exploring such a concept will help reveal how the food system can make a sustainable transition and avoid the pitfalls of work elsewhere where alternative and conventional operations have been set against each other in binary.

5. Questions raised across the papers relate to how to govern and effectively lead on the governing of initiatives that sit 'on the periphery' of the food regime, particularly in times of crisis and in the wake of crisis.

6. A further theme was that experiences of 'alternative' practices, forms of governance and ways citizens are shaping food systems outside the mainstream. The role of such alternative modes of food system organisation in the pandemic also featured.

Paper presentation summaries:

Healing Precarity in Food Systems: CSAs, Covid-19 and Complexity. (Blake, L. and Chohan, J., University of Bristol)

Food systems are highly complex and experience many problems – social, environmental and economic. An approach is needed to deal with this complexity. There is significant

research in the bio-natural sciences looking at food systems and their relation to pandemics. There is evidence to suggest that the likelihood of such COVID events increases with the adoption of industrial agriculture. Encroachment on the environment and biodiversity loss are a further factor.

The pandemic has emphasized the fault-lines within our current food system, its sustainability and deep routed precarity. In particular, the just-in-time nature of our food system supply chains and its underlying structural fragility.

The study focuses on CSAs (Community Supported Agriculture) looking into how agriculture is being re-embedded into local ecologies and communities. The methods used were surveys with CSAs across the UK, looking into how they coped and adapted with the impacts of the pandemic.

The findings show that CSAs are nimble and resourceful. A steep increase in demand was a common occurrence and many scaled up their operations in response. For most, production and distribution was unaffected. CSAs undertook collaborations to help others distribute and sell their produce. CSAs increased their donation of food to Fareshare and were successful at helping those that were vulnerable and those that had to isolate.

The small and local nature of the labour force meant CSAs to a certain extent were immune to the workforce challenges elsewhere in the food sector. Furthermore, volunteers reported benefits in their wellbeing due to feeling that they are helping others.

Britain's World War II food policies — their planning, implementation, and results — and lessons that could help us transform today's food systems to be sustainable and just. (Boyle, E. Independent author)

COVID, climate and conflict are all intertwined with food. Britain was importing two thirds of its food calories via ships in the 1930's. With the outbreak of war these ships would not only be commissioned for other purposes but also would become enemy targets. With a need to reduce the reliance on importing food, plans were made to take-over the food system. The objectives of this were to produce more, waste less

and share scarce foods. The capacity of domestic farming increased, changing agricultural land from pasture to arable in some cases.

By January 8th 1940, anyone who wanted bacon, butter or sugar had to use a ration book. Farmers were being encouraged to produce certain crops. Lord Walton, Minister of Food at the time, developed a communication campaign to appeal to household decision makers to encourage healthy eating, food growing and less wasteful behaviours amongst others.

There were however challenges. Loopholes allowed those that were wealthy to get around some of the rationing. For example, households that had servants could access a greater amount of food. A black market did develop in food during the war. This was small scale such as providing your local grocer with eggs from chickens from your home for extra of certain products like cheese. There were competing interests as how the remaining space onboard ships importing goods should be used. For example, whether food should be imported or alcohol.

Overall, the measures were regarded as successful with adequate food for the population, in fact food was considered to be better quality that in pre-war times. Morale was positively affected with the knowledge that there was adequate food. Better health was also a benefit. Sugar intake was reduced as well as calorie intake. This was accompanied by lower rates of heart disease and diabetes.

The paper gives 5 key lessons for the modern day food system.

1. That change is possible.

2. People need reasons to support a transformation in the food system. The war was a key reason to make a change.

3. Good leadership is critical to change the change.

4. For transformation everyone needs a role.

5. Sacrifices must be shared - Rationing was for everyone.

The importance of small-scale farming and alternative food alliances for promoting resilient futures post-COVID-19 crisis in Brazil. (Silva Machado, F. Federal University of Rio de Janeiro)

Resilience is an important concept at a time of crisis. This paper draws upon the idea of rural resilience. This relates to the capacity of agriculture systems to adapt and transform in times of crisis. Many scholars have explored the concept of resilience, in particular how resilience has provided a pluralistic notion of how to understand development.

In the context of Brazil, whilst there are significant resource's being placed in large scale agriculture by the government, the research focuses on smaller scale farms. The research seeks to address the conflict between productivist and agro-ecological

farming systems by focusing on the complexity and uncertainty of farming in metropolitan Brazil.

Conflicts can be found in land use, with land being used for petrochemical companies to refine oil. Other pressures on land use include pressures on water resources, such as use by beverage companies. Further pressures are soil erosion. The paper explains that this shows the impact of globalisation in reshaping rural areas.

In terms of capacities for farmers to be resilient, these were listed as:

1. The capacity to learn and make changes to respond to a crisis such as moving from conventional to agro-ecological farming methods.

2. Combining different types of knowledge, such as combining different forms of crop farming that complement each other.

3. Creating opportunities for social organisation and cross-linkage between organisations.

Foodiverse: Characterising diversity in food systems. (Wahlen, S. and Mahr, B. University of Gießen)

This project concerns diversity in food systems and the role that diversity might play. This paper avoids the divide between the industrial/ conventional and the alternative/ agro-ecological food systems, instead focusing on the concept of diversity.

The paper explores whether diverse food systems are more resilient and more sustainable. To explore this there is a need to characterise diversity in food systems. A number of dimensions are given to explore sustainable and resilient food systems. Food culture is one factor, looking at this not in terms of consumer behaviour but in wider spread practices that relate to local eating patterns. Looking at the food chain is a further point to consider. This relates to different supply chains and how changes can be brought outside mainstream procurement. Food governance is a further aspect to consider from European and national level implementation, to local action.

There are different dimensions that must be analysed in order to advance diversity. For example, how different agricultural schemes impact bio-diversity. A further dimension is social-cultural ways of eating and handing food. The historical development of supermarkets is a good example. The final dimension is political-economic dimension that relates to the different ways that food governance and the food chain are underpinned by logic, such as economic drivers.

There are different kinds of diversity that are already known such as agro-diversity, bio-cultural diversity, and a diversity in modes of organisation and coordination. The question being put forward for this project is to understand the linkages in the dimensions. For example, how different forms of diversity can be characterised and how do they link together.

Track E

Sustainable Sourcing and Ethical Consumption

Key summary points:

1. The COVID19 pandemic has influenced a shift in food consumption habits with an increase in awareness of the need for ethical and sustainable foods.

a. Questions remain as to whether this shift in consumption is permanent as the world moves back to normal from the pandemic environment.

b. Government has an opportunity to tap into the new consumer awareness to bring in policies that support sustainable food production and consumption

2. Consumers are willing to pay more or are open to being educated to buy more ethical and sustainable foods.

3. Alternative foods sources that have less impact on the environment are needed. Edible insect products have been found to be a better source of nutritional value and produce less greenhouse gases in their production than livestock products.

a. Alternative food sources have potential to improve local economies yet are still subjected to greater bureaucratic red tape than existing sources.

b. Regulation is not evolving fast enough to encourage quicker adoption and greater production of alternative environmentally friendlier food sources.

Paper presentation titles and authors:

a) **Where now? A critique of pandemic consumer, business and government behaviours in relation to food in the UK. (Barnett-Richards, K., Timms, J., Quinn, L. and Bek, D. Coventry University)**

b) **Shifting the Dial for Workers: Developing and Implementing a new Standard for Ethical Trade and Responsible Sourcing. (Humphries, F. BRC-Global Standards)**

c) **Drivers and barriers for poultry consumption in India. (Scudiero, L. and Tak, M. Royal Veterinary College, University of London)**

d) **The Sustainability of Beef Supply Chain with RAPBEEF. (Susanty, A. Diponegoro University)**

e) **Edible, Sustainable and Ethical Insects: Devising an Export Roadmap from Thailand to Europe. (Tiwasing, P., Siriamornpun, S. and Ferreria, J. Coventry University and Mahasarakham University**)

Track summary:

The onset of the COVID19 pandemic was characterised by panic buying by consumers as they contended with the idea of food insecurity. This led to a change in disposable income and eating habits as people stayed at home during lockdown. The pandemic caused a shift in food consumption habits towards locally sourced products with an increase in awareness of ethical and sustainable foods. This created a more valuable market for businesses who seized the opportunity. The government's introduction of the Furlough Scheme helped sustain employment levels facilitating the survival of businesses in this sector during the pandemic period.

Coming out of the pandemic, consumers, government and business should aim to sustain the increased interest in sustainable and ethical consumption practices. Sustaining the increased interest that young people have shown in such products is vital.

The government has opportunities to tap into this new consumer awareness to bring in policies that support sustainable food production and consumption to ensure the shift in consumption practice is permanent. There is a need for the policies to align the shift in consumer behaviour with climate change mitigation strategies.

BRCGS has produced a white paper on ethical and responsible trade which showed consumers were willing to pay more or are open to being educated to buy more ethical and sustainable foods. The research led to the development of a new standard that goes beyond the physical features of the product but incorporates principles of the Universal Declaration of Human Rights, the Ethical Trading Initiative and International Labour Organisation standards. The certification programme, which is benchmarked against the Consumer Goods Forum's Sustainable Supply Chain Initiative, has a robust compliance programme to ensure the highest standard and quality possible.

Alternative food sources that have less impact on the environment are needed. Edible insect products have been found to be a source of higher nutritional value and produce less greenhouse gases in their production than livestock products. These alternative food sources have the potential to improve local economies where they are sourced yet are still subjected to greater bureaucratic red tape than existing sources. Regulation is not evolving fast enough to encourage quicker adoption and greater production of alternative environmentally friendlly food sources.

Track F

Decision making in Food Supply Chains: Transitioning to a circular economy

Key summary points:

1. Mathematical modelling plays an important role in optimizing supply chains. For example, supply chains can reduce their impact and become associated with the term 'green' through simulating their impact and taking action.

2. How decisions are made in supply chains must be considered in order to achieve greater resilience.

3. There are substantial opportunities for using waste from the coffee industry as plant growing material.

4. Whilst there are a number of different models for understanding decision making in supply chains, recent events suggest that modelling for complexities like a global pandemic is still challenging.

5. There are significant opportunities from seaweed plants to develop biodegradable films to use in food packaging. Nano-particles and other additives are required to supplement the film to ensure it is fit for purpose.

6. The modelling of maintenance and production schedules can optimise the operations of food manufacturing plants.

Paper presentation summaries:

Green food supply chain optimization using multi-objective mathematical modeling and simulation-based optimization, (Case study: Koorosh Protein Products Company). (Babakhani, N., Sajadi, S.M. and Taghizadeh-Yazdi, M. University of Tehran and Coventry University)

The presenters open by explaining that whilst companies must ensure that their supply chains are profitable, there is a critical need to pay attention to environmental issues also. The presenters introduce the term 'green food supply chain' and note that perishable foods in particular are a risk to businesses given their high tendency to generate food waste.

The study presented focused on 4 supply chain areas – supplier, manufacturer, retailer and customers – looking at the costs related to transportation. In the first stage of the research Mathematical modelling used model data to reduce green supply chain costs. The authors discussed how they added complexity to the modelling, showing a number of problem parameters.

Decision Making for Resilient food supply chain using operations research; a survey. (Ghanbari, S. Shahed University)

This paper discussed how food supply chains are vulnerable to various challenges such as unexpected disruptions as well as supply and demand inconsistencies. The paper presented focused on how to design a resilient supply chain using mathematical modelling methods. The author highlighted the findings of a literature review analysing papers in this area

looking at related areas of logistics, risks management and food safety.

The author noted the strategies currently in literature that concern resilient strategies to cope with uncertainties such as natural hazards, industrial accidents. The paper considered the viability of mathematical approaches to consider such strategies stochastic programming, fuzzy programming and robust optimising modelling.

Results obtained from this review offer broad implications and ideas for researchers to design resilient food supply chains to strengthen the network and thus reduce the impacts of unavoidable risks.

Circular economy of spent coffee ground as oyster mushroom cultivation: Urban agriculture strategic (Harsono, S. S. University of Jember)

This paper discussed the usage of coffee grounds for oyster mushroom cultivation. Coffee is an important agricultural product in Indonesia and widely drunk. However, its cultivation and processing generates a waste product that often ends up in landfill.

The paper describes how the coffee pulp waste has excellent nutrients for plant growing. The remaining pulp that is used can also be made into a dry powder and then used to supplement plant growing. The presentation explains how mushrooms are well suited to growing in such material.

The research detailed the technical feasibility of expanding the operation for larger scale growth of oyster mushrooms. The author mentioned the opportunity to implement such operations in urban areas to tackle unemployment during the COVID-19 pandemic.

A review on models and analysis methods of decision making in food supply chains. (Khajeh, E. Coventry University)

This paper presentation addressed the problem of strategy recognition and its importance in organisation success. Supply chains are complex global networks and therefore decision making by managers is an important research topic.

The presentation presented the findings of a review of 444 papers on decision making for food supply chains. Definitions, classifications, objectives, techniques, decision variables and solution methods were considered in line with sustainability. The results of the review demonstrated that greater focus on decision making within food supply chains could help achieve circular economy targets.

Development of Red Seaweed Carrageenophytes-based Biopolymers as Sustainable Food Packaging Materials. (Praseptiangga, D. Universitas Sebelas Maret)

This paper opened by explaining the growing interest in developing food packaging materials using natural polymers. Such polymers have film forming properties whilst still being biodegradable. In the study the author spoke about the opportunities of using red seaweed carrageenophytes to form film matrices of which there is an abundance of varieties in Indonesia.

The presentation next pointed out the weaknesses of using this material as a food packaging film. This included low mechanical and water vapour barrier properties and poor protection against UV light. As a solution nanoparticles have been incorporated to create a multiphase material with the natural polymer.

The author discussed how different types of nanoparticles were tested to find solutions to the natural polymer's weaknesses. The study showed that SiO_2 and ZnO nanoparticles incorporated into the carrageenan-based film reinforced the film's multifunctional properties with enhanced water vapour barrier properties, UV-screening, and antimicrobial activity.

Scenario-Based Simulation Optimization of Food Production System Considering Bottlenecks and Preventive Maintenance Case Study: A Tomato Paste Factory. (Sajadi, S.M., Mirzaeesadr, M. and Salehi, F. Coventry University and Islamic Azad University)

This presentation focused on how to best determine the production schedule and sequence of operation within a tomato paste factory. The purpose of this was to understand how to best facilitate the most sustainable operating practices, such as how to best minimise waste.

The study focused on the operational barriers that could help reduce costs and reduce lost sales. A modelling process was undertaken using data on forms of timing, failure density and routing of parts. Variables included repair and maintenance schedules. The design of the model included bottleneck analysis. In applying the model to the case study tomato paste factory, and further validation via expert guidance and statistical techniques, the model was validated.

The results show the potential of a 7% increase in production, compared with the previous year. The implications of this research are the maintenance schedules and production schedules should be scenario based to ensure high productivity and low food waste generation.