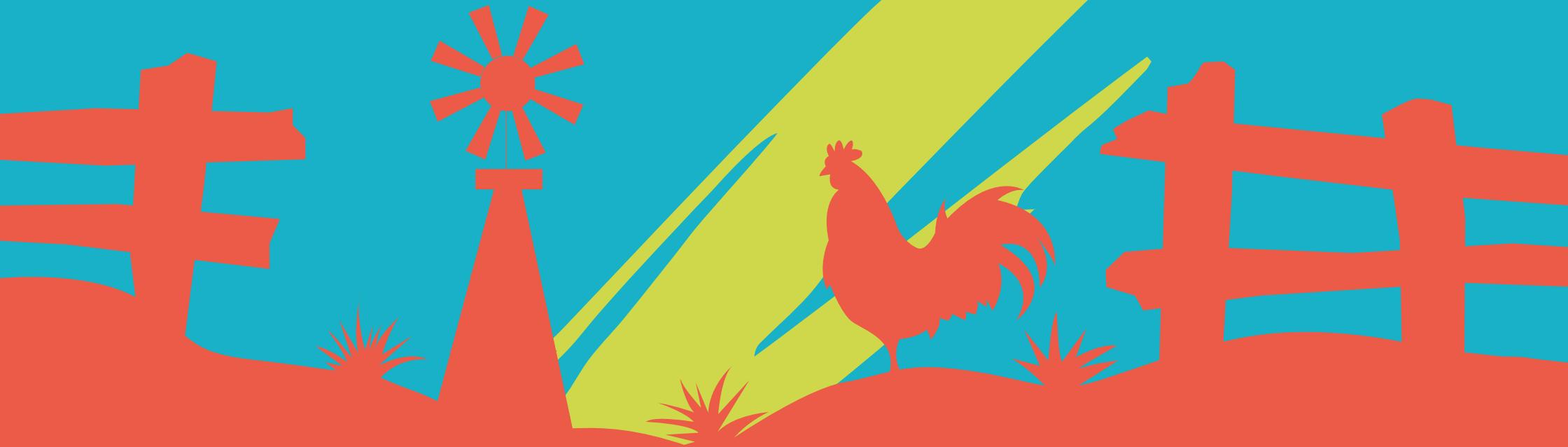


*Case Study*

# FARMING AND VENDING

Bringing *life* to technology.



Automatic vending machines are a welcome trend in farming. They provide an extra source of income for a farmer, with few overheads. The vending machine is cheap to run, can be installed on the farm, so no rent is paid. The only costs are the machine itself and running costs such as electricity and SIM card costs. We got involved recently with two machines, one dispensing milk and the other dispensing vegetables.

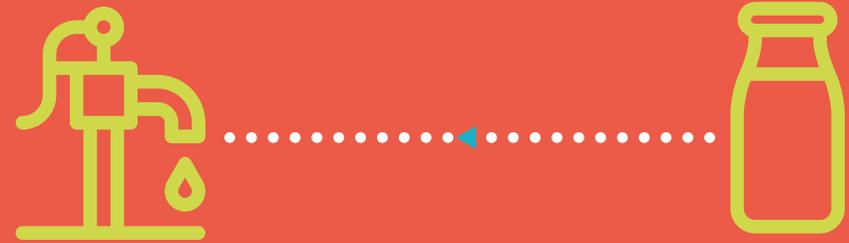


# MILK DISPENSING MACHINE

## The *Brief*

The idea of the milk dispensing machine is to be accessible to the public. The farmer can position the machine on the farm so that everyone with a jug or a bottle can visit and fill up with fresh milk, directly from the farm. The machine is easily accessible and it is easy to maintain and clean.

This is attractive to the farmer. There is no middle man. As the machine is running on their land, there are no expenses other than the cost of the machine and minor running costs. The machine is easy to use and is topped up by the farmer. We got involved because the farmer wanted to add a card payment to the machine.



## Our *Technology*

The customers pay for the amount they need and bring their own container, which helps reduce waste. The machine pumps a precise measure of milk from a chilled storage vessel. The pump might be a syringe pump, or it can contain a flowmeter to measure the amount dispensed.

The customer can pay by cash or card. The card transactions are completed over 4G. We created the computer system responsible for the card payments and added a 4G router for connections to the service provider.



## The Result

The machine is a link to the community, aimed at creating local customers. It is easy to access fresh milk, especially for those who care about food miles. The machine is available 24 hours a day and works with card payments, which makes it convenient for the customers.



# VEGETABLE VENDING MACHINE

## The *Brief*

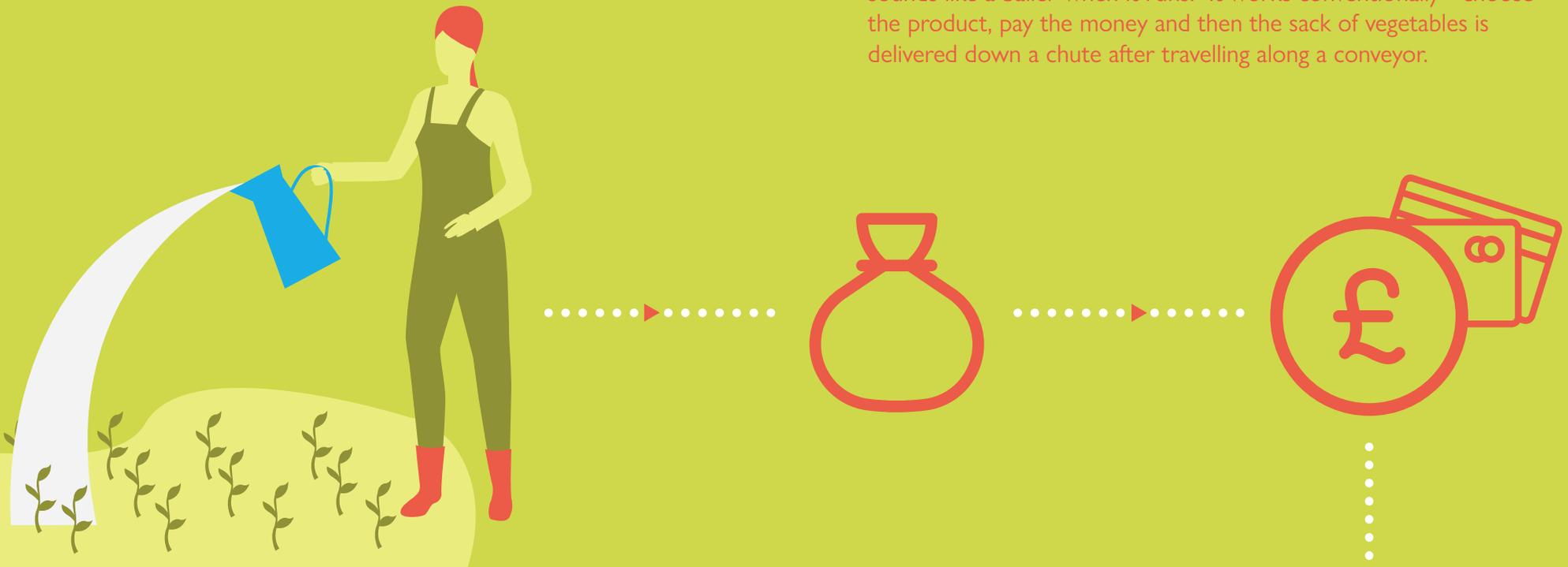
The vegetable vending machine dispenses large sacks of vegetables, mostly potatoes, with the option to provide smaller sacks of other vegetables, such as greens. The same philosophy applies as the milk machine. It is an extra outlet for the farm's produce, removes the middle man, and engages with the local community.

This machine, however, provided a valuable lesson in terms of design philosophy. As a designer, you tend to go with what you are comfortable with, knowing what works, from experience. The designer of this machine was a farm engineer, his experience was working on and repairing farm machinery.

His vending machine used what he was familiar with. He used actuators, motors, switches and conveyors from bailing machines, combined harvesters or from tractors - whatever was useful.

The advantage of this approach is that the owner can find spares easily, from the same source as spares for the farm's machinery. The machine is robust, the components are designed to be used on a farm and they are familiar.

The result is strangely satisfying. It isn't elegant or even pretty. It is a functional machine and it fits naturally in its environment. It even sounds like a bailer when it runs. It works conventionally - choose the product, pay the money and then the sack of vegetables is delivered down a chute after travelling along a conveyor.



## Our Technology

We got involved because the designer used PLCs to control the machine. A PLC is not an embedded computer and there are difficulties when it comes to interfacing to card readers. We helped him out with a solution. We added a separate embedded computer with a card reader and payment system. We also provided a means to alert the owner of the machine when the stock runs low.

Our system allowed the farmer to implement 3 different prices. We used 2 binary inputs, where 00 is £0 and the other 3 combinations can be set for 3 different prices. In some cases, the machines are installed in the nearby town, in a location where drivers can safely stop their car, so stock levels are important.

## The Result

It is fascinating to see how automation helps the farmers make more profit. A farm vending machine is a simple and low-cost solution to increase the profits of the farm. The farmer has more time to focus on the production of his product while making a passive income 24 hours a day. The machine is now capable of taking card payments and alerts the owner when the stock is running low.

It was a valuable lesson that even the simplest design does the job as good as the complicated vending machines today. He managed to create a robust machine with technologies and parts he knew how to use already. That was the goal of the farmer, to make it as simple as possible, so he can maintain it and fix it without extra help.





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