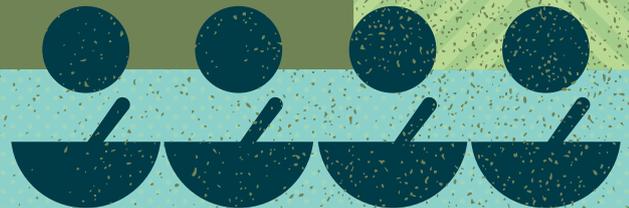
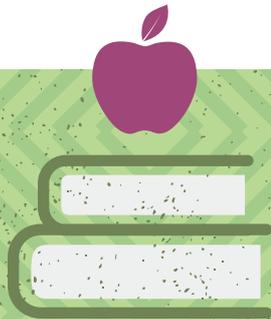
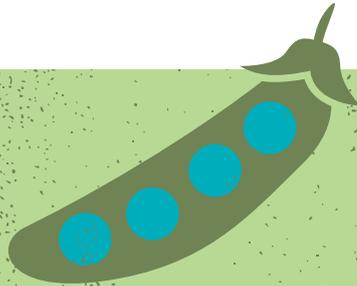




FOOD FOR US

reducing food waste,
supporting social learning,
creating value



Food for Us – Reducing food waste, supporting social learning, creating value
2019

www.foodforus.co.za

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Introduction

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An estimated third of the 29 million tons of food produced annually in South Africa goes to waste (Oelofse, 2014). Fifty percent of this waste (by mass) occurs during the agricultural production and post-harvest handling and storage stages (von Bormann et al., 2017). At the same time 13 million South Africans routinely experience hunger, with malnutrition a serious concern for early childhood development (StatsSA, 2018). This disconnect between the need for food and the food that is available for consumption but being wasted, has profound social, environmental and economic impacts. This, in turn, suggests that there must be opportunities to create social, environmental and economic value through innovative and transformative initiatives that link food producers with food consumers in South Africa, particularly those in need.

Food for Us is a sustainable food systems mobile phone learning pilot project initiated in 2017 by a consortium of partners in South Africa working with the United Nations (UN) Sustainable Lifestyles and Education Programme within the One Planet Network. The intention was to design and develop a mobile application (app) that could help reduce on-farm food surplus, while also supporting social learning. The initial phase of the project was 18 months. This publication shares what has been learned and can also be considered a springboard for the potential that is possible...

... transitioning to a more productive, efficient, sustainable, inclusive and equitable food system in South Africa.

The Food for Us project aim and objectives

The Food for Us project sought to contribute to the emergence of more sustainable food systems, and to how these are managed. The pilot project had a number of objectives:

- To adapt and develop a mobile phone app to trade on-farm (informal through to commercial) surplus produce.
- To trial the mobile phone app in trading on-farm surplus produce.
- To undertake research to understand the scale of and opportunities to reduce on-farm loss and waste.
- To build the capacity of South African researchers in the fields of food waste and transformative learning.

In particular, the combination of social learning and a mobile phone app enabled interactions between food producers and food consumers to enhance sustainability, efficiency and inclusivity within food systems.



The Food for Us mobile app

Recent reports on mobile phone usage in South Africa suggest that there are more mobile phones than people in the country. More than 80% of the adult population own a mobile phone and 70% of the population are accessing the internet using them. This level of mobile phone usage is also growing rapidly with a 15% increase in the number of people accessing the internet over their phones between 2016 and 2017 (GreenCape, 2018). Data costs in South Africa, while still high, are also decreasing, enabling more people to use mobile phone functionality that requires data. This creates opportunities for trialling and testing the use of mobile phone apps for food system innovations.

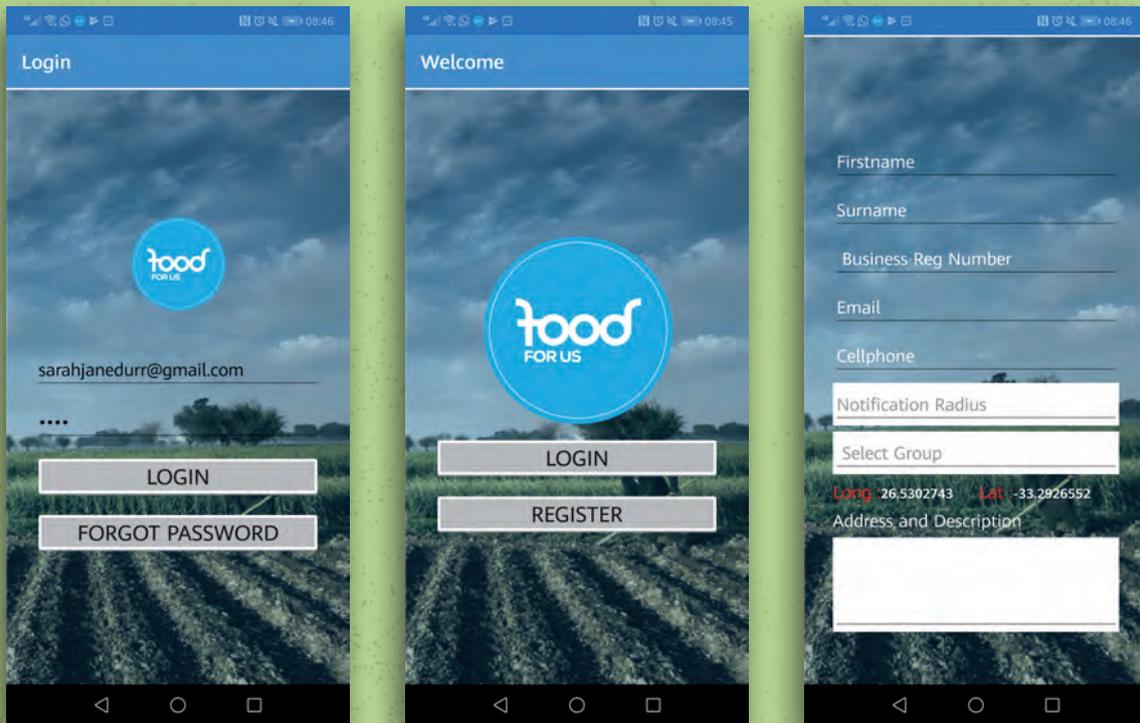
More than 80% of the adult population own a mobile phone and 70% of the population are accessing the internet using them.

The Food for Us mobile app was developed and trialled during the project to ensure that it is fit-for-purpose and meets the needs of the users; and that it adequately links growers with buyers. LEAD Associates, a project partner, developed the main structure of the app. Two consultative workshops were held with buyers, sellers and intermediaries to ensure their involvement in defining the functionality of the app. They helped to define the initial features of the app; for example, by providing input on what information needed to be included, and what information would be useful to buyers to facilitate purchasing.

Two versions of the app were developed. Version 1 was trialled for 4–5 months from September 2017. Following initial use, feedback was gathered to further refine the app, with functional adaptations made prior to trialling Version 2. The latter is the current version in use and is available for download from Google Play for Android phones (access: Food For Us Google play store) and via iTunes for iPhones.

What the app can do:

- link sellers with buyers
- upload products from drop-down menus
- specify quality of produce
- upload pictures
- set geo-references or notification distances for available produce.



The Food for Us app: Examples of the Version 2 interface

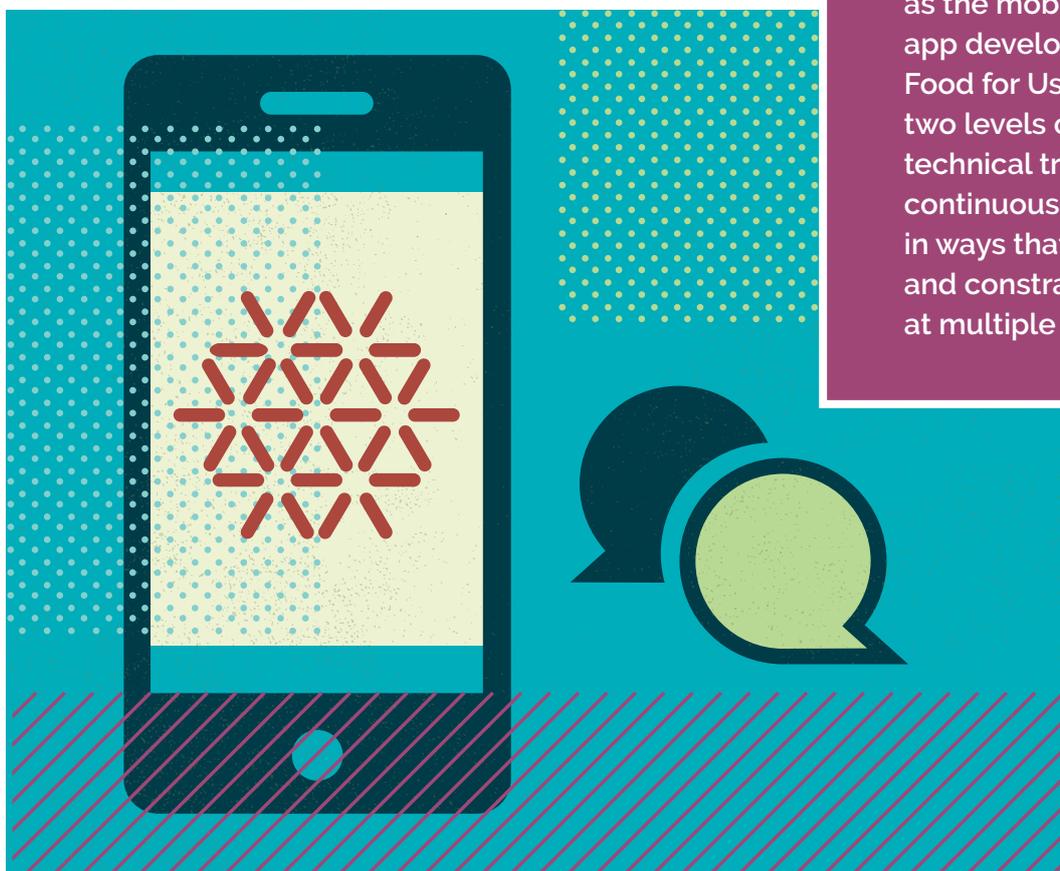
Piloting the Food for Us app

The Food for Us app was piloted in two sites focusing initially on small-scale rural and peri-urban farmers in Worcester in the Western Cape and the Raymond Mhlaba Municipality in the Eastern Cape. Farmers in these two areas need greater access to markets to enhance the value of their crops. This is an important and often marginalised component of the food system.

Based on these two pilots, deeper insights into social learning and mobile phone app development have emerged that significantly strengthen our understanding of the potential to achieve 'socio-technical transitions' in South Africa's food systems.

While the initial focus of the project was on diverting food surplus that would otherwise have been lost or wasted on-farm, the pilot phase revealed a need to support value creation with diverse groups with often very specific requirements. As the potential of the social learning networks and the technical platforms offered by mobile phone apps and related management systems develops, the opportunities for transformation at other levels within the food system are being developed.

The term **socio-technical transitions** is used to signify the complex, long-term transitions of systems, such as the food system, and to signify the interaction between social groups and technologies, such as the mobile phone app developed through Food for Us. These two levels of socio-technical transition continuously interact in ways that enable and constrain change at multiple levels.





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National stakeholder engagement

Recognising that food systems are complex and multifaceted, it was important at the beginning of the project to gain input and support from a diverse range of stakeholders. Relevant stakeholders were identified and invited to workshops in the two pilot provinces. Over 130 people representing national government, business, community-based organisations, local farmers (small and large) and feeding schemes attended these workshops. During the workshops, issues of food surplus, access to markets and app functionality requirements were discussed and clarified.

Additionally, the project was discussed at international, national and local initiatives by the Food for Us project team. These included contributions to the Department of Trade & Industry's (DTI) Sustainable Food System (SFS) Programme's Food Waste Forum; the first global conference of the UN SFS Programme in Pretoria; and via representation on the Multi-stakeholder Advisory Committees for the Sustainable Lifestyle and Education and SFS programmes; regionally with WWF-South Africa, the City of Cape Town and the Department of the Premier, Western Cape; and ongoing engagement in Worcester and the Raymond Mahlaba municipalities.



Introductory workshops to discuss farmer-buyer challenges and potential functionalities of the Food for Us app: *Sustainability Institute, Stellenbosch (top); and Rhodes University, Grahamstown*

Research focus

Food for Us has a strong research focus based on the recognition that socio-technical transformations in the food system within a framework of just transitions require a significant deepening of understanding to develop new approaches and changed practices. A research method based on **communities of practice** and **value creation** underpinned the research processes within the project. The focus of the research was to track the interactions that were facilitated and enabled by the app and what it offered in a landscape of practice, and to establish what kind of value could be created by such a process.

Research focus:

Track the interactions that were facilitated and enabled by the app and establish what kind of value could be created by this process

Two rounds of surveys were conducted, one at the beginning and one towards the end of the project. This allowed the researchers to track the kinds of produce that farmers have as surplus, their understanding of food waste and surplus, and changes that have been made to their food system practices based on their engagement in the Food for Us project. The research is also tracking the different types of value being created, including potential value, applied value and transformation value.



Can you give us an example of food waste in your community? [BASELINE SURVEY]

Cabbages in field that haven't been harvested due to lack of market. The food is given to animals because the produce wasn't marketed and got spoiled. – SELLER

No, nothing goes to waste. – SELLER

Did you get what you hoped for out of the project? [FINAL SURVEY]

Was hoping to extend the buyer network and sell more produce. But also in slow producing season so not much to put up. It could be a very valuable tool. – SELLER

Did the app affect changes in the local supply chain as hoped? [FINAL SURVEY]

It has created the beginnings of a more effective supply chain! The more it is used the better the supply chain will become and the more people who will become connected and it will be easier. This needs to become the main way that people trade. – BUYER

What value did you receive from buying a part of this project? [FINAL SURVEY]

People know I have honey because of the Food for Us app and the WhatsApp group. This has made people aware and they know what I have – they know I have honey available. – SELLER

What does waste mean to you? [BASELINE SURVEY]

Produce food and then one is not able to sell or consume the food that one has produced and then it goes to waste. – INTERMEDIARY

Don't know what that means – all food is used. – BUYER



Examples of the kinds of value that were created by the project:

- **Applied value** was found when farmers could use the app to advertise their produce.
- **Potential value** was found when the local development agency in Raymond Mhlaba Municipality identified the app as a possible market transformation tool for farmers to find local buyers for their produce, which would otherwise have gone to waste.
- **Transformation value** was found when participants in the project were able to develop new networks and strengthen their farming practices through new connections in the local food system.

Throughout the project the researchers played an important mobilisation and support role spending many hours working in the pilot sites and communicating with stakeholders and local participants. This support and engagement went way beyond what was originally envisaged and enabled significant research insights and learning within the pilot sites and into the food system more broadly. It also illustrated the importance of individuals and intermediaries as change agents to enable and encourage use of technical solutions *in situ*.



Critical relationships:
Intermediary interacting with researchers in Worcester



Mobile phone app and case management system development

A key component of Food for Us is the adaptation, development and refinement of the mobile phone app. The app is supported by a 'backend' case management system that allows for the gathering and synthesis of data related to use of the app. This backend data collection is important for tracking levels of use, produce being offered and traded on the app and significant variables such as distances between sellers and buyers as well as environmental indicators, like carbon savings. Such data is potentially very useful for informing local economies and managing food surplus, as well as creating sustainability in the food system.

Backend data is potentially very useful for informing local economies and managing food surplus, as well as creating sustainability in the food system.

It was originally intended that the app development would adopt a 'lean start-up' approach (Ries, 2011) that worked through quick cycles of trialling new functionality, responding to user experiences and requests, and updating the app. It quickly became apparent that the constant updates were interfering with the stability of the app, particularly in the pilot areas where users were reluctant to incur data costs associated with regular updates; or users were not updating the app software regularly. Ongoing updating of software appears

to be one of the key features of apps and their use, a factor that proved to be another learning point in the programme. This issue also needs to be considered when using apps in resource-poor environments, and support needs to be provided at a technical level, as well as with data costs and provisioning.

Training and support

The Food for Us pilot sites were chosen to support rural growers and often marginalised communities who needed new, low-cost ways of connecting local growers and consumers. This decision had significant implications for the level of proficiency that the users had in terms of the use of smartphone functionality. This in turn required higher levels of support both through face-to-face training and online access to technical staff.

Limited data access also mitigated against the use of webinars as a training and support mechanism. As such, the researchers, local intermediaries and the team responsible for the app development all spent substantial time setting up email addresses, updating phone operating systems and diagnosing a range of issues not directly linked to the app but that impacted on its usability.

This offers useful insight for app developers, especially into the contexts of use, and also requires careful analysis of assumptions about app use before development and application of socio-technical tools, especially if these are to serve those who could benefit most from them.

Pilot sites were chosen to support rural communities who needed new, low-cost ways of connecting local growers and consumers.



Face-to-face training:
Raymond Mhlaba field visit

Matchmaking

Food for Us seeks to support local food economies by connecting local food producers and consumers in ways that reduce transaction costs and that redirect food surplus into higher value use (ideally human consumption). At the core of this process is the disruption of existing value chains and the systemic elements that produce high levels of waste in the context of food insecurity. The practice of centralised buying requiring high volumes, prescriptive aesthetic standards and security of supply marginalises small-scale producers operating at the local level.

The practice of centralised buying requiring high volumes, prescriptive aesthetic standards and security of supply marginalises small-scale producers operating at the local level.

Food for Us has sought to find ways of linking local food producers with local consumers through the app. This has proved challenging. Substantial effort is required to transform existing practices and to find the value proposition that will encourage collaboration between producers and consumers at the local level. Innovative #MatchMaking events in the trial areas were adopted to bring together stakeholders from farms, retailers, feeding schemes and traders with the aim of using these events as a platform for introducing and registering app users.



Linking local food producers with local consumers: A matchmaking event held in Alice, Eastern Cape

Dissemination and mobilisation seminar

Food for Us recognises that systemic transformations within South Africa's food system will require individuals and organisations from government, research institutions, civil society and business to work together to bring about significant change in the current food system. For this reason, Food for Us always seeks to engage with a wide range of role players and to share insights from the project as it develops.

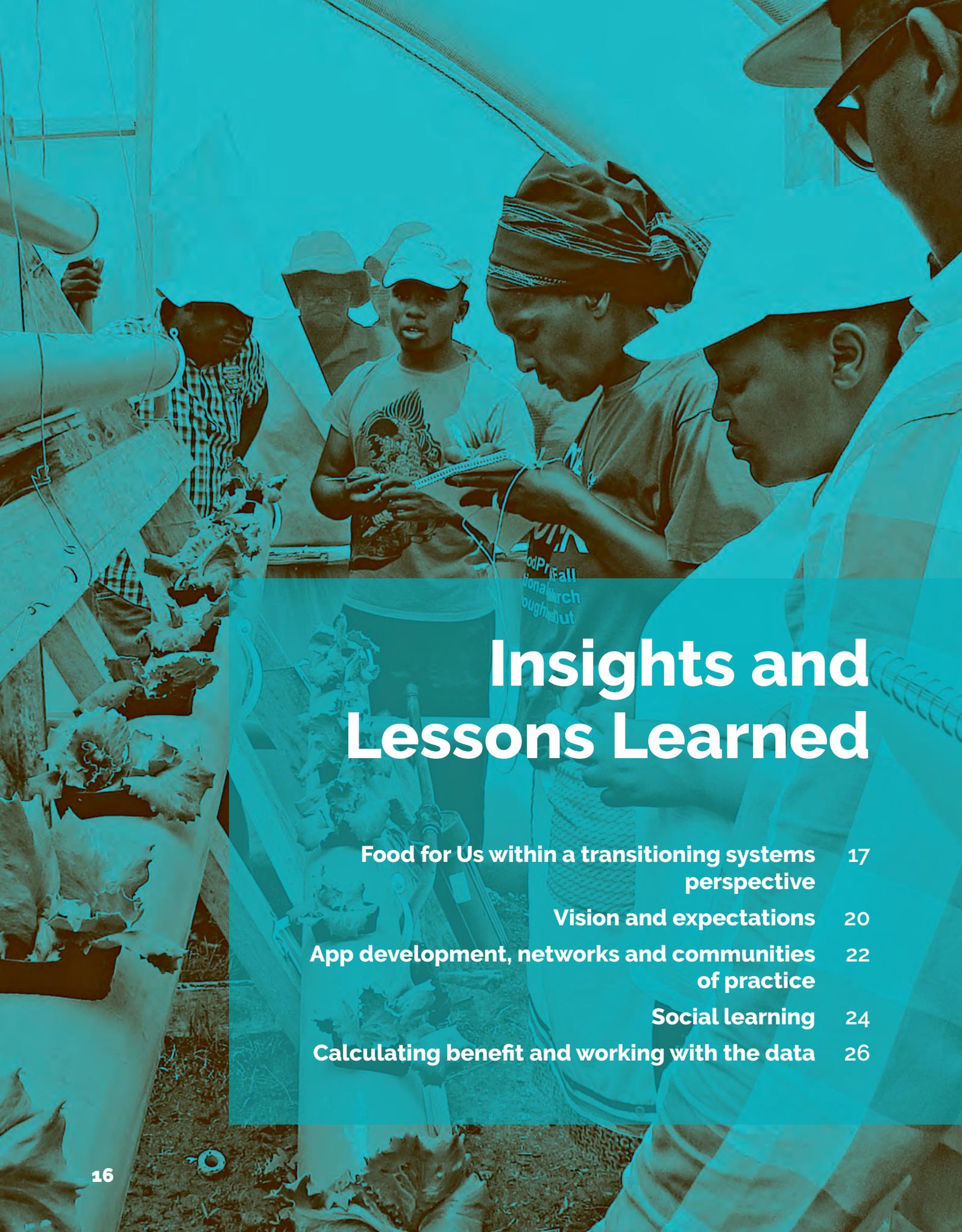
Towards the end of the first phase of the project, the Food for Us project team met with over 50 people representing international food waste organisations, national and provincial government, academics, national and local community-based organisations and non-governmental organisations, municipal economic development professionals. The aim of the event, held in July 2018, was to reflect on our work in enabling a more sustainable food system, and the many challenges that this holds for just transitions to sustainability. This rich sharing of insights and potential ways forward was celebrated with a lunch produced entirely from surplus (or cherished) food, that would otherwise have gone to waste.



Dissemination and mobilisation event:
Distinguished Prof. Heila Lotz-Sisitka, Rhodes University; Solly Molepo, Department of Trade & Industry; Tatjana von Bormann, WWF-South Africa (top); cherished food lunch, Sustainability Institute, Stellenbosch

International collaboration

Food for Us has contributed to a number of international processes focusing on action research, learning and change. These include participation in two Multi-stakeholder Advisory Committees of the UN One Planet Network. These advisory committees shape global agendas through the SFS and Lifestyles and Education programmes of the UN. In addition, the Food for Us project team have supported the development of project monitoring and evaluation frameworks and ideas on how to scale social initiatives and innovations. Through the project a case study has been developed in the T-learning project of the International Social Sciences Council that is seeking to develop understandings of transformative learning in times of climate change.



Insights and Lessons Learned

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Food for Us within a transitioning systems perspective

The location of Food for Us within the Environmental Learning Research Centre at Rhodes University helped to establish the project as a research and learning programme that sought to contribute to just socio-technical transitioning in South Africa's food system. The project team included experts who could calculate carbon, water and nutritional savings from food surplus (Carbon Calculated), inform the project on food surplus concerns (Pinpoint Sustainability), help to create sustainable value (CSV), inform food systems research (Sustainability Institute), design the mobile app (LEAD Associates), and locate the initiative within an international sustainable food system innovation story (Feedback). This multidisciplinary team was essential to enable a contribution to the different dimensions of the project, providing evidence of the need for multi- and interdisciplinary engagement in creating sustainable food systems.

Socio-technical transitions, especially within a just transitions framework, involve complex transformations at different levels that must align for impact to be achieved. Geels (2011) notes that these transitions:

... involve alterations in the overall configuration of ... agri-food systems which entail technological, policy, markets, consumer practices, infrastructure, cultural meaning and scientific knowledge. These elements are reproduced, maintained and transformed by actors such as firms and industries, policy makers and politicians, consumers, civil society, engineers and researchers. Transitions are therefore complex and long-term processes comprising multiple actors.

At another level, socio-technical transitions can be understood as the transitions enabled by the interaction between social actors at local levels, and technological platforms such as mobile phone apps and the case management systems that support them.

The Food for Us project sought to work at both levels of the transitioning system: by actively engaging and researching the interactive (boundary-crossing) learning processes involved in local level socio-technical transitions using apps to enable and support transitions, and by convening and contributing to national and international engagement processes. As such, the project has contributed to food system transitioning processes at multiple levels, with a high level of potential for this to be scaled vertically and horizontally in future.

The Food for Us pilot project provided a focused set of networks and activities for innovation within the food system and the broader context of food waste, food insecurity, marginalisation of local food producers and under-resourced consumers.

Food for Us offered a niche for experimentation, learning and contribution to local and systemic change.

These larger systemic issues are being exacerbated by climate change, extreme rainfall events (both drought and floods), poverty and inequality. As such, Food for Us offered a niche for experimentation, learning and contribution to local and systemic change.

There are a number of theoretical frameworks that provide insights into how **niche innovation can contribute to broader systemic change**. Schot and Geels (in Geels, 2011) distinguish three core processes in niche development:

- The articulation (and adjustment) of *expectations or visions*, which provide guidance to the innovation activities, and aim to attract attention and funding from external actors.
- The building of social *networks* and the enrolment of more actors, which expand the resource base of niche innovations.
- Learning and articulation processes on various dimensions; for example, technical design, market demand and user preferences, infrastructure requirements, organisational issues and business models, policy instruments and symbolic meanings.

As found in the Food for Us project, these processes overlap significantly, and it is their interactions that may generate the movement and, ultimately, potentially the transitions at local, national and international levels. Within these interactions, Food for Us has used the work of Wenger, Trayner and Laet (2011) to develop a conceptual framework for learning and value creation.

More specifically, Wenger et al. (2011) provide a useful framework for linking the vision of reducing food waste, the networks enabled by the Food for Us app and case management system and the learning opportunities afforded by the community of practice within and beyond the Food for Us project activities.

Transitioning took the role of **intergenerational boundary crossing** which was experienced in the Eastern Cape, Raymond Mhlaba case study. The Mxumbu youth co-operative was instrumental in working alongside elder farmers within the community to upload the produce of the farmers who did not have internet-enabled phones, or that did not feel confident using them.

Researcher: "So it would work nicely, If the Mxumbu youth co-op had one or two phones that you could then go to the elder people in the gardens and say, OK Mr Williams, you've got however many spinach and put it on the app."

Xolisa Dwane: "That's what we have been doing. We have spoken to a few of them and they agreed...This is what we planning to do with all the youth we are connecting with. We're connecting. We are Middeldrift Mxumbu, and we are connecting with youth that is in Tslate, there is a location Tslate, and they are supposed to rope in the old people and sell it though their phones."

– VALUE CREATION INTERVIEW

As Geels (2011) noted: "Niches gain momentum if expectations become more precise and more broadly accepted, if the alignment of various learning processes results in a stable configuration ('dominant design'), and if networks become larger..." We would add that these things become possible where communities of practice create "learning partnerships among people who find it useful to learn from and with each other about a particular domain [where] they use each other's experience of practice as a learning resource. And [where] they join forces in making sense of and addressing challenges they face individually or collectively" (Wenger et al., 2011).



What other things have you learned through being part of this project? [FINAL SURVEY]

I have learned that building relationships is very, very important, I have learned that it is incredibly important to ask others for help. I learned at the Matchmaking event through one of our discussions, I found out from one of the other farmers that one cannot plant beans in winter, they will not grow. I did not know this before the Matchmaking event. I realised that I need to talk to other people on what they think and what they know. – SELLER



Using these broad theoretical framings and the experiences during the pilot phase of Food for Us we have developed the following insights.



Vision and expectations

Food for Us initially had a strong focus on reducing on-farm food waste by channelling surplus food from via the app; as such, there was (and still is) a strong commitment to creating social and environmental value using mobile phone technology to connect food producers and food consumers to reduce this food waste burden. There was also the recognition that economic benefit would need to be created in order to sustain Food for Us (or at least the benefits that it creates) over the longer term. The vision was to lower the transaction costs between food producers with surplus food and food users with a need to access affordable, nutritious food.

There was (and still is) a strong commitment to creating social and environmental value using mobile phone technology to connect food producers and food consumers to reduce this food waste burden.

Given the South African context with an explicit need for redress in the agriculture sector and support for smallholder farmers, the Food for Us project team decided to trial the project with marginalised communities to test its capability to achieve not only environmental outcomes (i.e. reduced food waste and carbon emissions) but also socioeconomic outcomes that could benefit small-scale farmers. This informed the selection of two pilot sites that contained mainly small-scale growers. In addition, the focus shifted from commercial

buyers to smaller scale markets, local shops and feeding schemes, as this was also identified as a space where both environmental and socioeconomic benefits could be identified.

These shifts had a number of implications for the pilot project, including a shift from high volumes of food surplus that are produced on large-scale commercial farms to a greater focus on market transitions at a local level, where food surplus is less likely or is generated in small volumes. This resulted in higher levels of support being needed relative to the amount of food surplus being traded.

Learning the importance of the local focus and work with small-scale farmers in the pilot (who are often neglected in food system research) suggests a number of **possible scaling pathways**, especially if the pilot project is to expand to include larger numbers of small-scale farmers. It should be noted that around 1.3 million households in South Africa are engaged in small-scale farming (Fig, 2018). One such scaling pathway would be to expand the support to those communities of practice with a shared interest in learning and change among small-scale farmers. In addition, as an estimated 90 percent of food produced in South Africa is grown by larger-scale commercial farmers (Janse van Rensburg, 2018), a second scaling pathway and trial could be with a more commercially orientated community of practice.

It would also be possible to take the insights developed in the pilot project to scale numerically, geographically and into new sectors, such as industrial by-products, by offering the app to more independent users, which has the potential to achieve greater environmental and economic benefits but risks the creation of social value. A third option in terms of vision and expectations would be to combine the potential of a community of practice with a broader network of app users in a way that seeks to support both the scaling of social learning and the social, environmental and economic impact of a more distributed network of app users. These options are outlined further in the *Way Forward* section.



App development, networks and communities of practice

By supporting the app, networks and communities of practice, Food for Us worked across three interrelated levels of connectivity.

The app was the interface that worked through mobile phones to connect food buyers and consumers with farmers producing food surplus. Significant challenges were encountered with the development, use and updating of the app. One of the overarching challenges was communicating the relationship between the app and a case management system that stores information for use by the researchers and the app developers to track app usage, what was being traded, and where the trades were taking place, etc. While this data is potentially extremely useful for understanding food systems, this functionality introduced significant complexity into the development process and was one feature that affected the stability of the app during the pilot project.

This complexity was exacerbated by functionality requests throughout the pilot, which had implications for the app's stability and cost for users when updates were required. Although this kind of ongoing updating is fairly common in the industry, it was not appropriate in the resource poor, low technological literacy, expensive data and poor connectivity context of the pilot project.

After a year of learning and testing there is a far better understanding of how the app needs to be structured, developed and rolled out to support interaction between growers and buyers, while also gathering data that can be used for research, learning and food system transitions.

After a year of learning and testing there is a far better understanding of how the app needs to be structured, developed and rolled out to support interaction between growers and buyers, while also gathering data that can be used for research, learning and food system transitions.

Providing the tool (the app) for connecting people in the food system is not the same as creating a network of users. Wenger et al. (2011) describe a network as a set of connections among people that participants use as a resource to solve problems, share knowledge and make further connections. These networks may or may not be supported by technological networks such as the Food for Us app. In Food for Us, both the app and WhatsApp groups set up for users were very effective in making growers and buyers

aware of the produce grown locally. One of the buyers noted she had been unaware that there were so many farmers selling such good food within the pilot area.

“

It served the purpose ... There were more farmers than I expected which was good to see. I was also not aware that there were so many co-operatives around Raymond Mhlaba and therefore this was good to see. – BUYER

”

The benefits of this kind of networking were captured in user surveys, interviews and interactions between participants. The challenge has been expanding the network in ways that are beneficial to both buyers and growers. This has resulted in expanding the involvement of intermediary organisations or individuals such as local municipality economic development officers or large-scale feeding schemes to more quickly and efficiently build the networks of participants.

Within the expanding networks are more formal learning partnerships among participants who find it useful to learn from and with each other about food surplus, access to market and systems. These communities of practice “use each other’s experiences as a learning resource” and in so doing “join forces in making sense of and addressing challenges they face individually and collectively” (Wenger et al., 2011).

It was this level of more formalised learning for change that Food for Us was designed to achieve. By embedding two researchers into developing the networks and by linking with existing communities of practice including Amanzi for Food and Imvotho Bubomi in the Raymond Mhlaba pilot area and the Worcester Avian Park Gardening Club, Food for Us expanded the learning and change processes at the local level and at the national and international level. These insights are extremely important for understanding and enhancing local level socio-technical transitions within the South African food system.



Linking with communities of practice: An Amanzi for Food discussion on Food for Us

Social learning

One of the main contributions of the Food for Us project was a deepening of understanding of the social learning processes that emerge around a mediating tool such as a mobile app in a wider transitioning system. Here valuable lessons have been learned about the scope, depth and 'chains of learning' that emerged around the development and use of the app.

1. Firstly, there have been significant learnings among those who developed the mobile phone app. A team of young mobile app technicians were able to learn not only more about how to develop responsive technology but also about food surplus and the importance of thinking about the user in the design of their technologies. They also learned how to manage the complexities created by rapid technological changes in the design stage, and how this affects both the designers, tech developers and the users.
2. Secondly, there have been significant learnings among the researchers and users of the app. Important insights were gained around learning in social networks, and the processes involved in learning a new technology, and how to best support this in-field via a learning-by-doing approach. This was particularly the case in low literacy and marginalised community contexts. Important lessons were also learned about intergenerational support for learning to use mobile apps and their technological affordances.
3. Thirdly, there have been significant learnings among those concerned with surplus in the food system. Broad-based figures indicate that a large percentage of food is 'wasted' on farm in South Africa. Closer engagement with the food system at different levels, however, shows that this may well be confined to larger-scale farms. This supports research by Feedback (Colbert, 2017) that South Africa has a sophisticated secondary and tertiary market for surplus food (notably in peri-urban areas), such as use of the 'bakkie trade' and more recently via collection by Food Forward for donations to groups in need. At the small-scale farmer level, the Food for Us research suggests very little food is wasted, and here surplus means a loss of valuable income, with implications for how the concept of sustainable development is interpreted in the context of sustainable food systems (i.e. it needs to, at the same time, include environmental and socioeconomic factors). At the small-scale farmer level, the recommended focus based on Food for Us learnings is the need to give more attention to support functions such as improved communication and linking between buyers and growers, access to market, and infrastructure support such as transport.



Major beneficiary:
Children at an ECD centre in Worcester

The issue of who benefits from food surplus and how is also an area that offers new opportunities for social learning and sustainable development.

As shown in the Worcester Food for Us pilot, early childhood development (ECD) centres are a major beneficiary of food surplus with important gains for children's nutrition and well-being, and ultimately also their learning potential. In the Eastern Cape pilot, newly established youth co-operatives were finding great benefit from the project, as it expanded their learning, capability and social networks, and positioned them as having a contribution to make in an intergenerational learning context.

As noted above, social learning within transformation of the South African food system is required at all levels. It is evident from the Food for Us pilot project that significant support is needed to develop and update the technological tools (both the app and the case management system), the networks between participants and users, and the communities of practice that enhance and deepen social learning and change. Food for Us has worked across these interrelated layers and has in the process developed insights and practices that have the potential to support diverse individuals and organisations to benefit from and contribute to change in South Africa's food system, with its main contribution being to offer insights into this food system at the small-scale farmer level in South Africa.

Significant support is needed to develop and update the technological tools, the networks between participants and users, and the communities of practice that enhance and deepen social learning and change.

Calculating benefit and working with the data

Robust, granular data on the food waste challenge in South Africa is currently inadequate, with data obtained from ad hoc specific studies (which cannot be used for extrapolation), or, while seminal, Oelofse's (2014) work on the magnitude of food

waste in South Africa, which is based on high-level data for sub-Saharan data. As such, a component of this project was to illustrate and, where feasible, capture food loss and waste on-farm (through surveys) and calculate the potential environmental and social savings that could be realised by using the app to trade and divert on-farm surplus food for human consumption. This was undertaken by our project partner Carbon Calculated.



Due to the small number of transactions realised through the app during the trial, it was not possible to derive adequate data and therefore useful actual savings. This was because the focus of the first phase of app use was development and maintaining stability. However, once stability was

realised in the last two months of the trial, transactions increased substantially, which indicated the significant potential for savings if the app is fully realised. As such, potential environmental and nutritional savings scenarios have been derived for exponential increases in transactions for main food types traded. Four scenarios were calculated, based on the initial purchases of potatoes, onions and lettuce – see Table 1.

Table 1: Scenario-based estimated environmental savings (weighted averages)

Description	Units	Average savings			
		100 kg	500 kg	1 000 kg (1 ton)	10 000 kg (10 ton)
Total carbon savings	kgCO ₂ e	154.80	774.00	1,548	15,480
Total water use savings	m ³	22.79	113.96	227.92	2,279.20
Total energy savings	kcal	63,600.00	318,000	636,000	6,360,000
Total macronutrient savings	g	16 328.00	81,640	163,280	1,632 800.00

CO₂e = Carbon dioxide equivalent g = gram kcal = kilocalorie kg = kilogram m³ = cubic metre

In addition to calculating the potential environmental and nutritional savings, a core feature of this research was to derive South African-specific conversion factors to determine potential food waste savings. This exercise revealed that relevant emission factors for on-farm produce in South Africa were difficult to source, indicating an opportunity for further research. While access to data was a challenge, we were able to access international data from studies in countries with similar climatic and contextual conditions to South Africa (where feasible). To this end, conversion factors were developed for (1) emissions saved from producing food that would have been sourced elsewhere and food that would have gone to landfill, (2) water savings (blue and green*), and (3) nutrition savings (energy (kcal) and macronutrients – see Table 2.

Of notable interest are the nutrition conversion factors, which to our team's knowledge is a first for South Africa and therefore a groundbreaking outcome for this project. This allows for the deepening of the social-economic-environment interrelationships in sustainable food systems discourse and practice and helps to show diverse forms of sustainable value that can be created. It also offers a stronger case for dealing with food surplus not only as an environmental issue, but also as a social, economic and educational issue (i.e. strengthening the case for integrated sustainable development outcomes and sustainable value creation in sustainable food system work).

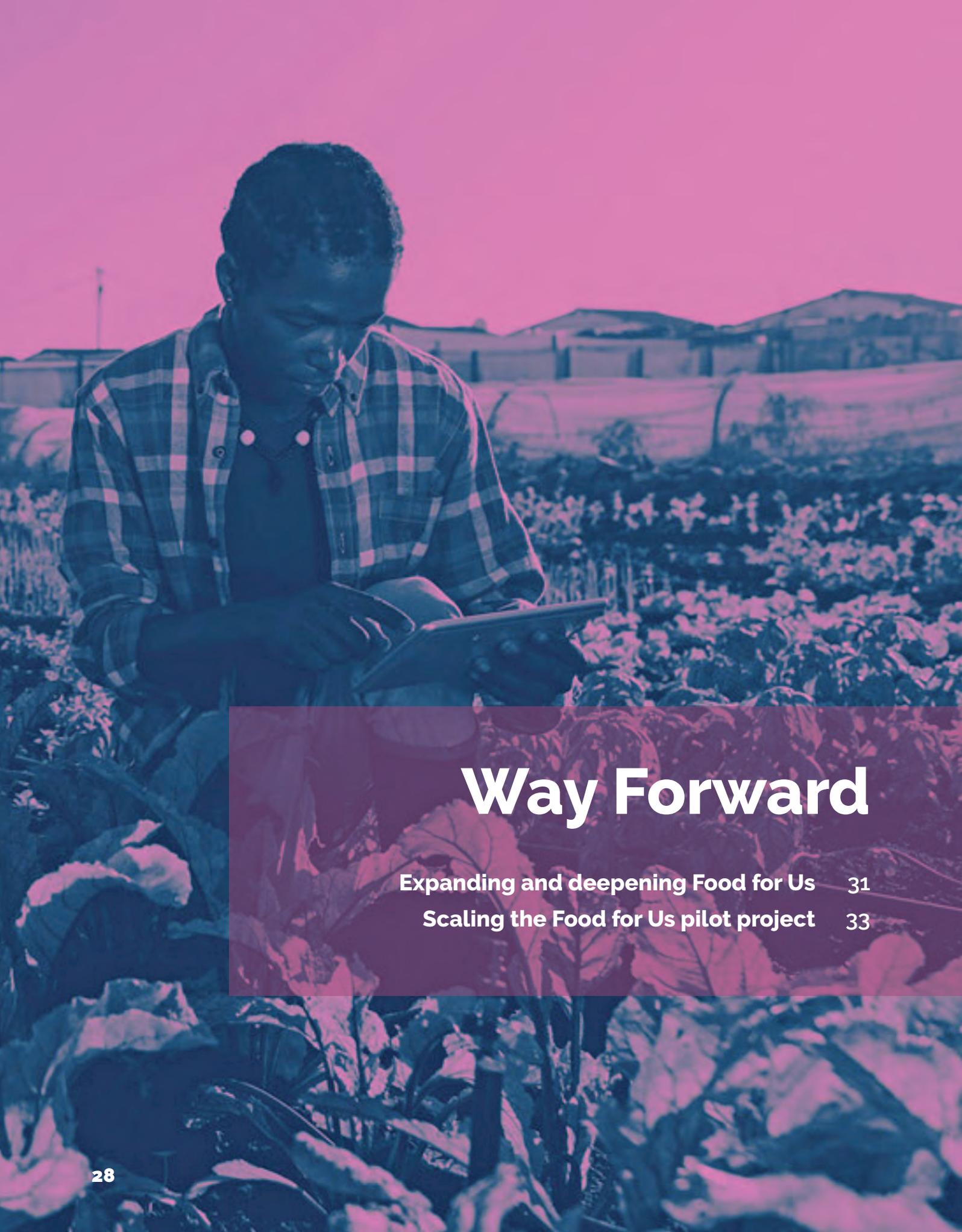
*** Blue water footprint** is water that has been sourced from surface or groundwater resources and either evaporates, is incorporated into a product or taken from one body of water and returned to another or is returned at a different time. Irrigated agriculture, industry and domestic water use can each have a blue water footprint.

Green water footprint is water from precipitation that is stored in the root zone of the soil and evaporated, transpired or incorporated by plants. It is particularly relevant for agricultural, horticultural and forestry products (Water Footprint Network, 2018).

Table 2: Conversion factors per produce type

Description	Units	Potatoes	Onions	Lettuce
Average carbon per kg of food	kgCO ₂ e/kg	0.21	0.45	2.15
Landfill emissions saved	kgCO ₂ e/kg	1.29	1.29	1.29
Water – blue	m ³ /t	77.7	44	57.75
Water – green	m ³ /t	152.2	176	12.75
Nutrition – energy	kcal/kg	870	400	170
Nutrition – carbohydrates	g/kg	201.3	93.4	32.9
Nutrition – protein	g/kg	18.7	11	12.3
Nutrition – fats	g/kg	1	1	3

CO₂e = Carbon dioxide equivalent g = gram kcal = kilocalorie kg = kilogram m³ = cubic metre t = ton



Way Forward

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Studies on food surplus and food waste in South Africa (such as Oelofse, 2014; von Bormann et al., 2017) highlight the complex problem of over 9 million tons of food going to waste in a country where 13 million people routinely experience hunger. A number of global studies have also made the point that one third of global food production is wasted (see WRAP, 2007; WRI, 2016).

This is more than four times the amount that is needed to feed all of the malnourished people in the world (Rivett-Carnac & von Bormann, 2018). What many of these figures and studies fail to do is to disaggregate the data down to local contexts with the level of detail needed to inform local action and transitions.

Food for Us very quickly realised that although local farmers were losing value as a result of surplus food, this was related to the need for better access to higher value markets. At the small-scale level, much of the surplus food was being passed on to people in the community or fed to livestock thus threatening the viability of farmers. Food for Us has the potential to increase productivity and sustainability at the local level, to build viable markets and to support access to food at the local level through communities of practice and networks of food producers and consumers. There is also the potential for local traders and even retailers with a commitment to supporting local farmers to use the app to access local produce, thus increasing the value for farmers within the food value chain.

Based on all the above, Food for Us has developed the following broad value propositions to guide the ongoing development of the initiative. Food for Us is committed to "growing a locally connected, caring and 'green' economy" and more specifically to "enhancing social and environmental value using the Food for Us digital platform to support sustainable local food economies."



During the pilot phase, it became increasingly apparent that a socio-technical transition within a social justice framework such as the one envisaged in the value proposition above will require more than the development and scaling of the app; i.e. technical tools are not all that is needed. The level of commitment required to build networks and, beyond that, support social learning and change through communities of practice was significantly beyond original expectations.

Food for Us is committed to “growing a locally connected, caring and ‘green’ economy” and more specifically to “enhancing social and environmental value using the Food for Us digital platform to support sustainable local food economies.”

By linking with a number of existing transition movements such as Amanzi for Food, Avian Park Garden Club, Imvotho Bubomi and the community members, government departments and researchers working in these processes, Food for Us has developed important insights into how better to support such socio-technical transitions from a learning and change point of view.

These insights have informed the development of a more detailed ‘business canvas’ detailing how various business models could support the creation of sustainable (social, environmental and economic) value at the interface between potential food surplus and market access at the local level. More broadly, the pilot of

Food for Us has stimulated interest from other communities and sectors to explore the potential of a social learning-supported mobile app and case management system to enable sustainability transitions in diverse contexts. Suggested models for Food for Us and a broader ‘franchised model’ that could be scaled across sectors are outlined as envisaged ways forward from the pilot project.

Expanding and deepening Food for Us

Food for Us is driven by an underlying motivation to create social and environmental value while simultaneously exploring the economic sustainability of an app that reduces food waste by creating viable markets for local food produce through the distribution of surplus.

It is an innovative example of creating shared value* within and through networks and communities of practice that include a broad range of stakeholders in the food system. The figure summarises the key dimensions of building such a shared value initiative.

A proposed business model for Food for Us



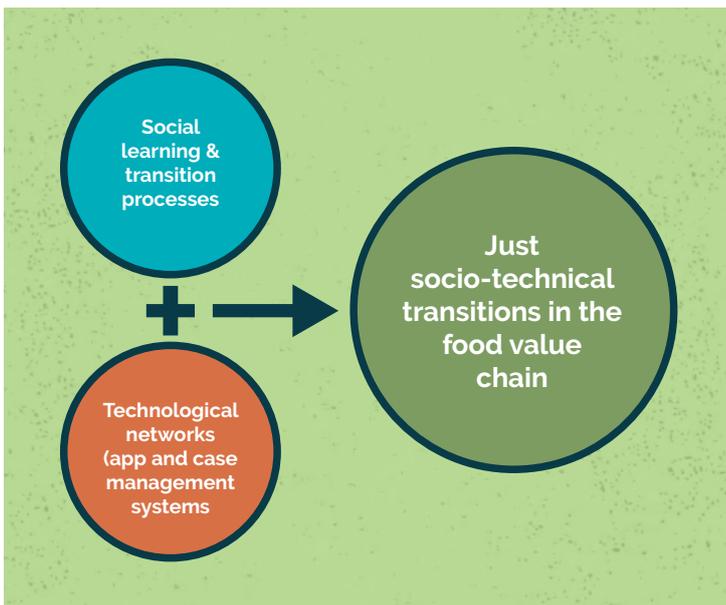
* Although Porter and Kramer (2011) have used the term 'Shared Value' we believe that the way in which they have developed the idea is largely instrumentalist and still focused on shareholder profit. We are proposing a more transformative notion of shared value that emphasises social and environmental value and more meaningful stakeholder learning and change within socio-technical transitions.



Food for Us' contribution towards a just and sustainable South African food system

The value proposition includes inclusive and diverse stakeholder involvement across government, business, research institutions and local communities. Key to the success of these partnerships is the involvement of intermediaries who have existing relationships and mandates to work with important stakeholder groupings in the food system. The above is made possible and powerful through the social learning and transition

processes supported through engaged communities of practice and the networks enabled by the app and the related case management system for collecting and synthesising information. Together these two components have the potential to support significant transitions in South Africa's food system at the local, national and international level.



To develop the social learning and technological components of Food for Us, it will be necessary initially to cross-subsidise the project activities and the kinds of innovation and transformation that it seeks to bring about. This will include engaging with large retailers,

government departments and programmes and international and local donors. Over the longer term, internal funding mechanisms such as subscriptions, advertising, data sales and potentially a percentage of sales could be considered and developed to support the ongoing sustainability of the app.

Scaling the Food for Us pilot project

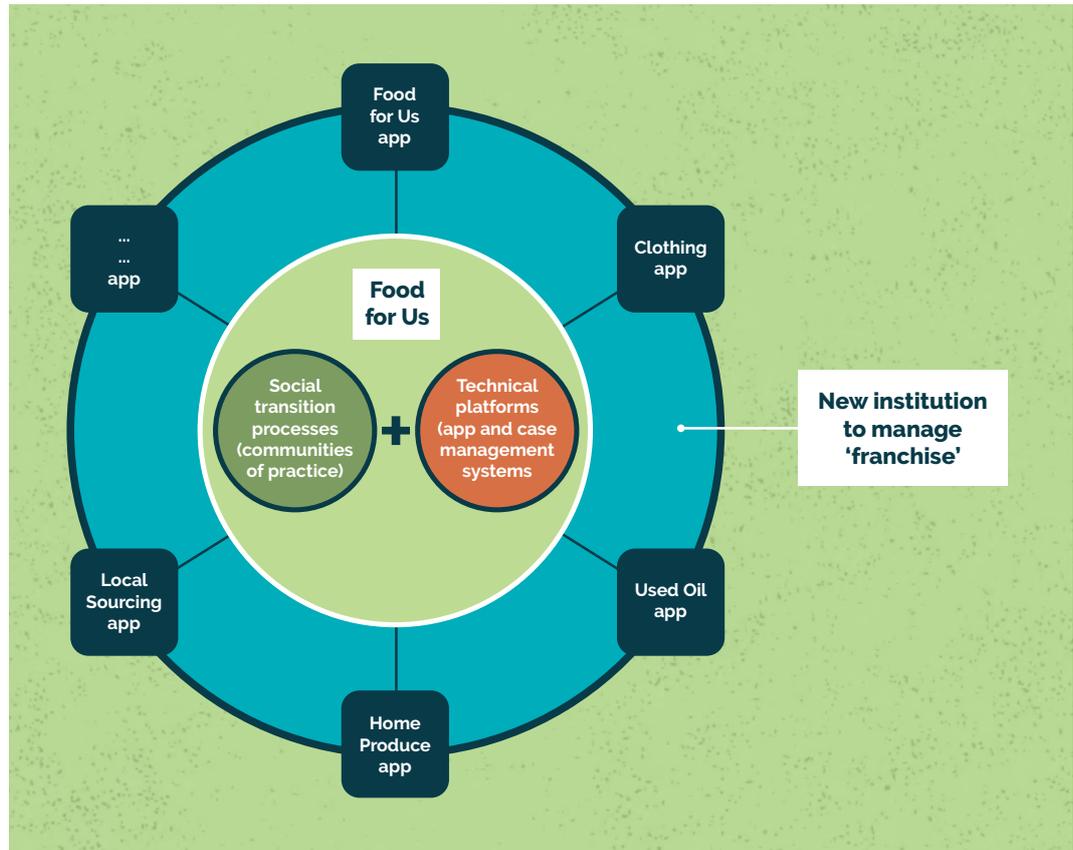
Scaling can be defined as the “deepening, adapting, sustaining and expanding programmes and projects in different places, policy levels and over time in ways that enhance desired outcomes” (SLE, 2018). The interactions and learning within and linked to Food for Us have highlighted the need to scale a number of different dimensions of the initial pilot project.

1. One scaling pathway is to deepen and strengthen the social learning processes supported by the focus on building networks and communities of practice within a just socio-technical transitions framework. This work can be enhanced by linking it to further refinements and usability of the app and case management system that have now been developed through the pilot project.
2. A second scaling pathway is a growing demand from potential partners and users to scale Food for Us geographically beyond the existing pilot sites. This will require both working with intermediaries in multiple and distributed sites and creating accessible interaction and learning platforms for networking and the nurturing of communities of practice.
3. A third scaling pathway exists in the strong demand to scale the pilot project into new sectors including creating local markets for livestock, home produce and surplus, for other ‘waste streams’ and by-products that can support industrial symbiosis between companies and a range of other opportunities, including the development of small and medium enterprises. This will require the development of new institutional forms to manage the financial, legal and governance issues associated with such expansion. Given the insights from the Food for Us pilot, the relationship between social learning and technological development will remain the heart and engine of the just socio-technical transitioning processes across the different sectors. The figure below illustrates how we currently envisage this scaling.

The relationship between social learning and technological development will remain the heart and engine of the just socio-technical transitioning processes across the different sectors.

The three scaling pathways outlined above, are not mutually exclusive. Within all three, Food for Us, as a collaborative initiative involving existing partners, would continue to develop the Food for Us app and the associated social learning, research and technical platforms.

Potential
scaling
opportunities
for Food for Us



Within this expanded scaling frame, the app itself would be made available and accessible to any initiative that is willing to contribute to and benefit from the social learning and technological processes at the core of this framework. The app would be available in one format only with limited options for customisation (e.g. insertion of individual branding within the existing look and feel). This will enhance the economies of scale for the app developers, which will support both stability and ongoing hosting and development. Each initiative would be encouraged to become part of the broader Food for Us network and community of practice that would be supported with learning programmes and sharing possibilities (through access to research reports and webinars) and through technical support that will be available across all of the sector apps. As the various sectors come on board, data would be collated and synthesised in a central management system and made available to inform decision-making.

The purpose would be to continue the social learning and innovation for sustainable development which allows for simultaneous value creation around environmental, social and economic value.



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