



About ISF

The Institute for Sustainable Futures (ISF) is an interdisciplinary research and consulting organisation at the University of Technology Sydney.

ISF has conducted project-based research with governments, organisations, businesses and communities across Australia and internationally since 1997.

We create change by applying our unique mix of skills, sound experience and knowledge to help communities and organisations choose and shift direction toward a preferred sustainable future.

We have an integrated view of sustainability as the active pursuit of a balance between economic wellbeing, environmental restoration and social justice.

Reflecting the transdisciplinary nature of sustainability knowledge and practice, we do not rely solely on technological solutions to environmental or social problems. Rather we recognise that political, socio-cultural, organisational and individual changes are critical in creating sustainable futures.



2016 overview



Professor Stuart White
Director
22 March 2017

We continued to deliver the innovative, quality research that we're known for: futures-focused, collaborative, and change-making in 2016.

Throughout the year our researchers participated in over 100 research projects located around Australia and overseas, contributing \$6m of research income to the University of Technology Sydney. We supported 38 postgraduate research students as they apply transdisciplinary thinking to the most urgent and exciting sustainability challenges of our time. Congratulations to Reza Memary and Eleanor Glenn who graduated in 2016 with PhD's in sustainable futures.

We started the year by championing the many benefits of energy efficiency by co-hosting the 2016 Australian Summer Study on Energy Productivity with the Australian Alliance to Save Energy.

During the year we won funding for a number of innovative projects that delivered on our vision for a future where energy is clean, affordable and accessible to all.

We also completed several large-scale research projects that support better water, sanitation and hygiene (WASH) policy, advocacy and practice in developing countries this year.

Meanwhile, research undertaken by ISF during Australia's Millennium Drought has provided useful lessons for water managers in Brazil, California and the Philippines on how to manage urban water during droughts they experienced during 2016.

The UN's Sustainable Development Goals are giving the world a shared language for talking about development and mobilising action. On analysing our work, we found each of our ten research areas align with at least five of the SDGs. Together, they contribute knowledge and evidence to support every one of the 17 Goals.

We continued to build strong partnerships in 2016. We are an integral part of the UTS Transport

Research Centre, a multidisciplinary, cross-faculty transport research hub launched by the NSW Minister for Transport, The Hon Andrew Constance MP on May 17, 2016.

We also launched a public access Internet of Things (IoT) low-power, long-range, wide-area network (LPWAN) for Sydney in partnership with Meshed Pty Ltd, and The Things Network. We were pleased to broker the establishment of EnergyLab, Australia's first energy accelerator that will support entrepreneurs striving to commercialise renewable and advanced energy solutions.

The insights we have gained from twenty years of using transdisciplinary research to create change and shift thinking towards sustainable futures made ISF researchers the ideal editors for Routledge's new book on Transdisciplinary Research and Practice for Sustainability Outcomes published in 2016. Contributors to this book represent a who's who of transdisciplinary expertise and experience globally, and it has been praised for both the breadth of practice and depths of theory it documents.

We are now putting the finishing touches on our next three-year strategic plan, and preparing celebrations for our 20th anniversary.

2016 Highlights



OUR PEOPLE



68
RESEARCH AND
PROFESSIONAL
STAFF



25
ADJUNCT
PROFESSORS,
ASSOCIATES AND
VISITING SCHOLARS



38
POSTGRAD
STUDENTS WERE
SUPERVISED BY ISF



140 PUBLISHED RESEARCH OUTPUTS
(book chapters, journal articles,
conference papers and reports)



233
INTERVIEWS
AND MENTIONS
IN AUSTRALIAN
AND
INTERNATIONAL
MEDIA



HIGHLIGHT
Front page in the
Sun Herald on food
futures research

The Sun-Herald



5
AWARDS AND
COMMENDATIONS



Dr Dana Cordell



ADVANCE GLOBAL
AUSTRALIAN AWARDS



OUR RESEARCH

104 RESEARCH
PROJECTS
INCLUDING:

\$6m
EXTERNAL
RESEARCH
INCOME



BATTERY RECYCLING

Investigating alternative models for the collection, storage and recycling of button cell batteries – a safety hazard for children.



SYDNEY INTERNET OF THINGS

Utilising data collected from smart sensors across Sydney to report on noise, temperature, wind and pollution.



THE GOODS LINE

Examining the re-development of Sydney's Goods Line to investigate the social and environmental benefits of urban renewal.

RESEARCH AREAS

CITIES AND BUILDINGS

8 projects
\$256,097

RESOURCE FUTURES

11 projects
\$1,228,990

CLIMATE CHANGE ADAPTATION

7 projects
\$624,177

SOCIAL CHANGE

12 projects
\$380,503

ENERGY FUTURES

23 projects
\$1,969,305

TRANSPORT

3 projects
\$100,270

INTERNATIONAL DEVELOPMENT

24 projects
\$1,142,442

URBAN WATER FUTURES

9 projects
\$230,874

NATURAL RESOURCES AND ECOSYSTEMS

7 projects
\$162,210



OUR CLIENTS

In 2016 our research was commissioned by:

27 State government	17 Australian government
9 Local government	12 Corporate
8 Industry bodies/association	10 Development/aid agencies
8 Not for profits	4 Higher education providers
1 Utility	5 Research organisations
3 Research grant bodies	2 International government

“ISF researchers were professional, a pleasure to work with and produced quality outputs.”

Bronwyn Powell
Knowledge and Learning Manager
CS WASH Fund

“A respectful, clear and professional approach that built trust with our clients, respected the relationships we had already built with them and enabled their full participation in the project.”

Kate Parsons
National Volunteer Programs Manager
Frontier Services

“We had a feel for what we wanted to do but lacked the expertise... The ISF team’s approach to the project just seemed to tick all the boxes and gave us real confidence.”

Peter Randall
A/Manager - Engagement and
Social Research
Metro Water Directorate - NSW
Department of Primary Industries

Urgent need to turn down inner west's heat

Yamba's Festival to be Waste Wise

Time to take plunge over coffee choices

Trial tests smart inverter tech

Suburbs combat extreme 'heat island' effect to cool off

Life in the slow lane

Sydney's traffic gets slower and gridlock lasts longer

'FIFTH FUEL' SAVES US \$50BN A YEAR, SO LET'S TAP INTO IT

Energy use is falling as our economy grows but we can do better than this

CHRIS DUNSTAN

Putting grassroots adaptation on map

HEAT ISLAND EFFECT

We need to talk more about green space



Public engagement

We're passionate and committed to maximising the impact of our research by contributing knowledge in academia, policy debates and public discourse.

Stay updated on our latest research findings, news and events by signing up to our newsletter at isf.uts.edu.au or connecting with us on Twitter, LinkedIn and Facebook.

In 2016, media interest in our research and sustainability leadership lead to 233 interviews and mentions in TV, radio, print and online news media.

ISF's commitment to contributing knowledge to public discussion also helped to shape Think: Sustainability –

a new program from 2SER 107.3FM, aiming to translate UTS's sustainability research into informative and entertaining programming. This program allowed ISF researchers to discuss topics such as sustainable housing, urine diversion, and light rail's impact on animal species, in a format accessible to a wide range of audiences.

Additionally, ISF researchers lead the public debate through their regular contributions to The Conversation, as well as through their appearances on programs such as ABC Morning News and Channel 10's The Project.

Nicky Ison appeared on Channel 10's "The Project" to discuss the Homegrown Power Plan, and potential savings involved with switching to renewables.

In response to Channel 9's reporting on travel times during Sydney's peak hour, Dr. Michelle Zeibots called for better public transport as a viable solution.

ISF researcher and PhD student Judith Friedlander appeared on ABC Morning News, discussing food waste and its relation to faith based practices.

ISF Research Director Chris Dunstan appeared on ABC News to contribute to the public debate surrounding renewable energy infrastructure and the South Australian power grid.

In 2016 ISF researchers authored a total of 140 publications.

This included one book, 13 book chapters, 24 peer-reviewed journal articles, 25 conference papers and 46 research reports.



Events



AUSTRALIAN SUMMER STUDY ON ENERGY PRODUCTIVITY

The atmosphere at this year's summer study was very positive, with a strong sense that the energy productivity revolution has really begun. More than two hundred leaders in energy productivity, energy efficiency and decentralised energy from government, politics, research, industry and NGOs attended the summer study.



CHINA'S ENERGY TRANSITION: THE WAY FORWARD

Climate and energy policy expert Dr Wang Tao gave some interesting insights into China's transitioning energy policy and how the country plans to honour its pledge to source 20% of its energy from zero-emission sources by 2030 at an event hosted by ISF and the Australia-China Relations Institute (ACRI).



THE BIG CONVERSATION: OUR CLIMATE AND ENERGY DILEMMA

Ian Dunlop, a global leader in advising on the significant risks that climate change poses for our social, financial, and energy systems was the eminent speaker at this event co-hosted by ISF and Engineers Australia. A panel then discussed the opportunities to be achieved through an urgent re-framing of our economy.



CIRCULAR ECONOMY: A GLOBAL UPDATE

An outlook on the future demand for metals was presented by international expert Dr Barbara Reck during a talk about the global opportunity for a circular economy, which focuses on maximizing reuse and recycling while minimizing raw materials extraction. Dr Reck has been working with the ISF in the Wealth from Waste research cluster.



SOLAR, STORAGE, STARTUPS: TRANSFORMING AUSTRALIA'S ENERGY MARKET

A capacity crowd came to hear from two Australian start-ups who are transforming Australia's energy market - and making money doing so. An expert panel then led a lively discussion about the best way to support clean energy entrepreneurs as they develop innovative products and business models in the rapidly changing electricity market.



LAUNCH OF THE UTS TRANSPORT RESEARCH CENTRE

A new single point of contact for government, industry and community to engage with UTS's multidisciplinary research teams; the transport research hub will focus on new technologies to optimise network performance across all transport modes. The Centre was launched by the NSW Minister for Transport, The Hon Andrew Constance MP on May 17, 2016.

For a full list of upcoming and past ISF events visit isf.uts.edu.au

Awards and commendations



ADVANCE GLOBAL AUSTRALIAN AWARD

Dr Dana Cordell's pioneering research identifying phosphorus scarcity, tracking its life cycle and developing global and regional scenarios for its sustainable production and consumption, has been recognised with an Advance Global Australian Award in the Food and Agriculture category.

These awards honour Australians who have achieved remarkable feats in their sector while living overseas or on their return to Australia.

As an outcome of her doctoral research at ISF and Sweden's Linköping University, Dana co-founded the Global Phosphorus Research Initiative (GPRI) and public website (phosphorusfutures.net) with colleagues in Sweden and Australia.

In 2010 she was employed by the Stockholm Environment Institute to work as a core member of a competitive international consortium of researchers on the Sustainable Use of Phosphorus project for the European Commission (D.G. Environment).

As Research Director at ISF, Dr Cordell leads 90 partners in the collaborative P-FUTURES project across Australia, Vietnam, Malawi and the U.S (p-futurescities.net) which works with local stakeholders to identify how urban food systems can cope or transform in response to the emerging global phosphorus challenge.

She also leads the Sydney's Food Futures (sydneyfoodfutures.net) project which models current and future food production scenarios to support stakeholder dialogue and

decision-making on resilient food futures for Sydney in the face of climate change and urban growth.

Dana's excellence in the field of sustainability research has been recognised with a host of prestigious accolades including the Eureka Prize for Environmental Research (2012) a Banksia Mercedes-Benz Environmental Research Award and a position in Australia's 100 Women of Influence (2013).



SYDNEY FOOD FUTURES PROJECT

An ISF-led project that modelled the impact of future urban growth on Sydney's food production won an award for the Sydney Peri Urban Network of Councils (SPUN) in the Natural Environment Policies, Planning and Decision Making category of the 2016 Local Government NSW awards.

As research partner for the project, ISF investigated the Sydney Basin's capacity to produce food and the factors that threaten to reduce this ability.

This research found that under current metropolitan planning, Sydney stands to lose 60% of fresh food produced in the Sydney basin. The Sydney food bowl's capacity to meet food demand could drop from 20% down to a mere 6%.



COOLING THE CITY

Penrith City Council was highly commended in the Climate Change Action category of the Local Government NSW Awards for its Cooling the City Strategy.

This Strategy comprises over 50 actions for policy and planning, engagement, green infrastructure and water sensitive urban design. It is supported by ISF research to identify local hotspots in three suburbs within the Penrith LGA by mapping heat, vegetation and council assets.

Council overlaid data on transport corridors, schools and aged care facilities to identify areas of higher vulnerability to heat, to understand the relationship between heat and vegetation coverage and to explore strategies associated with responding to heat.



Our postgraduate program

ISF offers an award-winning postgraduate program for Masters and Doctoral research students. Our postgraduate students work at the leading edge of complex societal problems and sustainability challenges, across diverse sustainability topics, to deliver real-world impact and contribute to stocks and flows of knowledge.

38

STUDENTS
SUPERVISED

8

STUDENTS
JOINED THE
PROGRAM
IN 2016

2

STUDENTS
GRADUATED
IN 2016

Reza Memary graduated from UTS with a PhD in Sustainable Futures in October 2016. His thesis "*Life Cycle Assessment for metals: from technical investigations to system innovations*" investigated how to improve industry tools used to quantify the environmental impacts of metal provision activities, in line with structural changes to socio-technical systems.

Eleanor Glenn graduated with a PhD in Sustainable Futures in May 2016. Her thesis "*From clashing to matching: examining the legitimation codes that underpin shifting views about climate change*" investigates people's views about climate change. It examines how they shift in conversation, and the potential for climate change communications and engagement to engage with and shift views.

ISF postgraduate student **Ian Cunningham** was awarded third place in the UTS Three Minute Thesis competition where students describe their research to a non-specialist audience in just three minutes with no props, no electronic media and only one static PowerPoint slide. Ian is researching the role of strength-based approaches to development, in particular water supply. These are approaches that tip the balance from a focus on problems to a focus on possibility by shining a light on what people care about, what has worked in the past and how citizens can apply that to change.

A video by ISF PhD student **Tanja Rosenqvist** about the need to rethink sanitation so that we focus on people (as well as poo) won the Student Big Ideas award at the 2016 WASH Futures Conference. Her research is exploring the relationship between the long-term sustainability of community-managed urban sanitation service provision in Indonesia and the way they are governed. By taking the everyday experience of service users as her point of departure she is exploring how people living in three poor urban communities in the Indonesian city of Bogor have experienced the implementation and management of community-managed sanitation systems.

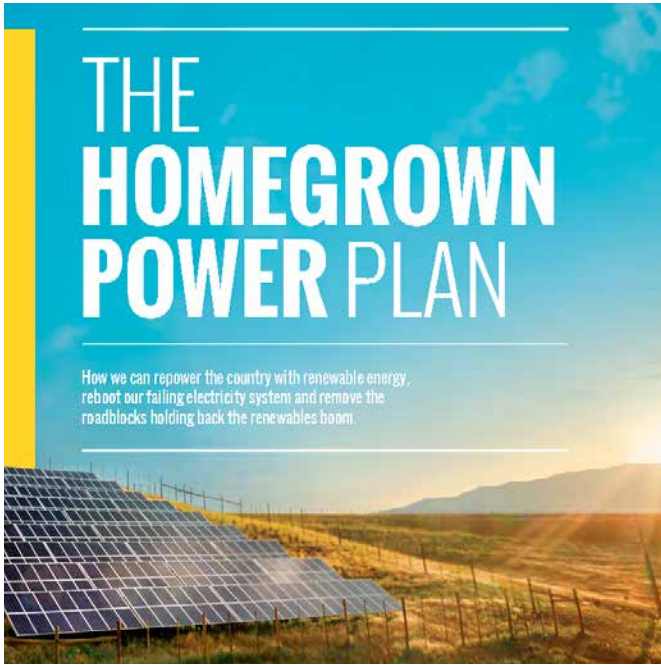
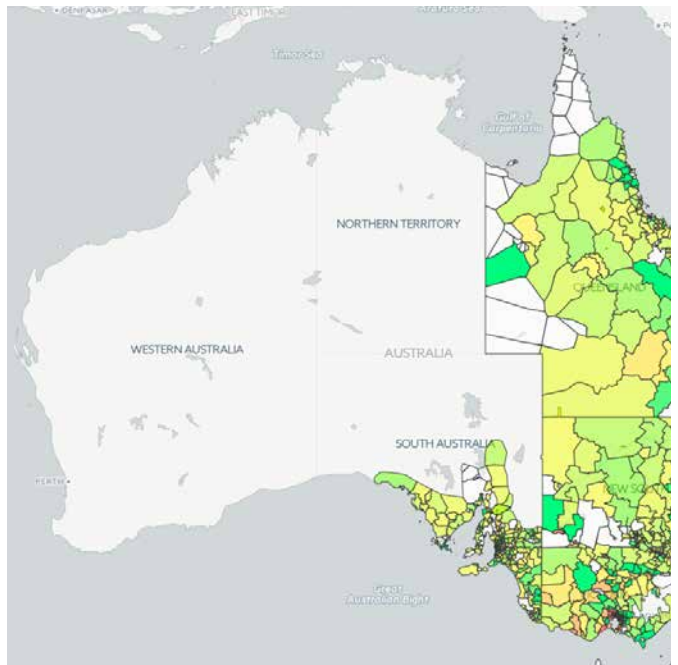
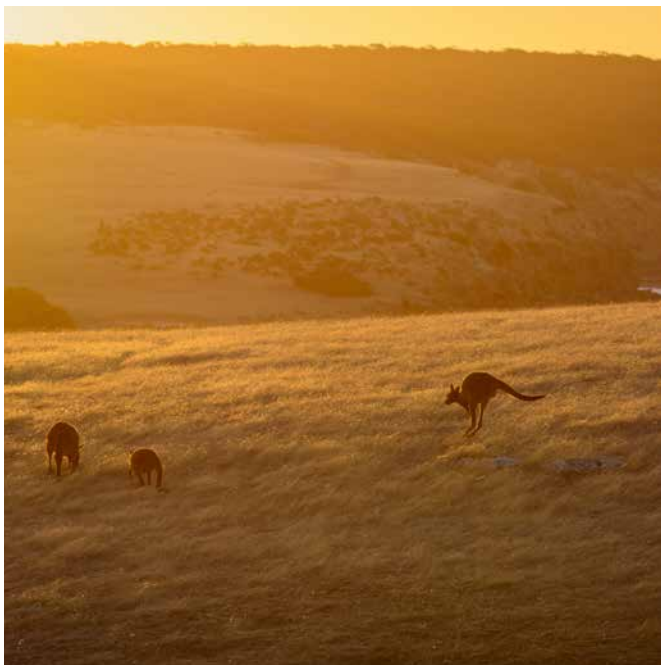


Photo Credit: AMDEE



Energy futures

Our vision is for a future where energy is clean, affordable and accessible to all. This vision is supported by research that shows how we could achieve 100% renewable energy for the nation, and more specifically on Kangaroo Island where the undersea cable supplying electricity from the mainland is due for replacement. Our free online Network Opportunity Maps show where investment in demand management and renewable energy could reduce the need to invest in poles and wires assets, supporting the uptake of local sustainable energy options, and reduce costs for all consumers. A virtual trial of Local Network Charges and Local Electricity Trading indicated there is potential for distributed generation to meet local consumption, which is unlikely to be realised under current market conditions. And the Global Wind Energy Outlook presents the potential of wind power to fulfil international energy needs, and the future of the wind energy industry out to 2050.

Rapid changes within the energy market have demonstrated the need for long term decision making, to ensure energy infrastructure runs optimally. In producing theoretical scenarios for a transition to decarbonised energy systems, ISF's research has demonstrated that moving to a 100% renewable energy system by 2050 is both technically possible and economically viable for Australia. This modelling demonstrates potential savings of \$20billion a year, by first implementing renewable energy in the stationary power sector, and then utilising the savings

created by this measure to implement renewables in the transport sector.

Our vision for a clean energy future was further supported by research conducted at Kangaroo Island, where the undersea cable supplying electricity from the mainland is due for replacement. We were tasked with investigating whether options for reliable local power supply that utilised local renewables were reliable, viable and cost-effective, compared to simply replacing the cable connecting Kangaroo Island to the mainland. Our scenario demonstrates that local electricity production would be a timely and viable alternative to constructing a new cable, while also enhancing the energy self-reliance of Kangaroo Island, providing further economic and social opportunities for the local community.

For a market in distributed energy or demand management to develop, it requires clear and accessible information about network costs and constraints, to allow the market to invest in reducing traditional network investments. Our free online Network Opportunity Maps show where investment in demand management and renewable energy could reduce the need to invest in traditional electricity infrastructure, such as poles and wires, by presenting network information in a concise and accessible manner. In summarising the potential of decentralised energy resources across the National Energy Market, the Maps support the uptake of local sustainable energy options, with the aim of reducing costs for consumers.

Improving opportunities for small-scale distributed energy generators to distribute and sell energy could unlock substantial clean energy potential. Our virtual trials of Local Network Charges and Local Electricity Trading demonstrate the value of distributed energy generation by modelling the benefits of avoiding infrastructure duplication, optimising the sizing of distributed generation, and supporting incentives for dispatchable generation during peak periods. Our research shows that distributed local energy could meet local consumption needs, in a manner unlikely to be realised under current market conditions, while also providing flexibility in the production and use of electricity, and subsequent economic savings for consumers.

Our vision for a clean energy future also crosses borders, as shown through the launch of the Global Wind Energy Outlook 2016. This report notes that the cost of wind power is now cheaper than nuclear or coal-fired power on an international basis, having fallen in cost by almost a third since 2009. Additionally, the Global Wind Energy Outlook also describes how increased global adoption of wind power, and more widely, renewable energy can lead to four other benefits globally – increased employment opportunities, reduced water use, reduced production of air pollution and reduced carbon emissions.



Water, sanitation and hygiene (WASH)

The Institute for Sustainable Futures is a global leader in approaches to securing access to water, sanitation and hygiene (WASH) in developing country contexts, with multiple projects completed in 2016.

The large-scale Enterprise in WASH research initiative completed its first phase after three years investigating the role of private and social enterprises in delivering WASH to the poor in Indonesia, Vietnam and Timor-Leste. Multiple workshops and sustained engagement with partner governments and civil society organisations is supporting uptake and use of the findings into policy and practice. Learning briefs for civil society organisations (CSOs) were produced as well as policy briefs, working papers and research reports, all of which are available from enterpriseinwash.info/. The learning briefs suggest approaches, strategies and program design for CSOs including how to reach the poor and disadvantaged. The second phase of the Enterprise in WASH project is now looking at three further dimensions of enterprise engagement, namely gender and entrepreneurship; business support mechanisms; and cost structures for private water enterprises in Indonesia, Vietnam and Cambodia.

Researchers from ISF co-authored a framing paper for the United Nations High Level Panel on Water, exploring how to promote gender equality in both water resources management and WASH, and by doing so, contribute to more sustainable and effective water management outcomes for all people, while decreasing the inequalities prevalent in many societies.

Prime Minister Malcolm Turnbull is a member of the High Level Panel on Water, and the 'Gender & SDG 6: The Critical Connection' framing paper was part of the Australian Government's contribution to the Action Plan of the Panel.

Research into how to make community scale sanitation work well in Indonesia also drew to a close in 2016. Local scale sanitation systems (serving communities of around 50 – 200 households) offer an affordable way to manage the public health and environmental hazards of untreated wastewater in urban areas. However, these systems need effective governance in order to operate in the long-term. The 'Community Sanitation Governance' research project investigated effective governance for successful long-term operation of community scale wastewater systems in Indonesia. After three years of extensive research and working closely with communities as well as representatives from local government and local NGOs, the team produced a final report with its findings and recommendations for both near term improvements and long term policies and programs for consideration by key stakeholders. A visual synthesis report was also produced as well as several research and policy briefs and practical guidance material on how to design governance for lasting service. All these resources, as well as related conference papers, are available from the web site at: communitysanitationgovernance.info/

The ISF WASH team presented seven papers, delivered five training sessions and presented three posters at the WASH Futures 2016 Conference in Brisbane from 16 to 20 May. The ISF poster on innovation in WASH and gender monitoring that explains how monitoring can achieve strategic gender outcomes and equitable services won an award at the conference and PhD student Tanja Rosenqvist won the Student Big Ideas Award for her suggestion that we need to move towards a people-centred definition of sanitation service.

“The learning briefs suggest approaches, strategies and program design for CSOs that are active in supporting small-scale local enterprises that provide water and sanitation services for the community, including the poor and disadvantaged.”



Sydney's food futures

Local food production in the Sydney Basin provides many benefits, and underpins the resilience and security of the city. However, competition for Sydney's land for residential growth could threaten future local supplies of fresh food. By mapping Sydney's current and future food production, ISF has created an evidence base to support effective policy and innovation for sustainable management of Sydney's peri-urban agriculture.

The benefits to growing fresh food in the Sydney basin are enormous. Growing perishable foods such as eggs and greens close to the market reduces food spoilage, food waste and fuel use, as well as providing employment opportunities and other economic benefits. However, the resilience of Sydney's food bowl is currently under threat. A growing population, a pressured housing market, planning laws that favour development over agriculture, and a changing climate are resulting in mounting pressure for the Basin's food producing lands to be converted to residential uses. In a geographically-constrained basin such as Sydney, peri-urban agriculture cannot continue to drift infinitely outwards, and may soon be lost if current rates of land-use change continue. This threatens the ability of Sydney to meet any of its own demand for food, and also could result in the loss of the many benefits peri-urban agriculture provides.

In partnership with the Sydney Peri-Urban Network, ISF modelled and spatially mapped Sydney's current and future food production for four future land-use scenarios. The modelling showed that

if the proposed urban sprawl planned under the Plan for Growing Sydney is implemented, 92% of Sydney's current fresh vegetable production could be lost by 2031. Adjusting for Sydney's 1.6 million population growth—which will mean increased demand for food—the model finds that local agriculture will be able to meet only 6% of demand in 2031, compared to 20% currently. However, the modelling demonstrated that by preventing any further conversion of agricultural lands to residential uses, Sydney could retain some local food production, without exceeding desirable densities in existing urbanised areas. However, policy and planning changes are needed to protect these lands and prevent conversion to residential uses and fragmentation of agricultural lands.

ISF also engaged with a broad range of stakeholders to explore the feasibility and desirability of food production scenarios and responses to these scenarios, utilising workshops, interactive maps, a website, a policy briefing with high-level government stakeholders, a public forum and a short animated film.

In conjunction with Wollondilly Shire Council, the Sydney's Food Futures project was the 2016 winner of the Natural Environment Policies, Planning and Decision Making award at the Local Government New South Wales Awards. ISF is conducting further research into the future of peri-urban agriculture in the Basin, including possible policy responses to help sustainably manage this valuable resource. This project also generated significant media interest through a front

page feature article in the *Sun Herald*, as well as articles in outlets such as *The Daily Telegraph* and *The Conversation*.

“Our agricultural production is literally being chased to the hills – and this at a time when we face the challenge of feeding over a million extra mouths.”

Laura Wynne



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