

Do you have the facts to make sustainability a reality?



If you want to understand how systems and technologies can help balance environmental and economic demands, consider talking to the Institute for Sustainable Systems and Technologies (ISST).

Sustainability is both a national research priority and a "hot topic". It's an emotive issue, but at its heart is scientific knowledge.

For more than a decade, the University of South Australia (UniSA) has been providing hard facts on environmental issues and options to governments, industry and community groups, significantly influencing the development of products, programs and policies.

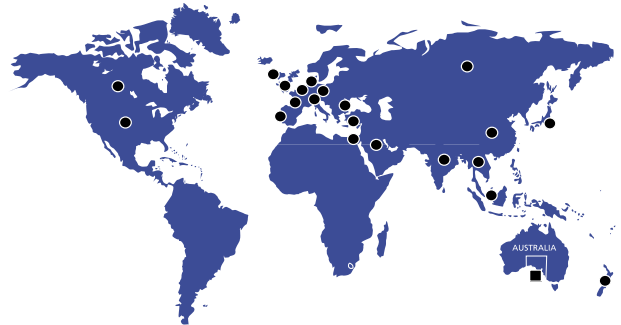
The Institute for Sustainable Systems and Technologies (ISST) combines expertise in natural and built environments, energy, water, transport, land-use and agriculture. This skills mix allows it to offer integrated solutions to complex problems, whether through systems analysis, mathematical modelling, decision-making support, product development or simply lateral thinking.

Finding the right balance.

Sustainability is as much about growth as it is about preserving what we have. ISST's brief is to develop systems and technologies that will sustain ecosystems and facilitate social and economic development while optimising the use of natural resources, minimising waste, emissions and other environmental consequences, and reducing costs.

Researchers collaborate with like-minded experts and industry bodies in around 20 countries. Key partners include: the World Renewable Energy Network; Stanford University's Systems Optimisation Laboratory; ACME Telepower Ltd, India; Cranfield University in the UK; and Technion, Israel.

INTERNATIONAL COLLABORATIONS



Meeting society's needs and yours.

ISST's interests are diverse, ranging from water recycling systems and energy efficient housing to new systems for sustainable manufacturing. We run the National Laboratory for Transport Network Analysis, have mapped the "ecological footprint" of South Australia regions, and developed exciting new products such as a roof-integrated solar heating system.

ISST provides short-term consultancies, contract research, industry-based education programs and testing services for projects and can match research needs with funding opportunities. As UniSA is a recognised research agency, clients can structure research programs to gain taxation benefits.

"Through our working relationship with UniSA on a grape sampling device, we are on track to add substantial value to our business. UniSA will definitely be among the first people that we'll call to help us in the future."

Orlando Wyndham Group Pty Ltd

No-till farming machinery research and development at UniSA is helping farmers handle the reality of Australia's unreliable rain patterns.

No-till farming – sowing directly into crop residue, without prior cultivation and with little soil disturbance – increases crop water use efficiency, reduces soil degradation and erosion and can boost grain yield and financial returns, particularly in poor rainfall seasons. This technique of conservation agriculture is now practised over about 100 million hectares worldwide, including more than 45% of Australia's crop area. Current adoption by grain growers is highest in Western Australia (up to 90%) where no-till farming increased grain production by an estimated 12 million tonnes during the "dry" of 2000-02.³

Funded by industry and government, ISST scientists played a leading role in developing novel technologies and undertaking regional programs of on-farm adaptive and participatory research. Field research and extension activities were instrumental in developing and promoting best practice in no-till farming, using more effective technologies, and boosting the adoption rate in the industry. Their specialised expertise is also applied in conservation agriculture development projects overseas.

A long-term collaboration with manufacturer Horwood Bagshaw resulted in the commercial development of a new generation of no-till farming machinery also suited to precision agriculture, with features such as computer controlled seed and fertiliser application rates optimised from GPS derived paddock performance maps.⁴ This no-till technology is now licensed for manufacture in Germany and Russia and for use in Eastern Europe.

EXAMPLE NO-TILL FURROW CROSS SECTION (SCALE IN MM)

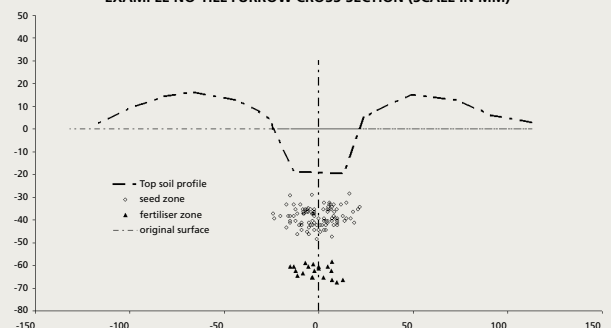


FIGURE 1: Old principles under a new light: accuracy of seed placement by novel no-till machinery is targeted to optimise crop grain yield.

FIGURE 2: Paddock ready for sowing under no-till: no prior ploughing and minimal soil and residue disturbance at sowing are key principles of no-till farming. (Photo by SANTFA)



¹ Goddard, T., MA Zoebisch, YT Gan, W Ellis, A Watson and S Sombatpanit (2008) *No-Till Farming Systems*. Special Publication No 3. World Association of Soil and Water Conservation, Bangkok. ISBN 978-974-8391-60-1, 544pp. ² D'Emden FH and KS Lewellyn (2004). *No-till adoption and cropping issues for Australian grain growers*. Proceedings of the 4th International Crop Science Congress, Brisbane, Qld, September 2004. Accessed 5 June 2008 at www.cropsociety.org.au/icsc2004/symposia/6/4/928_emdenf.htm ³ Crabtree, B (2002) *The development and extension of no-till farming systems in WA*. WAN3 scientific project report. Accessed 5 June 2008 at www.no-till.com.au/publications.html ⁴ Hinter G (2002). *Cultivating the seeds for a new era in farming*. B-Hert News "Excellence in collaborative R&D" Issue 14, June 2002. p.16, 17 – Accessed 5 June 2008 at www.bhert.com

Make the decision today to incorporate ISST into your development strategy.