



Waste Not, Want Not

The logistics of feeding those in need

Ten years ago Ronni Kahn, the founder of OzHarvest had an elegant idea: Why don't we pick up unwanted food from restaurants and grocery stores, and transport it to homeless shelters and people in need? Not only would this reduce food wastage but would provide much needed sustenance for the poor!

Despite the simplicity of the brainwave, and the concept soon capturing the imagination of restaurants, supermarkets and shops across the nation, actually figuring out the most efficient routes to pick up and distribute the donated items has always been a logistical challenge.

With operational constraints including multiple pick-ups and drop-offs; speedy timeframes for the delivery of perishable goods (such as cakes and frozen food); working around the catering schedules of homeless shelters; needing to distribute food equitably; and having limited resources and funds; OzHarvest has long recognised this as a fundamental challenge, but has never before had the resources to solve it.

Enter the team from UNSW's Research Centre for Integrated Transport Innovation (rCITI).

Dr Vinayak Dixit, from rCITI, has always been interested in operational logistics and a couple of years ago was looking around for an interesting, real-world problem to solve when he started thinking about the operations at OzHarvest. It wasn't long before he had contacted the non-profit and started gathering data.

"Immediately it was a fascinating engineering research challenge. The drivers do a fantastic job, but everything was being done manually," explains Dr Dixit, who accompanied a driver on his route one day to get a deeper understanding of the problem.

"Using statistical analysis, we wanted to know if we could predict and understand how much food will be donated, where it will be coming from and when. Then we could try to find the most efficient way to route that food through."

Having already spent the last two years working on the project, Dr Dixit and his team have made some advances in their research. Algorithms have been written and testing is underway, but the recent award of a Linkage grant from the Australian Research Council will help propel the project onto the next stage: to develop a holistic innovative mathematical model to solve these routing problems.

“We hope our research will inform multiple facets of their work,” says Dr Dixit. From a planning perspective he wants to develop algorithms for when a new supplier comes on board that will determine how much food will be donated and how the routes should change to accommodate that. He also plans to develop an impact assessment for when they start a new operation, so they can come up with an accurate cost-benefit analysis. From an operational standpoint he wants to develop an algorithm that they can run the night before to determine the route for the next day.

*The Linkage Scheme is amazing. Especially in the case of OzHarvest where **they recognise the problem as being fundamental**, but as a not-for-profit organisation, don't have any funds to invest in research*

OzHarvest is equally excited about the research project which could save the charity thousands of dollars as Louise Tran, National Communications and Marketing Manager, explains. “We are continually looking for ways to improve and excel at what we do and hope that the team at UNSW are able to contribute innovative ideas and new ways of thinking into how we can improve our services.”

At a glance:

Project partners: Research Centre for Integrated Transport Innovation, OzHarvest

ARC grant: \$150,000

Aim: Develop an innovative holistic mathematical model of the vehicle routing problem for a charity-based food rescue and distribution system

Timeframe: 3 years

Did you know?

OzHarvest has delivered over 30 million meals to many of the 2.5 million Australians who don't have access to quality nutritious food. The not-for-profit organisation saves \$8 billion of food waste in Australia each year and has diverted a total of 10,000 tonnes of surplus food from landfill.