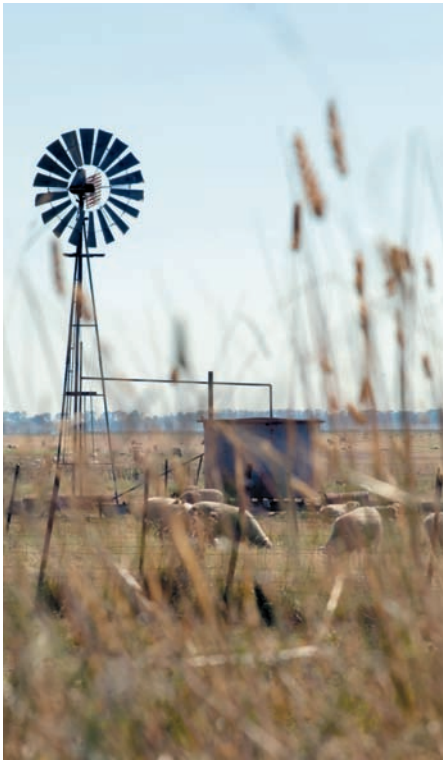
Running a smart farm

A partnership involving CSIRO's ICT Centre and CSIRO Livestock Industries based at the JM Rendel Research Laboratory near Rockhampton is working towards the 'Smart Farm' of the future, with research focusing on Wireless Sensor Networks (WSNs) and their potential to transform the Australian agricultural industry.

'As water and labour resources become more scarce and costly, the viability and sustainability of our agricultural industry hinges on the ability to effectively utilise and manage these resources,' says Project Leader Dr Tim Wark of the CSIRO ICT Centre.

'A key factor in this process is the availability of timely, accurate information and know-how that can revolutionise how daily management decisions are made.'

WSNs are a rapidly growing area of research and provide access to environmental information in greater detail than ever before possible. They are comprised of a group of 'nodes' each measuring a variable, for example soil moisture, which wirelessly interacts with their neighbouring nodes creating an ad-hoc network that passes information to a central database.



Water and stock management could be informed on a paddock-by-paddock basis with Wireless Sensor Networks.
Carl Davies/CSIRO Plant Industry

'By covering a farm with these nodes the farmer can always have an accurate picture of soil moisture levels to determine the most effective irrigation needs for a field,' says Dr Wark.

'We are also investigating the potential of WSNs for monitoring and understanding cattle behaviour. The nodes are worn by cattle with the information retrieved being used to help develop methods for classifying and modelling herd behaviour under different environmental conditions.

'By combining this important information with additional information gained from other sensor networks, a wealth of knowledge can be gained as to the effect of environmental and herd factors on animals' development over their lifetime.'

Dave Swain, Group Leader, Autonomous Livestock Systems at CSIRO Livestock Industries, says, 'Wireless Sensor Networks provide the opportunity to autonomously monitor and manage livestock production systems in real time. For the first time we will be able to simultaneously deliver triple bottom line (environmental, economic and social) benefits by allowing land managers to develop and deliver precision management options in a more labour-efficient way.'

Researchers are also investigating ways of combining information from WSNs with the National Livestock Identification System (NLIS). As part of the NLIS, all cattle are required to wear electronic tags, which enable tracing of their locations and interactions throughout their lifetime.

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Switched on to green power

Fuji Xerox Australia recently announced that it will soon run its company sites on 100 per cent green power from renewable energy sources. Over the next four years the company will be increasing its use of renewable energy–based power by 25 per cent annually, aiming to purchase 100 per cent green electricity by the year 2010.

'Every year Fuji Xerox Australia is accountable for the release of some 9000 tonnes of carbon dioxide (CO_2) emissions responsible for global warming, the majority of which relates directly to the generation of electricity consumed at our sites,' says Ramsay Moodie, the company's Corporate Affairs Director.

'Our commitment to introduce 100 per cent green power is a significant step forward in lowering the CO_2 emissions generated by our activities. While this is an expensive move, we think it's important to drive the development of the green power industry, and to encourage other users to do likewise.'

The company has implemented various other environmental improvement programs, including the conversion of its fleet of service cars to LPG, which reduces CO_2 emissions by 500 tonnes each year.

'Fuji Xerox Australia has been introducing environmentally friendly processes to its operations since the late 1980s, when we began producing products using re-manufactured parts. Today all our new products contain up to 100 per cent recyclable or reusable parts,' explains Moodie.

'Our greatest achievement has been our equipment end of life recycling initiative

Fuji Xerox, a leader in industrial recycling and sustainability initiatives, is finding its commitments paying off on a new, greener bottom line.

where at end of life we take equipment back and recycle it for a close to 100 per cent resource recovery. This really does set us apart in an industry that is still only just coming to grips with the concept of extended producer responsibility.'