WELCOME

On behalf of the Australian Agricultural and Resource Economics Society, I welcome you to the AARES 2002 Conference in Canberra.

Most of you will have attended one of the two pre-conference workshops: *WTO: Issues for Developing Countries* and *Rural Livelihoods and Adjustment*. Many of the issues raised in those workshops will be carried forward as we now move into the conference proper.

President-Elect Ron Duncan and the Local Organising Committee, chaired by Max Lawrence, have put together a first-class conference program around the theme: *Agenda for the 21st Century*. Over the next few days an impressive array of invited speakers from around the world will address elements of that theme related to agricultural and resource economics, international trade agreements, farm management, and natural resources and the environment. Two other highlights of the program warrant specific mention. This year's Alan Lloyd Fellow is Yair Mundlak of University of Chicago and Hebrew University, who will be presenting a paper titled "Explaining Economic Growth". The inaugural recipient of the AAEA-AARES Young Professionals Exchange Award is Dan Phaneuf (North Carolina State University), and he will present a paper on recreation demand models.

The total program, counting contributed papers as well as invited papers, includes over 180 papers on topics ranging from AARES to Zimbabwe, to be presented by members and guests from every corner of the globe, in a conference that is becoming increasingly international. The conference is a place for cultural and social as well as intellectual exchange. So, we welcome you, especially those for whom this is their first AARES conference, and encourage you to participate fully in what promises to be a productive and exciting few days, where one of the biggest challenges will be in choosing which papers to attend from a world-class list of topics and presenters.

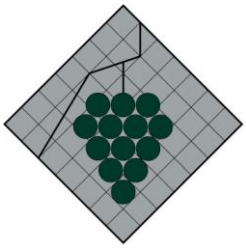
Julian Alston

President, AARES

AARES 2002
Canberra

GRATEFUL ACKNOWLEDGEMENT IS GIVEN FOR THE SUPPORT FROM THE FOLLOWING:

THE AUSTRALIAN
NATIONAL UNIVERSITY
The National Centre for Development Studies



Grape and Wine
Research and
Development Corporation

2002 AARES CONFERENCE PROGRAM

TUESDAY 12 FEBRUARY

8:00 – 7:00	**Delegate Registration**	*1st Floor Foyer*
8:45 – 5:00	**'WTO: Issues for Developing Countries' workshop**	*Lake Huron*
8:45 – 5:00	**'Rural Livelihoods and Adjustment' workshop**	*Lake Superior*
5:00 – 6:30	**Outgoing Council Meeting**	*Lake Nyanza*
6:30 – 8:00	**Welcome Cocktail Party** *The Burley Griffin Reception Centre (15th Floor)*	

WEDNESDAY 13 FEBRUARY

8:00 – 5:00	**Delegate Registration**	*1st Floor Foyer*
8:45 – 9:00	**Conference Opening**	*Lake Superior*
9:00 – 10:30	**Opening Plenary**	*Lake Superior*
	***Agenda for the 21st Century:* What does the future hold for Agricultural and Resource Economists?** Chair: Michael J. Taylor (AFFA) Ross Garnaut (Australian National University) Roger Beale (Environment Australia) Beth Woods (RIRDC)	
10:30 – 11:00	**Morning Tea**	
11:00 – 1:00	**Contributed Paper Session A**	*(6 rooms)*
1:00 – 2:00	**Lunch**	
2:00 – 3:00	**Presidential Address**	*Lake Superior*
	Chair: David Pannell, Past President, AARES Julian Alston (University of California – Davis) ***"Spillovers"***	
3:00 – 3:30	**Afternoon Tea**	
3:30 – 5:30	**Contributed Paper Session B**	*(6 rooms)*
6:30 onwards	**Conference Dinner**	*Rydges Lakeside - Lake Superior*

THURSDAY 14 FEBRUARY

8:30 – 5:00	**Delegate Registration**	*1st Floor Foyer*
8:30 – 10:00	**Trade Plenary**	*Lake Superior*
	***Agenda for the 21st Century:* Prospects for International Trade Agreements** Chair: Ron Duncan (Australian National University) Sherman Robinson (IFPRI) Christopher Findlay (Australian National University) Zhong Funing (Nanjing Agricultural University)	
10:00 – 10:30	**Morning Tea**	
10:30 – 12:30	**Contributed Paper Session C**	*(6 rooms)*
12:30 – 1:30	**Lunch**	
1:30 – 3:00	**Concurrent Sessions**	
	Concurrent Session 1:	*Lake Huron*
	***Agenda for the 21st Century:* Farm Management** Chair: Vince O'Donnell (ABARE) John Mullen (NSW Agriculture) Glenn Ronan (Primary Industries and Resources SA) Ross Kingwell (Agriculture WA)	
	Concurrent Session 2:	*Lake Superior*
	***Agenda for the 21st Century:* Natural Resources and the Environment** Chair: Jack Pezzey (Austrailan National University) Roger Sedjo (Resources for the Future, Washington DC) Drew Collins (BDA Group)	
3:00 – 3:30	**Afternoon Tea**	
3:30 – 5:30	**Contributed Paper Session D**	*(6 rooms)*
5:30 – 7:00	**Annual General Meeting**	*Lake Huron*
6.30 – 11:30	**Social Night**	*National Museum of Australia*

FRIDAY 15 FEBRUARY

8:30 – 5:00	**Delegate Registration**	*1st Floor Foyer*
8:30 – 10:30	**Contributed Paper Session E**	*(6 rooms)*
10:30 – 11:00	**Morning Tea**	
11:00 – 1:00	**Contributed Paper Session F**	*(6 rooms)*

1:00 – 2:00	**Lunch**	
2:00 – 3:00	**Alan Lloyd Address**	*Lake Superior*
	Chair: Ron Duncan, Incoming President, AARES Yair Mundlak (University of Chicago and Hebrew University) ***"Explaining Economic Growth"***	
3:00 – 3:30	**Conference Closure**	*Lake Superior*
	Ron Duncan, Incoming President, AARES	
3:30 – 4:00	**Afternoon Tea**	
4:00 – 6:00	**Incoming Council Meeting**	*Lake Nyanza*

Pre-Conference Workshops

Tuesday 12 February – Rydges Lakeside Canberra

Workshop 1 – WTO: Issues for Developing Countries

This full day workshop will bring together influential trade economists from Australia and Asian developing countries to interact on issues that will drive the negotiations and decision making of developing countries during the forthcoming agricultural trade negotiations in the World Trade Organisation. There is general agreement that developing countries will play a much greater role in future agricultural negotiations than in the Uruguay Round and previous rounds. Australian economists and trade negotiators need to understand the perspectives of these countries and ensure that they build these into strategies for the Round. Developing countries also need to understand the views of the developed countries, including those of Australia who played an influential role as leader of the Cairns Group of countries during the Uruguay Round. Issues to be discussed are expected to include Sanitary and Phyto-Sanitary (SPS) issues and food quality, food security, farming without subsidies, food aid and accession issues. This workshop holds the prospects of participants influencing and being influenced by the key trade thinkers of the region.

Workshop 2 - Rural Livelihoods and Poverty: A challenge for agricultural economists

If Australia desires to manage its vast landmass productively and sustainably, it will need viable regional communities. The challenge is to create sustainable futures for these communities by developing new industries, adopting new industry mixes, and rethinking old industries. In preparing for the future, the challenges typically involve the application of technology and adapting life in rural/regional Australia to deal with the events and circumstances that citizens in urban areas take for granted**.** More specifically, it is about building information networks and increasing the capacity of people in rural and regional Australia to manage their own situations in an innovative way to solve the problems that beset them. Agricultural economists in many other countries are focusing on the challenges that rural livelihoods and poverty have for research and innovation, for natural resources and the environment, for access to public goods, and for the whole range of institutions, including markets, that affect the well-being of rural residents. These issues will be the subject of this full day workshop. The approach taken will be one of active participation, with modern communication facilities being used to facilitate pre-workshop discussion**.**

CONFERENCE PROGRAM AT A GLANCE

		Lacke Titicaca	Lake Hakone	Lake Huron	Lake Superior	Lake Nyanza	Lake Geneva
Wednesday 13	8.45 - 9.00				**Conference opening**		
	9.00 - 10.30				**Opening plenary**		
	Morning tea						
	11.00 - 1.00	Ag development	Trade liberalisation and protection	Agribusiness & food processing	Conservation & biodiversity	Bioeconomic modelling	Theory
	Lunch						
	2.00 - 3.00				**Presidential address**		
	Afternoon tea						
	3.30 - 5.30	Food & water	Trade reform	Weeds & insects	Emerging environmental markets	Bioeconomic modelling	Concepts
	Conference dinner from 6.30 onwards						
Thursday 14	8.30 - 10.00				**Trade plenary**		
	Morning tea						
	10.30 - 12.30	Asia development	Domestic ag policy	RIRDC session	Non market valuation	Fisheries	Policy targeting
	Lunch						
	1.30 to 3.00			**Farm management invited speakers**	**NRM invited speakers**		
	Afternoon tea						
	3.30 - 5.30	Vietnam	Policy & grain marketing	Crops & livestock	Non market valuation	Water	Values & policy
	5.30 - 7.00			**AGM**			
	Social night at National Museum of Australia from 6.30 - 11.30						
Friday 15	8.30 - 10.30	China	GMO food preferences	Dairying	Water, forest & recreation	Soils & vegetation	Modeling
	Morning tea						
	11.00 - 1.00	Livestock	Biotech, production & trade	Crops & livestock	Ag & global warming	Salinity	Sugar & price forecasting
	Lunch						
	2.00 - 3.00				**Alan Lloyd Address**		
	3.00 - 3.30				**Conference closure**		
	Afternoon tea						
	4.00 - 6.00					Incoming council meeting	

CONFERENCE HIGHLIGHTS

AARES-AAEA Young Professionals Exchange Travel Awards

AARES and the Foundation of the American Agricultural Economics Association (AAEA) offered two travel awards in 2001. These awards were intended for agricultural and resource economists in the early stages of their careers, in order to provide them with an opportunity for professional and personal development and international professional and cultural exchange. Each award has a value of US$2,000 to be used to assist the winner to participate in the Annual Conference of either the AARES or the AAEA.

The first award, “Heading South” was awarded to the North American resident, Dan Phaneuf, for his paper titled, “Kuhn-Tucker Recreation Demand Models with Large Choice Sets: An Application to Beach Recreation”, which he co-authored with Roger von Haefen and George Parsons. Dan will be presenting his paper in Contributed Paper Session E on Friday 15 February.

The second award, “Heading North”, will be given to an Australian or New Zealand resident to support their participation in the Annual Conference of the AAEA, and will include US$2,000. The “Heading North” award winner will be announced at the Conference Dinner.

Productivity Commission Sponsored Sessions

The role of the private sector in producing environmental outputs, notably biodiversity conservation, has emerged as a prominent theme of research undertaken by the Productivity Commission during 2001. To highlight this research and to link it with related research being undertaken in Australia and internationally, the Productivity Commission has sponsored two sessions at this year’s AARES Conference.

The first session, which will be held in Contributed Papers Session A on Wednesday 13 February, is entitled Conservation and Biodiversity. The lead paper in that session, “Constraints to private conservation of biodiversity” by Dwyer, Hughes and Petersen outlines elements of the Productivity Commission’s research work.

The second session focuses on the emerging environmental markets. It is to be held in Contributed Papers Session B in the afternoon of Wednesday 13 February. A feature of that session will be papers detailing recently introduced environmental markets in Victoria.

Rural Industries Research and Development Corporation (RIRDC) Sponsored Session

A number of RIRDC funded research projects will be featured in Contributed Paper Session C to be held on Thursday 14 February. The papers are predominantly centred on food demand projections. With so many factors influencing food demand, it is not surprising to see a diversity of topics. Population projections however feature in two of the papers. Other papers consider the impact of GMOs on food demand, the market shares of processed food imports into Japan and issues of market power in grains and oilseed markets. RIRDC Research Coordinator, Jeff Davis, will chair the session.

SOCIAL PROGRAM

Welcome Cocktail Party

Tue 12 February, 6.30pm – 8.00pm
Location – Rydges Lakeside Canberra

Conference Dinner

Wed 13 February, 6.30pm onwards
Location – Rydges Lakeside Canberra
Dress Code – Smart casual

National Museum of Australia Dinner

Thu 14 February, 6.30pm – 11.30pm
Location – National Museum of Australia, Lawson Cres, Canberra

- A tour of the National Museum of Australia is provided during the course of the evening. This will be a fantastic opportunity for delegates to view this magnificent new landmark building.
- Predinner drinks will be served overlooking the lake. Please note that drinks are not included in the cost of the dinner and must be purchased separately.
- Buses have been arranged to transfer delegates to the Museum. Buses will be departing from the Rydges Lakeside Canberra. You will be advised of the pick up times during the Conference.

Canberra Tour

AARES delegates and partners have been offered a discounted rate of AUD$20 for the Canberra Tour courtesy of City Sightseeing. Tours depart daily.
A 24-hour ticket enables you to visit Canberra's most popular sightseeing destinations on an open top double-decker bus. For further information, please contact City Sightseeing on 02 6257 3423.
Internet site: www.city-sightseeing.com
(You must mention you are attending the AARES Conference to obtain the discount rate.)

ADDITIONAL INFORMATION

Conference Participation Identification

Various categories of participants will be attending the conference. The colour of dot on the name badge worn by the person will help you to identify them. Name badges must be worn at all times. Admission to all sessions, morning and afternoon tea, and lunches is by name badge only.

Blue	Contributed Paper Speaker and Delegate
Yellow	Invited Speaker
Green	Workshop only
Red	Local Organising Committee

Canberra Transport

Taxi cabs of Canberra	13 2227
National Taxis	13 1008

Registration Desk

The Conference Organisers are happy to be of assistance. If you have any questions please do not hesitate to ask at the registration desk. The desk will be open at the following times:

Tuesday 12 February	8.00am to 7.30pm
Wednesday 13 February	8.00am to 5.00pm
Thursday 14 February	8.30am to 5.00pm
Friday 15 February	8.30am to 5.00pm

Please notify the registration desk if circumstances prevent you from presenting a paper. The desk can be contacted on mobile 0402 227 418.

PRESIDENTIAL ADDRESS

ALSTON, JULIAN M.

Spillovers

Interstate and international spillovers from public agricultural R&D investments have implications for measures of research impacts on productivity and the implied rates of return to research, and for state, national, and international agricultural research policy. In a model of agricultural productivity in U.S. states, estimates of the effects of own-state R&D are significantly biased when interstate spillovers or federal R&D are omitted from the model. The national net benefits from a state's agricultural research investments are much higher than the own-state net benefits, and there may be a large potential payoff to reallocating federal funding both among states and between support for state research and extension, and intramural USDA research. Similarly, results from studies of particular crop technologies indicate that international technology spillovers, and multinational impacts of technologies from international centers, have been important elements in the total picture of agricultural development in the 20th Century. Within countries institutions have been developed to address spatial spillovers of agricultural technologies. The fact that corresponding institutions have not been developed for international spillovers has contributed to a global underinvestment in certain types of agricultural research.

COLLINS, DREW

Underlying issues for environmental and resource policy in the 21st century

Improving efficiency in the consumptive use of natural resources has dominated natural resources policy in the later part of the 20th Century. More recently, policy interest has moved to the issue of externalities arising from resource use — forcing to an extent a coming together of natural resources and environmental policy. Economists are being asked to provide policy prescriptions that can harness market forces to internalise production externalities and ensure appropriate conservation of environmental amenities. This paper reviews a number of underlying issues that need to be resolved before environmental and resources policy can be aligned to meet the challenges of the 21st century. These include the compatibility of sustainability and economic efficiency goals, property rights and cost sharing and the overselling of market instruments as a policy panacea.

FINDLAY, CHRISTOPHER

Preferential trading arrangements: will they lead to free trade?

Key words: Free trade agreements, agricultural products

There has been a surge of interest in preferential, or 'free trade', agreements. Such agreements have been signed or are under consideration by many of Australia's most important trading partners, some of whom have previously shown little interest in such arrangements. This paper discusses the sources of the appeal of these arrangements, and examines some of their implications, with a focus on the trade in agricultural products. The notion that bilateral agreements of this type will help make progress to wide-ranging liberalisation is criticised. Alternative strategies are discussed.

GARNAUT, ROSS

Australia's Resource Sector: Head Office or Branch Office?

There has been considerable discussion over the past year of whether the internationalisation of the Australian economy will lead to its becoming a "branch office economy". The Australian Government's rejection of the Shell takeover offer for Woodside, and the discussion of ownership of other major Australian companies operating in the minerals and petroleum industries have fuelled the debate. This follows periods in which foreign ownership of Australian agricultural sector assets has generated debate. This paper raises questions relevant to assessment of whether it matters if the Australian agricultural and resource sectors are, in global terms, operated within "head offices" or a "branch economy". What are the implications for Australians who draw their incomes from the resource sector? What are the implications for the contribution of research to productivity and incomes growth in Australia? Do the answers to these questions have relevance for policy, or are the important outcomes driven by forces beyond the influence of Australian governments? The

paper concludes with some thoughts on a research agenda.

KINGWELL, ROSS

Issues for Farm Management in the 21st Century: A view from the West

Against a backdrop of descriptive snapshots of the years 1975, 2000 and 2025, this paper explores challenges for broadacre farm managers. Issues of particular relevance to Western Australian farm managers are emphasized. Key market, environmental, technical, structural and social challenges and their implications for farm managers are discussed. Established and emerging trends, along with commentaries of a range of futurists, are used to develop forecasts of challenges for farm management. Only the sub-set of most likely challenges is discussed. The paper concludes by examining the question of change in farm management: How might the farm manager in 2025 be different from one in 2000 and what are the implications for farm management advisers and researchers?

MULLEN, JOHN D.

Farm Management in the 21st Century

A key element of an agenda for farm management in the 21st Century should be productivity on farms. However if the past few decades are a guide, off-farm pursuits, in the form of value adding, promotion, business skills, for example, are strong attractions despite an impressive record of on-farm gains. After arguing in a fairly subjective way that the potential for off-farm gains should not be accepted uncritically, the focus of the paper turns to demonstrating the value to the agricultural sector of farm productivity growth since 1953 and the contribution of one source of productivity, new technology from R&D activities. Another theme of the paper is the importance of understanding the implications for farm profitability when promoting new technologies or developing resource management policies to meet the community's environmental goals.

MUNDLAK, YAIR

Explaining Economic Growth
(Abstract unavailable at time of publishing)

RONAN, GLENN

Delving and Divining for Australian Farm Management Agenda: 1970-2010

Key words: Farm management, issues, policy, people

Challenges and opportunities on and off the farm generate a changing agenda for farm business management and farm families in Australia's rural sector. National, state and regional interest in the contribution and connections of farming to agribusiness, the food sector and the economy, the environmental status of rural land and water and the welfare of farm families leads to public policies interfacing and interacting with private farm business interests. Conceptualising farm businesses as mixes of 'management', 'resources' and 'family' aids appreciation of new structures and strategies, ties in with 'triple bottom line' thinking and reflects the shift from farm policy to an array of policies focussing on social, environment and economic aspects of contemporary life in rural and regional Australia. Farming's links to the domestic and international economy, the environment and regional economies and rural communities are illustrated as the basis of agenda review and search.
Selected issues on the agenda from 1970 are plotted and delved into with the aid of a new farm management database, which includes the literature of the Australian Farm Management Society. Divining agenda towards 2010 is attempted. Some legends, leaders and champions of Australian farm management are nominated.

EUGENIO DÍAZ-BONILLA, SHERMAN ROBINSON, MARCELLE THOMAS, & YUKITSUGU YANOMA

WTO, agriculture, and developing countries.

Key words: WTO, developing countries, international trade

This paper analyzes agricultural trade issues, linked to the new round of WTO negotiations, from the perspective of developing countries. The paper explores issues in aligning the different components and subcomponents of the negotiations with the final objectives of sustainable economic growth, poverty alleviation, and food security. In order for economic growth to fulfill its promise in developing countries it must be adequately high, but also equitable, stable (linked to poverty issues and food security), and sustainable (linked to protection of the environment).

SEDJO, ROGER A.

Timber and the Environment: Present Situation and Future Potential

Key words: Forests, timber, environmental services

This paper examines the forests of the world from the perspective of their ability to provide a wide array of environmental services while continuing to produce industrial wood to meet world demand. The approach is to examine the ability of the world's forests to meet anticipated industrial wood demand while continuing to provide environmental and ecological services, including biodiversity and carbon sequestration. The prospects to achieve both objectives appear promising due to the enhanced ability to produce industrial wood from very modest areas of intensively managed forests.

WOODS, BETH

Agricultural and resource economics – contributors to improving the triple bottom line

Agribusiness is shifting from 'produce, then sell' to meeting consumers' identified needs. New technologies — including precision agriculture, integrated information systems, and molecular biology — will feature prominently in delivering customised products. The focus on value creation and distribution, tangible and intangible, and away from commodities cements the end of statutory marketing mindsets, towards networks, alliances and different corporate interests, including health, leisure and customer services. The goal of sustainable resource management is an imperative; the challenge is achieving it. Economics will be an important contributor to innovation processes through policy analysis, managing adjustment, building capacity, and positioning business in a dynamic environment.

ZHONG, FUNING

China's Accession to the WTO: Its Impact on Chinese Agriculture and Rural Economy

Key words: Chinese agriculture, Structural adjustment, Non-farm employment

The accession commitments make Chinese agriculture vulnerable to potential imports in both the short-run and long-run. It is estimated that the imports of bulk commodities during the transitional period require additional 5% adjustment in the structure of Chinese agriculture. As Chinese farmers have been struggling in re-structuring their production since 1996, such pressures are likely to have significant impact on farmers' income, especially in the less-favored areas.
However, the long-run impact on Chinese agriculture may be even more serious. The small-scale production in Chinese agriculture implies co-existence of low income per worker and high labor cost per unit of product. Opening up the agricultural market inevitably requires large scale transfers of laborers from the farm to non-farm sectors if social stability and economic growth are to be maintained.

POSTER ABSTRACTS

BRENNAN, JOHN P. & GORDON M. MURRAY

Assessing the relative threats from crop diseases

A study has been made to define the threat posed by various pathogens to each of the grain crops in Australia within GRDC's mandate, in each of the production zones. The methodology for assessing the relative threats from each of the pathogens, and the diseases that they cause, is described. The framework developed is applicable to other pests, so that all biological threats can be assessed on a common scale. The information provided by this analysis will provide a consistent and comprehensive basis for the GRDC to allocate the research resources for control of the diseases caused by the pathogens.

MONTECILLO, OLIVE P. & JOHN CORBOY

Investing in High Density Planting System for Stone Fruit Production

A commercial scale research project was conducted to evaluate advanced planting systems for stone fruit production on a 55-hectare farm in Merrigum, Victoria. The results indicated that generally, the Open Tatura Trellis (OT) system posted the highest gross margin and net present value but slightly lower internal rate of return than the Central Leader (CL), Tatura Trellis (TT) and Free Standing (FS) systems. CL showed the best financial returns on canning peaches. OT is best suited to the growing characteristics of plums. Where land availability is limited but investment funds are not, the financial returns of OT is more attractive.

CONTRIBUTED PAPER ABSTRACTS

Contributed paper sessions will be held in breakout rooms at the Rydges Lakeside Canberra. The session timetable can be found as a separate handout in your conference satchel.

The first paper will be presented at the time indicated at the commencement of each session. Five contributed papers of 20 minutes duration have been scheduled for each session. Each paper consists of 15 minutes of presentation time and 5 minutes for questions. Questioners should identify themselves and their affiliation. Five minutes have been allowed for room changeover. Times will be strictly adhered to by the chair of each session.

ABDALLA, ALI AND MAX FOSTER

Market implications of restrictions on antibiotic use in food animals

Growing concern about the emergence of strains of bacteria resistant to antibiotics is putting an increasing pressure on governments to reconsider their widespread use in food producing animals. This analysis assesses the economic impacts on Australian consumers and livestock producers if restrictions on the use of antibiotics are implemented. The impacts are estimated for a number of scenarios. The first scenario is a unilateral ban on non-therapeutic use of antibiotics in Australia. In each subsequent scenario, restrictions are applied to an additional country or country grouping to show the incremental impact. A partial equilibrium multi-commodity, multi-country/region econometric model of world agriculture is used to estimate these impacts. Only the costs and benefits that directly affect supply–demand situation in the market for livestock products are considered. Estimation of the impacts on human health through a reduced contribution to antibiotic resistance is beyond the scope of this study.

AGBOLA, FRANK W., PUSHKAR MAITRA AND KEITH R. MCLAREN

The analysis of consumer demand for food in South Africa: An application of the Modified Almost Ideal Demand System

Key words: South Africa, household demand, AIDS model, elasticities

This study examines consumer demand for food in South Africa using a modified version of the Almost Ideal Demand System developed by Deaton and Muellbauer. The system of equations is estimated for meats, grains, fruits,

vegetables, milk products and other foods using cross-sectional Integrated National Household Survey data. Own-price and expenditure elasticities are reported and discussed. Results indicate that demographic and socio-economic characteristics of households are important factors influencing the variation of expenditures on food in South Africa.

AGBOLA, FRANK W.

Exploring the impact of HIV/AIDS on the agricultural sector in South Africa

Key words: South Africa, HIV/AIDS, agricultural sector

This study explores the impact of HIV/AIDS on the agricultural sector in South Africa. The HIV/AIDS epidemic is continuing to evolve at an alarming rate in Sub-Saharan Africa. Eighty-three percent of all the AIDS deaths occur in Africa. In Africa, AIDS now kills 10 times more people a year than war. The Food and Agriculture Organisation estimates that, in the 25 most affected countries, about 7 million agricultural workers have died due to AIDS since 1985. South Africa has the highest new cases of HIV in the world, estimated to be about 1,600 cases a day. Following the dramatic turn of events, the South African government has regarded the HIV/AIDS epidemic a developmental and socio-economic policy issue that needs urgent attention. The prevalence of the HIV/AIDS epidemic is having and going to have dramatic effects on the development of the South African economy, impacting on household spending patterns, human capital base, food security, nutrition and overall economic growth of the economy. This study examines recent developments on HIV/AIDS in South Africa, drawing on experiences from some developing countries in order to make recommendations about policy responses to address the HIV/AIDS crisis in the agricultural sector in South Africa.

AGBOLA, FRANK W., TIMOTHY G. KELLEY, MARTIN J. BENT AND PARTHA P. RAO

A hedonic price analysis of quality characteristics of chickpea in India

Key words: Hedonic price analysis, quality characteristics, chickpea, India

This paper examines consumer attitudes to quality characteristics of chickpea in India. A linear hedonic price functional form was estimated using price and quality data of 52 kabuli and 128 desi-type chickpea samples obtained from major chickpea markets in India. Empirical results indicate that physical quality characteristics and purity standards are important factors influencing consumption decisions in the Indian chickpea market. The chemical quality characteristics have been found to be unimportant in influencing consumption decisions due to their cryptic nature. The implicit values of the physical quality characteristics and purity standards are reported. The results demonstrate that there is an incentive for breeders, producers and exporters to improve the quality characteristics of chickpea export because consumers in India discriminate between chickpea varieties based on their physical characteristics and purity standards.

AKMAL, MUHAMMAD

The structure of consumer energy demand in Australia: an application of a dynamic almost ideal demand system

By parametersing the Almost Ideal (AI) demand system as a vector error correction model (VECM), this papers studies the structure of consumer energy demand in Australia. Domestic per person energy use is divided into the consumption of electricity, gas and a miscellaneous category, residual fuels, with non-energy household consumption expenditure closing the system. The AI/VECM model is estimated using national-level quarterly data covering the period from the third quarter 1969 to the second quarter 1998.
A univariate cointegration analysis suggests that the model variables are at most I(1) and the residuals, obtained from the estimation of the static AI model, are I(0), indicating the existence of the underlying steady-state relationship. For the purposes of estimating the dynamic expenditure system, the non-energy equation is arbitrarily dropped and the remaining three equations are estimated using Zellner's iterative non-linear seemingly unrelated regression procedure.
The restrictions implied by the static model are not supported by the data, indicating the indispensable nature of the adjustment parameters in the model. Symmetry restrictions, which are tested using the dynamic system as the maintained model, are not rejected even at the 10% level. The underlying expenditure function, however, violates quasi-concavity frequently, although it is strictly quasi-concave at the sample means, where elasticities are evaluated.
The demand for electricity and gas — the two main fuels which account for more than 90 of household energy expenditure — is price

inelastic, whereas that of residual fuels is highly price elastic. Contrary to expectations, electricity and gas are strong complements, whereas the other fuel pairs are significant substitutes. Gas demand is particularly sensitive to residual fuel prices, which lends support to the generally held notion that gas share in Australia has increased at the expense of oil.

ALAOUZE, CHRIS M.

The economics of bycatch reduction devices in regulated fisheries

Bycatch reduction devices increase the equilibrium population of the bycatch species at every level of effort directed at the target species of fish. Also, cost per unit of effort is increased and this reduces effort and profit. It is shown that for effective bycatch reduction devices, the fall in effort makes an unimportant contribution to the increase in the equilibrium population of the bycatch species. Thus, it is concluded that mandatory bycatch reduction devices be introduced at minimum cost. That is, without additional regulations which mainly reduce effort and profit.

AMBARAWATI, I GUSTI AGUNG AYU, GARRY R. GRIFFITH & HUI-SHUNG (CHRISTIE) CHANG

Assessment of beef cattle development schemes on farm performance in Bali.

Key words: Beef cattle development, policies, gross margin assessment.

The beef industry in Bali is dominated by smallholders. Three different beef cattle development schemes have been introduced to encourage beef production, including the Beef NES scheme, the Food Safety Credit and the Food Safety Project. They differ in profit/ cost sharing arrangements. The Beef NES scheme is conducted under a contract farming system between farmers and finance providers. The Food Safety Credit provides subsidised credit to farmers, while the Food Safety Project is a pilot project under the Bali government grant. A gross margin analysis is conducted to compare profitability of the schemes. The results show that the Food Safety Project provides the highest gross margin to farmer participants.

ANTONY, GEORGE

The political ecology of environmental priorities in Australia

Analyses of environmental conflicts are incomplete if restricted to scientific attributes while ignoring the political and economic motivations of the protagonists. In a quick overview of major areas of environmental conflicts in Australia, the drive to conserve forests is used as the basis of comparison. It is argued that, at times, popular sentiment and activism influenced policy decisions ahead of ecologial and economic significance. Inherent in this tradition is the danger of ignoring environmental issues where there is little popular or activist interest and ecological/economic stakes are not clearly defined, even if potentially substantial.

BARI, MAKSUDUL & ARTHUR BUCKINGHAM

Economic Impacts of Native Vegetation Retention Targets in New South Wales

Key words: Regional Economic Impacts, Native Vegetation, Clearing, Targets

Over clearing of native vegetation results in significant land degradation, threaten biodiversity and impact on various social, cultural and heritage values. To improve the effectiveness of implementation of the NSW Native Vegetation Conservation Act 1997, the Department of Land and Water Conservation has commenced a process to develop and implement targets for native vegetation retention and revegetation. Limiting clearing to target rates is expected to provide broad environmental and social benefits. It will, however, result in forgoing various economic benefits from more intensive forms of land use. This paper provides an estimate of the economic impacts of interim bio-regional targets for native vegetation retention in NSW set for the 2001–2002 financial year. Note: Views expressed in the paper are those of the authors and not necessarily of DLWC.

BATHGATE, ANDREW & J. MADDEN

A review of economic studies of salinity in NSW

Key words: Dryland salinity, salinity management, economic analysis

Recently the funds allocated to combat the increase in dryland salinity have been increased substantially. A small proportion of

these funds will be used to undertake economic analyses. As part of the NSW salinity strategy economic studies will be undertaken to determine the viability of management options. During the past 15 years a range of economic studies have been completed in different areas of the state, and extensive effort has been undertaken to collect physical data to characterise the problem and the options for salinity management. It is appropriate, therefore, that previous work is reviewed to determine the range of issues that have been studied and the methods applied. This information may assist in determining priorities for economic analysis. In addition, the nature of the salinity problem in NSW is also discussed in light of new information.

BAUMANN, ANNETTE

The commercialisation of genetically modified crops: The case of canola in Western Australia

The introduction of genetically modified canola to the Australian agriculture is associated with a number of problems: concerns expressed by various groups of stakeholders — for example, researchers, the agricultural and the biotechnology industry and consumers — include gene flow, the development of herbicide resistance in weeds and other negative environmental and health effects. This study aims at investigating the causes of those concerns and addresses relevant solutions. A preliminary qualitative study showed that it is necessary to enhance communication among all major groups of stakeholders in order to address and, if possible, eliminate their concerns.

BEG, A.B.M.R.A., M.E. QURESHI, & M.K.WEGENER

Impact of various shocks in a co-integrated system of sugar price

It is well known that many univariate macroeconomic time series can be well described by a single equation ARIMA model. So differencing the data produces a series that appears to be covariance stationary. But for multivariate model it is not clear what kind of transformation should be used. If the time series are cointegrated, its system dynamics can be decomposed into transitory (T) component and common trend (CT) component. The common trend can track the movement of any of the specific series in the system. It is, therefore, interesting (i) to examine how the system dynamics will react to different innovations to the transitory and common trend components, and (ii) to investigate whether the common trend and transitory innovations can be linked in different ways to changes in macroeconomic variables. These two issues can be examined by Innovation accounting and by the Granger causality tests to examine whether the common trend and transitory innovations are related to macroeconomic changes in VEC models. We will explore these issues with reference to the spot prices of the leading sugar exporting countries.

BEGHIN, JOHN C., JEAN-CHRISTOPHE BUREAU & SUNG JOON PARK

Food Security and Agricultural Protection in South Korea

Key words: Korea, agricultural distortions, food security, protection, targeting, WTO negotiations

As part of its food security policy, South Korea has been pursuing food self-sufficiency using nearly prohibitive tariffs and high administrative prices in key agricultural and food markets. Using a dual approach to trade and trade restrictiveness indices, we analyze the impact of these market distortions on welfare and trade volume. Then, we compute optimum distortions, which minimize the welfare cost of observed self-sufficiency and productions objectives. We rationalize these optimum distortions as what could be claimed as legitimate protection under a "food security" (FS) box in WTO negotiations. FS-box protection is sensitive to changes in the definition and the extent of the FS objectives. We show that FS via production targets and reliance on imports would more palatable to consumers and trade partners, while preserving rents to the farm sector.

BEGHIN, JOHN C., BARBARA EL OSTA, JAY R. CHERLOW & SAMARENDU MOHANTY

The Cost of the U.S. Sugar Program Revisited

We analyze the welfare cost of the U.S. sugar program, using a multimarket model of U.S. sweetener markets, which includes raw crops, sugar extraction and refining, and sweetener users (food-processing industries and final consumers). We address the industrial organization of food industries using sweeteners and treat the United States as a large importer. With the removal of the program, cane growers, sugar beet growers and processors would lose $307, $650, and $89 million (1999 prices), respectively;

sweetener users would gain $1.9 billion; World prices would increase by 13.2 percent. The deadweight loss of the program is estimated at $532 million. **JEL Classification**: Q18, Q17, F13.

BELL, ROSALYN & STEPHEN BEARE

Capturing benefits from water trade

While there is potential for substantial benefits from water entitlement trade, external effects such as salinity may mean that those trading cannot realise these benefits and so the resulting allocation of water may be far from optimal. With a trading house as a single seller of water entitlements and trade profits distributed to buyers, it is demonstrated that an allocation of entitlements can be achieved which gives a social outcome higher than that possible from atomistic competition for entitlements. Such a result may be comparable to an optimally set uniform charge for water entitlements, but makes use of trade to generate information on the optimal level of charging in the presence of salinity. Furthermore, it may be preferable to agents in terms of the resulting income distribution.

BENNETT, JEFF, MARTIN VAN BUEREN & STUART WHITTEN

What Value Viable Country Communities?

Key words: Country communities, viability, choice modelling

Ensuring the continued viability of rural and regional communities in Australia has become a high priority politically. Economic and environmental forces are perceived as threats to viability. Declining terms of trade for agricultural commodities along with decreased relative prices for transportation and communication services have led to fewer and more concentrated regional centres. Environmental threats such as dryland salinity are perceived as potential future causes of diminished settlement densities. In Europe and the United States of America, similar political pressures to keep rural communities viable are also apparent, often as a component of the "multi-functionality" of agriculture. Given that these pressures are manifest in the form of demands for public resources, the question is whether or not the tax paying public enjoy benefits from any resultant improvement in country community viability. As an integral component of a number of recent non-market, environmental valuation exercises, the value of these benefits have been estimated. The results demonstrate a positive "existence value" held primarily by urban dwellers for country communities.

BLACK, JONELLE.

Discovering common ground in natural resource management: incorporating concepts of fairness in choice modeling

Consumer preferences for non-market goods and services can be elicited using stated choice methods (Lourviere et al 2000). In recent years, choice modelling has provided a framework for economic research on consumer preferences for a diverse range of environmental features throughout rural and urban Australia (Bennett and Blamey 2001).

When applying a choice experiment, the survey respondent must choose between a number of scenarios. In doing so, the respondent **implicitly** reveals what components (or attributes) of the scenario they value and what they are willing to trade-off to achieve a particular outcome. When applied to natural resource management scenarios, this provides an important mechanism to predict shifts in community behaviour.

However, choice experiments do not go as far as **explicitly** revealing why a respondent arrives at a particular decision — it overlooks the judgement process and instead focuses on the outcome of the decision. This is not to say that the judgement process is devoid of theory and application — research is typically within the discipline areas of psychology and sociology.

A particular finding of environmental sociologists working in Australia is that **fair** decision making processes are of paramount importance to community acceptance of natural resource management decisions (Syme et al 1999). Research has also indicated that workability and effectiveness are important criteria in the acceptance of environmental policies (McCann 2000).

This paper reviews the concept of fairness in natural resource management decisions and provides a framework for it to be included in choice experiments.

PATTON, DEAN & JOHN BRENNAN

Changed payment system for wheat grades: The consequences for farming systems in the Central West of NSW

Key words: Linear programming, New South Wales, farming systems

The new AWB Ltd payment system for wheat grades has changed the incentives for farmers

to grow and market wheat varieties in Australia. Based around standard quality characteristics, the payment system provides incremental premiums and discounts for deviations in protein and screenings around this standard. The aim of this paper is to compare the optimal crop–pasture rotation using the previous cliff-face pricing structure with the new premiums and discounts pricing structure. The optimal rotations are analysed by applying a linear programming model of farming systems in the Central West of NSW (PRISM Condobolin). To assess the robustness of our results, optimal rotations are also compared for a range of cereal and oilseed prices. It was found that the new pricing structure favours increased wheat production by reducing the relative economic importance of beneficial rotation crops, particularly canola, and pastures (such as lucerne). This is an important finding, given the need to develop and promote more ecologically sustainable farming systems that are not dominated by wheat production.

BRENNAN, LISA & BOB MCCOWN

Reinventing farm management economics in farming systems research

Key words: Farming systems research, farm management research, economics

In the main, Australian agricultural economics has been in the background in the recent trend toward convergence of research and farming practice which has become known as Farming Systems Research (FSR). However, the inherent importance of good economic performance of farms suggests that FSR that is effective in supporting farm management practice might well include economics. There was a time when economics played a dominant role in a direct link between farming and research about farming. This was in the days of a research movement known as Farm Management Research (FMR). Lessons from the subsequent rise and fall of the FMR era seem to have gone largely unnoticed by conventional agricultural research. However, the demise of FMR made some important contributions to the idea and development of the FSR approach in lower income countries. Maybe it is time to ask if the reports of the death of FMR have been exaggerated, and if within a dynamically evolving FSR, a reinvention of FMR might be desirable and feasible in Australia? This paper examines this possibility. We conclude that there are opportunities to bring economists from the background to the foreground of FSR by using 'hard systems' tools, such as systems simulation, in new ways through participatory action research.

BURTONA, MICHAEL, DAN RIGBYB, TREVOR YOUNGB & SALLIE JAMESA

Consumer Attitudes to Genetically Modified Organisms in Food in the UK

This paper reports the results of a study of UK consumer attitudes to food safety as they relate to Genetically Modified Organisms (GMOs) and the extent to which they translate into a relatively high willingness to pay to avoid these products. The results indicate the relative importance of different aspects of the food system in forming preferences, and that GM food is only one of a number of concerns, albeit a significant one. The results also indicate that attitudes towards organic food may be taken as a useful indicator of attitudes towards GM technology, as the preference structure that underlies the former also appears to inform the latter. Significant differences are found between attitudes to GM food in which plants are modified by the introduction of genes from other plants and those in which they are modified by the introduction of genes from animals and plants.

CACHO, OSCAR J., ROBYN L. HEAN & RUSSELL M. WISE

Carbon-accounting methods and reforestation incentives

Key words: Climate change, carbon accounting, reforestation, bioeconomics

The emission of greenhouse gases, particularly carbon dioxide, and the consequent potential for climate change are the focus of increasing international concern. Eventually, an international agreement will likely be enacted to reduce greenhouse gas emission levels and assign rules for emission trading within and between countries. Temporary land-use change and forestry projects (LUCF) can be implemented to offset permanent emissions of carbon dioxide from the energy sector. Several approaches to accounting for carbon sequestration in LUCF projects have been proposed. In this paper, the economic implications of adopting these different approaches are evaluated in a normative context, based on simulation of Australian farm-forestry systems

CAO, LIANGYUE, NICO KLIJN & TRISH GLEESON

Modeling the cost to the beef industry of a temporary loss of export markets in case of a foot and mouth disease outbreak in Australia

Key words: Foot and mouth outbreak, dynamic bio-economic modeling, Australian beef industry

The size of cost to the Australian beef industry of a potential loss of major beef export markets following an outbreak of foot and mouth disease (FMD) in Australia is important in determining appropriate precautions. The size of this cost is evaluated with a dynamic bio-economic model of Australian beef production, consumption and export trade. The model used represents forward-looking competitive behaviour of beef producers and traders on domestic and export markets based on perfect foresight.

CHEN, YU-HUI, & CHUNG-CHIANG CHEN.

The Structural Adjustment of the Taiwanese Rice Industry: A Contract Theory Approach

Key words: Rice policy, principal agent approach, structural adjustment

The adjustment of the Taiwanese rice policy is inevitable in the near future. Although keeping the well-managed farms staying in and encouraging the less efficient ones out of the business may be an intuitive way, but how to distinguish farmer's efficiency or design a proper policy scheme is the most important way to proceed. Set forth on the principal-agent model, a three-stage rice policy scheme is designed to achieve the goals of revealing farmers' production information in the short-run and adjusting the production structure of the Taiwanese rice industry and the reduction of AMS in the long-run.

CHEN, YU-HUI, CHUNG-CHIANG CHEN & YEA-HUE CHEN.

To Participate or Not to Participate the Set Aside Program: A Three Stage Indifference Price Approach

Key words: Set aside program, three-stage indifference price approach

Keeping the pace with the limited quantity guaranteed purchasing, the set aside program became one of the major policies in Taiwanese rice industry in recent years. Although the government was optimistic of introducing the policy, but never get the chance to conduct any analysis to investigate the accomplishment of the policy enforcement. A three-stage indifference price approach is applied to investigate the farmer's participation tendency of the set-aside program. Our findings suggest that the probability of participation for a poor-managed farmer is higher than that of a well-managed one under a certain expected market price.

CHOI, JUNG-SUP, ZHANG-YUE ZHOU & ROD J. COX

Beef Consumption, Supply and Trade in Korea

Key words: Beef, Market Opening Up, Korea.

The Korean beef market has been heavily protected. However, there have been significant changes taking place to Korea's beef market protection since the beginning of 2001. In January 2001 beef import quotas were lifted and replaced by an import tariff. The dual retail system — where domestic and imported beef are sold separately — was abolished in September 2001 and now domestic and imported beef can be sold in the same outlet. In addition, any retailer is now able to sell imported beef. As a major beef producer and exporter, what is happening in the Korean beef market is of great relevance to the Australian beef industry. In this study, we examine beef consumption trends in Korea; Korea's beef cattle production and its beef supply potential; beef import prospects; likely responses in the Korean beef industry as a result of the beef import tariffication; and beef trading arrangements in Korea. We also draw implications on how the Australian beef industry may capitalise on the opening up of the Korean beef market.

CHUDLEIGH, FRED C., COX, HOWARD W. & CHAPMAN, VERONICA J.

Modelling Profitable and Sustainable Farming Systems in Central Queensland

Key words: Whole farm economics, APSIM, crop modelling, climate variability, farming systems research

Central Queensland's dryland farming systems are subject to high levels of climatic variability, are seen as being relatively risky and also suffering falling profitability due (in part) to the rapid decline of nutrient content and physical structure of soils. This suggests that many farming practices in Central Queensland are not sustainable.

A multi agency project that uses participatory on-farm research and development processes has been addressing the core issues that contribute to more sustainable and profitable farming systems in Central Queensland. A component of this research has been the enhancement of farming systems knowledge through combining relevant whole farm models with biological models developed by the Agricultural Production Systems Research Unit (APSRU). The result of this simplified bioeconomic modelling is that the profitability and sustainability of a range of farming systems has been simulated and evaluated over time and under varying environmental conditions.
The suitability of this approach as a component of farming systems research aimed at changing farming practices is discussed.

CLAYTON, HELENA.

Intertemporal issues facing rice-shrimp farmers in the Mekong Delta

Key words: Land degradation, sustainability and development, Vietnam

This paper explores the economics of productive land loss in rice-shrimp aquaculture systems in the Mekong Delta. The emphasis is on evaluating the long-term economic tradeoffs associated with land loss under alternative production choices. A bioeconomic spreadsheet-based model is used to evaluate tradeoffs under alternative production scenarios using different assumptions about time preference rates and farm planning horizons. Results indicate that there are limited incentives for farmers to move away from production choices leading to land degrading. The economic dimensions of this result are discussed. The model assumptions imply low opportunity costs as it is assumed that higher value, low degrading technology, is not available. However, there is in fact alternative low land-degrading rice-shrimp technology, yet the high capital outlay and risks associated with such technology has constrained the adoption of these alternatives by the poorer farmers. The results are discussed with reference to the local policy and extension implications.

CONCU, GIOVANNI B. & STEVEN SCHILIZZI.

The role of space in environmental valuation

Key words: environmental valuation, spatial variables, GIS.

Human-environment relationships are significantly affected by the space in which they take place. Space is like a container defined over an array of characteristics of objects in an environment. When valuing natural assets we first identify the objects that fill up the space. Then we turn to analyse their spatial descriptors and which are the plausible roles that these play in the processing of values by human actors. This lead us to propose several methods to elicit values based on spatial indexes, with the help of Geographic Information Systems. We conclude introducing some considerations on the use of spatial indexes for planning environmental policies.

COOK, DAVID & ROB FRASER

An Economic Method for Empirically Assessing the "Appropriate Level of Protection"

Key words: Interstate Quarantine, Appropriate Level of Protection

Australia's membership of the World Trade Organisation has generated a need for analytical techniques demonstrating that the behaviour of its internal markets and regulatory authorities for food and food-related products conform to the provisions of the Agreement on Sanitary and Phytosanitary Measures (SPS Agreement). However, since quarantine has long been considered a scientific issue, it is as yet unclear what role economic models have to play in this process. This paper shows how consumer welfare effects can be integrated with the traditional producer welfare effects in quantitative analytical models using the examples of the mango and tomato industries in Western Australia, both of which enjoy quarantine protection from interstate growers.

COOPER, IAN M.

A bibliography of Australian farm management research and publication.

One of the outcomes of the merger of the Farm Management Society of Central South Australia and AARES was a project to record the history of the Australian Farm Management Society. As part of this project it was decided to develop a bibliography of Australian Farm Management Research and Publication. It has been produced as a web site to facilitate further development. One of the problems is what to include or exclude from the bibliography. This hinges on one's definition of

'Farm Management'. The approach taken will be explored and progress to date reported.

COYLE, PETER & CHRIS MAYBERRY

A comment on an $8 million state government support package for adverse seasonal conditions in the Western Australian agricultural sector, 1998 to 2001

Key words: Adverse weather, grant scheme, adjustment process, exiting

In response to a series of adverse weather events from 1998 to 2000, in parts of the cereal crop belt, the State Government of WA implemented a grant scheme. Farmers, who could demonstrate in two of those three years that their expenditure was greater than 85% of their income, due to adverse weather conditions, would be eligible to receive a $5,800 grant. Due to the size of the grant, eligibility criteria relating to viability and equity were not included.
Comments on the grants being paid to farmers having multi-million dollar equities in their farms are included. Discussion on the ability of farmers to withstand some poor seasons is related to this grant affecting exiting decisions. The scheme will adversely affect the normal adjustment process, where farm size has steadily increased, that has occurred throughout Western Australian agricultural areas over the last one hundred years or so.

CRASE, LIN, BRIAN DOLLERY & MICHAEL LOCKWOOD

Transaction costs and foregone welfare in the market for permanent water in NSW.

A threshold value approach is combined with the transaction cost framework associated with New Institutional Economics to consider the problem of enhancing the water rights of individual irrigators. Welfare estimates deriving from a choice modelling experiment that involved over 500 irrigators are used to quantify the difficult policy choices confronting legislators in this complex field. The results provide some guidance to the minimum environmental values to justify the substantial attenuation of water property rights.

CROSTHWAITE, JIM, KIM LOWE, & GARY STONEHAM.

Biodiversity conservation: measurement and economic analysis

The science of biodiversity conservation has come of age in Australia. The combined effect of better information on conservation priorities and improved mechanism design means that it is now possible to implement cost-effective biodiversity conservation schemes. We outline recent advances in the development of databases, mapping tools and concepts for characterising the quality and spatial attributes (location, size, connectivity) of native vegetation and species' habitat. The conservation strategies that provide impetus for these developments are emphasised. The paper also highlights the direct and indirect efficiency gains from new mechanisms employed for biodiversity conservation.

DEMONT, MATTY & ERIC TOLLENS

Ex-ante Welfare Effects of Agricultural Biotechnology in the European Union's Sugar Industry

Key words: Agricultural biotechnology, sugarbeets, welfare, European Union

Since 1995, genetically modified organisms have been introduced commercially into US agriculture. In the US, the first ex post welfare studies reveal that farmers and input suppliers are receiving the largest part of the benefits. However, up to now no parallel ex ante study has been published for the EU. We develop a theoretical welfare framework, which explicitly recognizes that research protected by intellectual property rights generates monopoly profits. The result is a stochastic equilibrium displacement model, shaped to the EU's sugar sector, and enabling to assess the size and distribution of the benefits of transgenic sugarbeet adoption in the European Union and the Rest of the World.

DONAGHY, PETER, JOHN ROLFE & JEFF BENNETT

Disaggregating consumer demands for organic and genetically modified foods using the Choice Modelling technique.

Key words: Genetically modified, organic, demand, choice modelling

Issues about consumer demands for genetically modified and organic food remain highly topical in Australia. It is unclear how consumers perceive issues associated with food production such as food safety, environmental impacts or animal welfare. It is also unclear how consumers might value potential changes in those issues. This paper reports on research using the choice modelling

technique to estimate and compare consumer demand for genetically modified and organic foods against conventional alternatives in Australia. The case study considers commodities including tomatoes, milk and beef. The results provide some indication of the contribution of associated factors with consumer choices, as well as exploring consumer values for higher food safety standards. The results are of relevance to the current policy debate regarding the introduction of GM foods to Australia.

DUKE, CASON, GANGADHARAN,STONEHAM, STRAPPAZZON, AND EIGENRAAM

A Laboratory Study of Auctions for Reducing Non-Point Source Pollution

Problems like nutrient control often involve asymmetric information. For example, only landholders know their opportunity costs of alternative production processes or land use changes, while government regulators may have better information about the relationship between various land use changes and benefits for the environment. Land use decisions therefore depend on the information revealed from both private landholders and regulators. In this paper we report a testbed laboratory auction experiment to study what kind of information structure leads landowners to reveal their costs and allows the regulator to award land management contracts to minimize pollution control costs. Sellers in these multi-round, sealed-offer auctions compete to obtain part of the fixed budget allocated by the regulator to subsidize pollution abatement. In one treatment the regulator reveals to these landowners the amount of environmental benefit associated with alternative projects they could undertake, and in another treatment it does not. Our preliminary results indicate that winning offers exceed project costs by a greater amount when landowners know their projects.

DWYER, GAVAN, PHILIP HUGHES & DEBORAH PETERSON

Constraints to private conservation of biodiversity

Key words: Biodiversity, constraints, conservation, private sector

The private sector plays an important role complementing and supplementing public conservation of biodiversity. However, the private sector is constrained from undertaking otherwise desirable conservation activities by institutional constraints.This paper reviews how elements of the land tenure, competitive neutrality, native wildlife and taxation frameworks may be affecting private conservation initiatives. These frameworks are characterised by extensive and often complex legislation and regulation. At times their interpretation or application can be uncertain. Inconsistent policy, a lack of complementary policy between jurisdictions, and interactions between constraints magnify these problems.

EBNESHAHIDI, DR. HAMIDREZA

Trade liberalisation in the wheat industry

Key words: Simulation-based solution method, wheat, and trade liberalisation.

Dynamic spatial equilibrium models are an empirically useful way of analysing policies. However, the models have not been extensively used due to the lack of an easy solution method. A new simulation-based solution method developed in this study and used to examine the trade liberalisation in the wheat industry. Also, a number of games were conducted to verify the social net benefits and the net benefits to consumers, producers, and taxpayers. The results are reasonable and show that a more comprehensive dynamic spatial equilibrium model has a promising future in policy analyses.

EDWARDS, GEOFF

The dairy industry "adjustment" package: public policy issues

Key words: dairy industry, deregulation, adjustment package

The restructuring package that accompanied deregulation of the Australian dairy industry in 2000 is considered from a public policy perspective. Several questions are raised, including: the case for an assistance package; whether the package can be viewed as adjustment assistance; the appropriateness of a consumer tax for funding the package; and whether the policy process for deciding on the assistance was conducive to sound public policy making. Questions are also asked about implications of the dairy restructuring package for policy toward highly assisted manufacturing industries.

EIGENRAAM, M., C. BEVERLY, & G. STONEHAM.

Resource degradation: the economics of soil acidification

Key words: soil acidification, dynamic optimisation, degradation

Computer modelling techniques provide one source of information for the management of land and water degradation issues. They can help to reveal the relationships between landholder management decisions and the rate of resource degradation. This paper discusses computer-modelling approaches to investigating technical solutions to land and water resource degradation. The paper draws from research funded by the GRDC into the processes of soil acidification, and research being undertaken by the Economics Branch, Victoria. The principles and methodology of this research are germane to research issues in soil and water salinity. This paper focuses on the assessment of alternative technical options for the management of land and water degradation with the aid of computer simulation and optimisation techniques. Further, a general comment is made about the type and usefulness of computer modelling as an input to the management of degradation.

EIGENRAAM, DUKE, STONEHAM, & STRAPPAZZON

Auctions for conservation contracts: an empirical examination of Victoria's Bushtender scheme

In this paper we provide an analysis of Victoria's Bushtender scheme. Bushtender is an auction-based approach to allocating conservation contracts that was trialed in two Victorian regions from July through December 2001. In this paper, we analyse the bids provided by farmers. We examine whether bids seem to be competitive, and hence whether the scheme could provide good value for money if extended to the rest of Victoria.

FLEMING, CHRISTOPHER M. & ROBERT R. ALEXANDER

The Economic Implications of a Multiple Species Approach to Bioeconomic Modelling.

Key words: Bioeconomic Models, Endangered Species, Conservation, Wildlife

Ecologists frequently note the importance of modelling entire ecosystems rather than single species, but most bioeconomic models in the current literature focus on a single species. While the mathematical difficulty of multiple species may quickly become overwhelming, sometimes making the single species option necessary, it is important to recognise the significance of the single species assumption to the model results. In this paper, the authors address the economic significance of this assumption through the development of a multiple species model, and demonstrate the importance of interrelationships and economic values to the survival of endangered species.

FRASER, ROB

Moral Hazard and Risk Management in Agri-Environmental Policy

This paper develops the key finding of Hogan, Ozanne and Colman (2000) that risk aversion among farmers ameliorates the moral hazard problem in relation to agri-environmental policy compliance. It is shown that risk averse farmers who face uncertainty in their production income are more likely to comply with such a policy as a means of risk management. In addition, it is shown that a principal who has control over both the level of monitoring and the size of penalty if detected can reduce non-compliance by adjustments to these instruments which increase the variance of farmers' income but leave the expected penalty unchanged. It is concluded that risk management by both principals and agents has the potential to diminish the moral hazard problem, especially given proposed developments in agri-environmental policy in the European Union.

FRASER, IAIN, & WILLIAM C. HORRACE

Technical Efficiency of Australian Wool Production: Point and Confidence Interval Estimates Sheep Productivity in South West Victoria.

Key words: Technical Efficiency, Multiple Comparisons with the Best, Wool Production

A balanced panel of data is used to estimate technical efficiency, employing a fixed-effects stochastic frontier specification for wool producers in Australia. Both point estimates and confidence intervals for technical efficiency are reported. The confidence intervals are constructed using the Multiple Comparisons with the Best (MCB) procedure of Horrace and Schmidt (2000). The confidence intervals make explicit the precision of the technical efficiency estimates and underscore the dangers of drawing inferences based solely on point estimates. Additionally,

they allow identification of wool producers that are statistically efficient and those that are statistically inefficient. The data reveal at the 95% level that twenty of the twenty five wool farms analysed may be efficient.
JEL CLASSIFICATION NUMBERS: C12, C23, D24

FRITSCHY, SIGMUND

Effective models of community consultation.

Company Environment Improvement Plans created under Victoria's Environment Protection Act often involve the formation of ongoing Community Liaison Committees (CLCs) at industrial sites. Industry, community and EPA participants were interviewed to assess the value of local community participation in improving environmental performance. The opinions of participants were reviewed to establish best practice guidelines for community consultation.

FULLER, FRANK, JOHN BEGHIN, STEPHANE DE CARA, JACINTO FABIOSA, CHENG FANG, & HOLGER MATTHEY

China's Accession to the WTO. What Is at Stakes for Agricultural Markets?

We analyze the impact of China's accession to the WTO on agricultural markets using the FAPRI modeling framework. Our analysis includes major crops, livestock sectors, and exogenous changes in consumer income, expanded textile production, and policies. Chinese livestock, grain and oilseed crushing industries experience lower revenues, while cotton production prospers with accession, despite increased cotton imports. Most food prices decrease with accession. Chinese consumers benefit from these lower prices, with vegetable oil, dairy and meat consumption increasing significantly. The increase in world agricultural trade with China benefits Argentina (soy meal and oil); Brazil (soy oil and poultry); Canada (pork); the EU (pork); and the United states (pork, poultry, soy oil).

GABUNADA, FE, MARIA FAY ROLA-RUBZEN & RIA MESORADO

Credit Constraints and Opportunities for Smallholder Producers in the Philippines

In the Philippines, farmers have often cited the lack of access to capital as the main impediment to increasing agricultural production. Production and marketing expenditures of smallholder farmers are predominantly financed by traders and household savings. Product, input and credit markets are strongly interlinked and involve both the formal and informal sectors. Formal credit institutions however adhere to stringent collateral requirements and in many cases have failed to reach the poor farmers. On the other hand, informal credit sources have provided a flexible and accessible service to smallholder farmers, albeit often at high interest rates. The concern of policy makers about the use of informal credit sources by farmers as the major source of credit relates to the possible exposure of the later to exploitation by informal credit sources. This research aims to understand the existing financial systems available to smallholder livestock farmers in Southern Leyte, Philippines. It investigates the constraints and problems faced by livestock farmers in relation to access to capital, identifies opportunities to overcome credit constraints and formulates recommendations for improving the current credit system and improving access of smallholder farmers to credit.

GILLESPIE, ROBERT.

Measuring the Benefits of Reticulated Sewerage — Expectations and Expert Property Valuation

Key words: Expert property valuation, expectations, sewerage reticulation, benefit cost analysis

In a competitive market, property asset prices reflect the value of the services generated by a property for its owner, including productive and consumptive environmental services. The analysis of property values can therefore provide considerable insight into the benefits of programs that have environmental, recreation, health and amenity benefits for property owners. Three property valuation approaches can be used to estimate the benefits to households of environmental programs. These include statistical models of house prices, assessment of property price differentials by property valuation experts or by surveying property owners themselves to determine the value differentials they perceive. However, great care needs to be taken in using the expert or property owner valuation approaches. Estimated property price differentials "before" and "after" an environmental program may not reflect the full economic benefit to households if expectations of an environmental improvement have already been built into property values. This can greatly affect the outcome of a benefit cost analysis. An approach to estimating the

economic benefits enjoyed by households about to be connected to a reticulated sewerage scheme when expectations were already partly reflected in property prices is detailed. The approach is illustrated using case studies of priority sewerage areas on the fringe of Sydney.

GRAFTON, R. QUENTIN, KATHLEEN M. DAY & STEPHEN KNOWLES

Social Capital and Environmental Degradation

Key words: Social capital, environmental degradation

Using data from 58 different countries and various measures of social capital and environmental degradation, the paper assesses the causal links between social capital and environmental performance.

GRAHAM, BRETT & ROD TYERS

Global Population Forecast Errors, Economic Performance and Food Demand: Preliminary Simulations

We begin with the recent analysis of global population forecast errors by the US National Academy of Sciences (Bongaarts and Bulatao, 2000). We adapt a standard global economic model to estimate the implications of the global and regional population forecast errors suggested by this study, via their demographic and income effects, for the composition of global food demand. The model is "GTAP-Dyn", a recursively dynamic, applied general equilibrium model of the world economy (Ianchovichina and McDougall, 2000). It extends the standard comparative static GTAP model of Hertel (1997) and it offers a more complete characterisation of international capital mobility, capital accumulation and investment. Moreover, it is better-suited analysis of long-term economic change than its better-known comparative static counterpart.

GREINER, ROMY

Further lessons from the Ord. How realistic is the prospect for ecologically sustainable development in Australia's Kimberley region?

The Kimberley is facing strong interest in the expansion of commercial uses of the region's natural resources. To ensure that future development and management of the region's resources would be in line with ESD principles, a R&D Program, entitled Ord-Bonaparte Program (OBP), was designed to support decision makers, planners and managers of natural resources. The idea was to provide integrated science and to complement existing community engagement processes, specifically with respect to the involvement of the indigenous peoples in the region. The OBP was to achieve this by (1) providing better data and integrated understanding of biophysical, socio-economic, cultural and institutional aspects of NRM, (2) integrating across multiple natural-resource based industries including agriculture, aquaculture, fishing, grazing and tourism as well as indigenous and non-market uses of the resources, (3) combining the capability of all relevant local, regional, state and federal stakeholders, and (4) providing processes that would involve a community base with specific emphasis on Aboriginal participation. In the process of its implementation, in response to the concerns of key regional stakeholders, the original concept of the OBP was stripped of some core foundations of its integrative intent, namely socio-economic and institutional analysis, integrated investigation and information delivery, and inquiry into tourism and non-commercial activities. This paper demonstrates the need for socio-economic analysis and integrated assessment and attempts to elicit why those lines of investigation are seen by key players as undesirable. There is much evidence to suggest that regional development in the region remains driven by narrow economic considerations and that most of the 'lessons from the Ord' published by Davidson and Graham-Taylor in 1982 have not been learnt.

GRIFFITH, G.R. & CHRISTOPHER .J. O'DONNELL

Testing for market power in the Australian grains and oilseeds industries.

Key words: Market power, conjectural elasticities, grains and oilseeds

Recent empirical studies have found significant evidence of departures from competition in the input side of the bread, breakfast cereal and margarine end product markets. In this study we specify a general duality model of profit maximisation that allows for imperfect competition in the input and output markets of the grains and oilseed industries. The model allows for a variable proportions technology and does not impose restrictions on the relationship between conjectural elasticities in each market. Aggregate Australian data is used to implement the model and draw inferences concerning the presence of market power.

GRIFFITH, G.R, A. CODDINGTON, & S.M. MURDOCH

Beef Feedlot Supply Response.

The Australian beef feedlot industry has undergone considerable growth recently, however the supply of grainfed beef continues to be extremely variable. Feedlot utilisation rates have varied from 39 to 82 per cent. In this study the economic factors that prompt changes in capacity, numbers on feed and therefore utilisation rate of Australian beef feedlots are analysed, accounting for the differences between states and destination markets. The price of fed cattle is found to be the main factor influencing decisions made in the Australian feedlot industry. It is also found that the price of major inputs into feedlots have become more inelastic over recent years.

GYLES, OLIVER

Estimating benefits for dairy production systems from sustainable irrigation practices: Intervention and adjustment in Victorian Land and Water Management Plans

Approaches to valuing regional responses in plant productivity from investment in natural resource management are reviewed. The usefulness of data from surveys for estimating marginal physical product is discussed. Since investment reduces declining trends in productivity, an estimate of value marginal product based on based on milk price has seemed appropriate. But as forage is an increasingly substitutable intermediate product in dairy production systems its value will not exceed that of the least cost substitute. Qualified estimates indicate the extent of overestimation of benefits produced by some previous approaches. Implications for natural resource management policy are considered.

HAFI, AHMED, LIANGYUE CAO & STEVE BEARE

Optimal extraction of water from a groundwater system with two linked aquifers a stochastic dynamic programming approach.

Key words: Groundwater, stochastic dynamic programming, optimal extraction and collocation

With increasing scarcity of surface water resources, groundwater extraction for irrigation becomes increasingly profitable. Due to the interdependence of different water resources in a catchment, the management of all water resources should be integrated. A model incorporating the dynamic process of the state of a two-linked aquifer system, stochastic recharge, water demand and extraction cost is built. The model is applied for the lower Macquarie catchment. For each aquifer, optimal pumping strategies for different states of the overall groundwater system are derived and the time paths of the optimal approach to the optimal steady state levels of extraction and the hydraulic head are obtained.

HAILU, ATAKELTY & TERRENCE S. VEEMAN

Investment in Pollution Abatement and Productivity Change in Canadian Regional Pulp and Paper Industries

The performance of pulp and paper industries in four Canadian regions is compared based on the estimation of an input distance function both with and without pollutant outputs. The environmentally sensitive approach provides higher productivity growth estimates for all regions, indicating the need for adjusting conventional measures that ignore the non-marketed benefits of pollution abatement activities. The results also consistently indicate the presence of substantial differences in the regional levels of technical efficiency.

HAJKOWICZ, DR STEFAN

An evaluation of options for managing dairying in the Lower Murray Reclaimed Irrigation Areas in South Australia using multiple criteria analysis

Dairy farming on the Lower Murray Reclaimed Irrigation Areas (LMRIA), between Mannum and Wellington in South Australia, employs around 200 people, produces 15-25% of the State's milk and has a farm gate value of around $32m/yr. The dairy pastures are typically irrigated by opening gates in levee banks along the Murray River. This allows water to flow over the paddocks and then into a system of channels. The excess water is pumped back into the Murray and is a major source of the River's nutrient and bacterial pollution. Below Mannum, the River Murray may exceed safe levels of bacteria for human contact such as swimming. In light of these problems the South Australian Government recently reviewed a set of options for improved natural resource management. These ranged from upgrades of irrigation infrastructure through to alternative land uses involving the rehabilitation of native wetlands. In order to give explicit consideration of economic and non-economic issues surrounding the

management of LMRIA multiple criteria analysis (MCA) was employed. The MCA technique facilitates evaluation of policy alternatives against a set of multiple, and often conflicting, criteria. In this study the MCA incorporated several monetary and non-monetary criteria to evaluate the options. The MCA process, including weighting of the criteria, was guided by a panel of community members and agency staff. This presentation describes the process of applying the MCA technique and the results obtained. It also reviews the effectiveness of MCA as a tool for natural resource management decision support.

HAN, HONGYUN

Chinese Agricultural Water Resource Utilization in the 21st Century.

Firstly, the present situation of China's water resources and its implications are discussed. As a large country, China is nonetheless resource poor on a per capita basis. With the development of industrialization and urbanization, more and more water resources will be transferred from low-value agricultural use to high-value industrial and residential uses. The challenge now facing irrigated agriculture is how to resolve the contradiction between increasing food demand and decreasing water supply without undermining the growing cities and industrial sector. Secondly, the problems of agricultural water utilization in China are presented: low efficiency, severe water pollution, inequitable distribution, and severe land erosion. Shortage and waste coexists in Chinese irrigated agriculture. Thirdly, an analysis of the causes of inefficient Chinese agricultural water utilization is provided: attenuated property rights, artificially low water prices, lack of user participation in irrigation districts management, fragmented government management, and lack of a compensating mechanism between upstream and downstream users. Against the background of a transitional economy, the lack of economic incentives is because of the inadequately institutional settings, so it is necessary to allocate the water resource through the market. Finally, feasible measures for addressing the problems are given: to establish non-attenuated property rights, to establish a effective price system, and to foster the main body of the market.

HARRIS, DR MICHAEL

Natural resource accounting in theory and practice: a critical assessment

In this paper an extensive review of the theoretical and applied literature on NRA is provided. The review begins by explaining the economic theory that underpins NRA, contrasting welfare and sustainability as policy goals, and presenting various distinct conceptions of national income. The state of play regarding official revisions to the system of national accounts (SNA) with respect to natural resources and the environment is presented and controversial areas are highlighted. Finally, the economic literature on proposed revisions, and applied studies that have proceeded using these methods, is summarised and critiqued. We argue that much of the literature proceeds with weak conceptual foundations, and that typical case studies produce results that are ambiguous in interpretation. Moreover, we highlight fundamental tensions between economic theory and national accounting methodology, and conclude that one outcome of this has been insufficient attention paid by economists to the revisions to the SNA, instead devoting time and effort to "freelance" NRA case studies utilizing sometimes ad hoc methods from the economic literature.

HEAN, ROBYN L. & OSCAR J. CACHO

Evaluating externalities using bioeconomic techniques: the impact of forestry on aquaculture.

Key words: Aquaculture, giant clams, externalities, bioeconomics

In this paper, a bioeconomic model is used to investigate possible externalities imposed by forestry on giant-clam farming in Solomon Islands. This is of economic interest due to the rapid expansion of forestry in that country and the potential for aquaculture to become an important source of cash income for village communities. Forestry may result in externalities through sediment run-off which has a complex array of effects on the seawater in which giant clams are farmed, such as turbidity and nutrient enrichment. These effects are unknown because empirical studies in the field and experimental research in the laboratory have not been done. In the absence of this information, simulation modelling provides insight into the economic implications of the possible effects of sedimentation on the production system.

HEAN, ROBYN L. & OSCAR J. CACHO

Farming giant clams for the aquarium and seafood markets: a bioeconomic analysis

Key words: Aquaculture, giant clams, optimal management, bioeconomics

Giant clams offer small holders throughout the Indo-Pacific with good prospects for commercial culture to satisfy their increasing dependence on the cash economy. Two species appear promising for an emerging village-based export industry in Solomon Islands. These species are Tridacna crocea, the preferred species for the aquarium market, and T. derasa, the species that has the best potential for the seafood market. In this paper, a bioeconomic model is used in a normative analysis to explore optimal management strategies for village farmers producing these clams. The normative study provides a benchmark against which current practices can be evaluated.

HENDERSON, BEN & ROSS KINGWELL

The Technical and Allocative Efficiency of Broadacre Farmers

Key words: farm efficiency, data envelopment analysis, stochastic frontier analysis

The technical and allocative efficiency of broadacre farmers in a southern region of Western Australia is investigated over a three-year period. Applying data envelopment analysis (DEA) and stochastic frontier analysis (SFA) reveals there is some inefficiency in each year, which decreases over time. The distributions of technical efficiency in each year are positively skewed toward higher efficiency levels, indicating a majority of farms produce close to their maximum technical efficiency. DEA and SFA produce similar efficiency rankings of farms yet DEA rankings are more stable.

The relationships between farm-specific variables and the DEA and SFA efficiency scores are investigated. There is evidence that farmers benefit from using at least a small amount of tillage, rather than using 'no-till' practices. Education levels and farmer age are found to positively influence technical efficiency.

Using a DEA profit efficiency model, the duality between the directional distance function and the profit function allows the decomposition of economic efficiency into its technical and allocative components. Greater gains in profitability are possible by improving allocative rather than technical efficiency. Technically efficient farms are not necessarily allocatively efficient. Also, Tobit regression results indicate that the variables associated with variation in technical efficiency are different to those explaining the variation in allocative efficiency.

HENDERSON, TRACY

Evaluating the performance of collaborative research and development activities.

Key words: Research evaluation, collaborative research, sugar, Co-operative Research Centre (CRC), performance evaluation

Collaborative research and development (R&D) activities involve researchers working closely with industry, community and/or other stakeholders to address research problems, as promoted by the Australian Cooperative Research Centre (CRC) Program. Case study analysis of two collaborative research activities undertaken by the CRC for Sustainable Sugar Production has identified some important positive and negative features of collaborative research. These findings and the results of a survey of CRC Sugar stakeholders will contribute to the development of a framework to systematically evaluate the performance of collaborative research activities. The proposed evaluation framework is expected to contribute knowledge regarding the value of collaborative research, as well as benefit researchers, stakeholders, funders, and research managers, and allow them to improve the efficiency and effectiveness of collaborative research activities.

HERTZLER, GREG, DUANE COLLINSON & IAN WILKINSON

The Prospects for Crop Insurance in Western Australia

For over a century, countries have been trying various crop insurance schemes, with notably poor success. Yet farmers still want insurance and the topic is often on the political agenda. Currently, the U.S. has a controversial scheme which is heavily subsidised. The European Union is investigating crop insurance. Last year the Australian government held a review into crop insurance with notable lack of success. This year, the government of Western Australia has called a task force to investigate the possibility of introducing a commercially viable crop insurance scheme. The challenges are formidable. Even if farmers are willing to buy insurance, insurance

companies have many problems right now and selling crop insurance would be one more. Two previous schemes in Western Australia have lost millions of dollars. Yet the task force is optimistic and takes the point of view that commercially viable insurance is a technology that will be invented some day. Perhaps it will be invented in Westerna Australia. This paper reviews the prospects.

HOQUE Z, B. FARQUHARSON, M. DILLON & G. KAUTER.

Benefits of Insecticide Resistance Management (IRM) strategies in the Australian cotton industry

Key words: Bio-economic modeling, cotton, and insecticide resistance

The economic implications of insecticide resistance are substantial for the Australian cotton industry. Resistance is present within the Heliothis population and further development would be catastrophic for the industry. The issue is both biological and economic. An economic evaluation of IRM will help to improve cotton grower's understanding of the benefits of different IRM strategies. But first an entomological model (HEAPS) is utilised to assess how IRM strategies can reduce or mitigate the genetic and population trends for Heliothis. The effects of current IRM strategies on future resistance levels and their impact on yields will be the basis for an economic analysis of methods of ameliorating resistance.

JACKSON, LEE ANN

Regulatory Harmonization in International Trading Systems: The Case of Agricultural Biotechnology Labeling in the United States and the European Union

This paper examines how national regulations requiring segregation of genetically modified agricultural crops affect international trade and welfares. The model uses a general equilibrium trade model to compare economic outcomes in four cases: both countries labeling, neither country labeling, and the two cases in which countries pursue divergent strategies. Preliminary results indicate that when countries pursue divergent strategies, labeling requirements create niche markets of consumers who are willing to pay a price premium to avoid the consumption of genetically modified crops. The existence of niche markets alters trade and welfare outcomes as compared to the situations when countries harmonize policies.

JACOBSEN, BEN & THILAK MALLAWAARACHCHI

Issues in the Implementation of Nonpoint Source Pollution Mitigation: A Case Study of Potential Expansion of the Sugar Industry in North Queensland

Key words: non-point source pollution, mitigation, externalities

Research to evaluate economic options to mitigate non-point source pollution in dugong protected areas near cane growing regions are hampered by a limited knowledge of biochemical pollution mitigation processes and seagrass ecology. Determining least cost mitigation policies needs to proceed with caution to identify non-regret policies that are most likely to result in net reductions in pollutant loads. Results of some preliminary analysis to capture the benefits of pollutant mitigation devices are presented in this paper with an examination of the feasibility of linking on-ground work with economic instruments such as water pricing and tradeable permits to encourage greater compliance.

JAHAN, NILUFAR, PERRY SMITH & GIL RODRIGUEZ

An analysis of the Australian food processing industry

The food industry, in particular, meat and dairy sectors, is a major contributor in the growth of the Australian economy. As a major export earner, the meat and dairy industry accounted for about 48 per cent of total agricultural exports in 2000. Another important component is the food processing sector. Over the last five year period, it has grown in value by11 per cent a year.
The paper will examine the sources of growth of value added and total factor productivity of the food processing industry. The factors shaping these sources and the productivity-related issues pertaining to global competitiveness will also be discussed.

JAMES, JENNIFER S. & JULIAN M. ALSTON

Seeds of Progress? French Wheat Production, Quality, and Policy

Recent theoretical work suggests that government policies may influence the quality mix of a commodity. This paper provides

empirical evidence of quality responses to government policies for wheat policy implemented in France. Analysis is conducted using a detailed data set that includes the class, a measure of varietal importance (area of land used for seed multiplication), several quality measures, and experimental yields for each wheat variety grown in France between 1973 and 1999. Results show statistically significant changes in the distribution of wheat produced across quality classes, and in quality and yield indexes occurring at times of important policy changes.

JAMES, JENNIFER S., SHELBY FLEISCHER, MICHAEL ORZOLEK, & TWILLA PARKER

Consumer Purchases of Genetically Modified Foods: Results from a Market Experiment

Genetically modified sweet corn hybrids containing the Bt gene are resistant to major pests of sweet corn, reducing necessary pesticide applications and the accompanying worker safety risks. Producer benefits from choosing to plant Bt-sweet corn are fairly clear. However, uncertainty about consumers' willingness to purchase corn that has been genetically modified decreases those benefits. In order to assess consumer willingness to purchase Bt-sweet corn and to allow for the influence of prices, Bt- and non-Bt sweet corn were grown, clearly labeled, and sold at various relative prices in Pennsylvania markets.

JARRATT, IAN

The influence of farm size on business aims, industry priorities, and farmer associations in the Queensland Redclaw crayfish industry.

Key words: farm size, industry development, farmer associations

Redclaw crayfish farming is an emerging Queensland industry with typical infant industry problems of insufficient reliable information on important matters such as: farmer aims; industry R&D and other priorities; and roles for farmer associations. To help fill these, and other, information gaps the Queensland Crayfish Farmers Association undertook a postal survey of all farmers in early 2001. Over 50% of the active farmers, accounting for over 80% of production, provided information. Large and small farmers differed significantly in many aims, priorities, needs etc. This paper mainly describes and explains these differences, and assesses the implications for various stakeholders.

JOHN, MICHELE, ROSS KINGWELL, STEVE SCHILIZZI & DAVID PANNELL

Profit versus water use: the challenges for dryland salinity control in low rainfall environments.

Key words: dryland salinity, lucerne, oil mallees, deep drains, salinity management

Currently, there are very few options for salinity management in low rainfall agricultural environments (less than <340mm). The challenge for salinity management in traditional farming systems, is to balance the profitability of annual crop based systems with higher water using perennial options and in some areas, engineering solutions. Using a whole farm bio-economic analysis, this paper reviews the potential profitability and water use of a number of perennial plant based systems (lucerne, oil mallees and saltland pastures) and the economic benefits of engineering options (deep drains and gradebanks) within a typical farming system in the low rainfall eastern wheatbelt of WA..

KHATTABI, ABDELLATIF

Evaluation of the Moroccan forest for recreation — opportunities and constraints
The Moroccan forest contains about nine million hectares of natural woodlands and 0.5 million hectares of plantations which cover almost 13 percent of the whole territory. Most of this forest in not economically important as far as timber production is concerned, but it provides a range of benefits such as fuelwood, grazing, medicinal plants, soil protection, a carbon sink, recreation and so forth.
Recreation is one of the most valuable services that flow from these forests, mainly from the ones that are close to bigger agglomerations. It offers opportunities either to experience isolation, nature contemplation or to practice many open air activities which benefit both physical and spiritual health. This recreation is an open access, and in the absence of a rational management, it may compromise a social welfare as a consequence of overcrowding and user conflicts. Environmentally sound, socially responsible, and properly balanced human and forest ecosystems interactions is becoming a management priority of the Moroccan Forest Administration. For this reason, some studies aiming to understand the forest recreation experience and the socioeconomic aspects of the recreationists in order to sustainably plan and manage healthy environment have been undertaken in Morocco. They provided data

collected through customers surveys of outdoor recreation in neighboring forests to some big cities, on biological and physical characteristics of the forests and on the levels and kinds of use of existing and potential recreation opportunities, as well as recreation needs of the public so as to integrate them in the management planning of the forest sites. In the present article, we will be dealing with the importance of forest recreation In Morocco and the review of the studies undertaken either to study or to value the outdoor recreation experience.

KOMPAS, TOM & NHU CHE

Catch, Efficiency and the Management of the Australian Northern Prawn Fishery

Key words: stochastic production frontier, efficiency

This paper is a study of the production technology and relative efficiency of firms harvesting banana and tiger prawns in the Australian Northern Prawn Fishery. Based on an unbalanced (vessel-specific) panel data set, it specifies a stochastic frontier production function to decompose the variation in the output of fish due to random effects from those that result in differences in technical inefficiency among fishing vessels in the industry. The results show that management restrictions over vessel size and engine power to limit catch have resulted in a substitution toward unregulated but less efficient inputs, increasing overall inefficiency in the fishery.

KOOPS, SVEN

Adopting the Resource-Based View of the Firm (RBV) to Understand the Relationships between Agrifood Supply Chains and Business Strategy

Responsiveness, through product-mix- and operational changes, i.e. business strategy, improves firms' survival chances (Pfeffer and Salancik 1978). RBV posits that resources provide sustainable competitive advantage (e.g. Wernerfelt 1984) and thus determine business strategy. We extend this view to include resources within the supply chain and, therefore, expect to identify supply chain resources that enhance a firm's responsiveness. Further, business strategy affects supply chains on the basis of firm/supply chain resource complementarity, i.e. we expect to identify supply chain resources that are complementary to a responsive business strategy, thereby contributing towards stable supply chain relationships.

Note to the reviewer(s): The study is at the stage of data collection. At the conference results will be presented that currently can only be hypothesised.

KULARATNE, DAILIN & ALISTER LAWSON

Economic evaluation of pasture renovation options in irrigated dairy farming.

Key words: pasture renovation, economic analysis, partial budget

Increased profitability is essential if irrigated dairy farm businesses are to be competitive and remain viable. The amount of pasture consumed is considered to be one of the key factors determining dairy farm profitability. Renovation of existing pastures may be an economical way of increasing pasture consumption and milk production. This paper evaluates the economics of a number of pasture renovation options using a Partial Budget Model. The analysis took into account changes in income (milk, hay and livestock sales), variable costs (feed, shed, herd and casual labour) and overhead costs (depreciation of livestock) resulting from the management changes associated with the pasture renovation scenarios

LAMBIE, ROSS

Analysing the Effect of a Distribution of Carbon Permits on Firm Investment

Proposals for policies to control greenhouse gas emissions often advocate the use of tradeable emission permits, due to their perceived lower cost compared to many other methods of control. However, there has been ongoing disagreement as to the likely effects of permit distributions on firms in industries that receive them. The paper argues that important insights into this issue can be obtained by analysing how a firm's investment behaviour is likely to be affected. Because decisions to invest in plant are made under uncertainty and often involve large financial commitments that are difficult to liquidate, a real options approach to analyzing investment is needed.

LANE, HELEN R. & ROBERT R. ALEXANDER

Enhancing biodiversity preservation on privately owned land: An analysis of New Zealand's policy approach

Key words: New Zealand environmental Policy, landowner incentives, policy dilution

As a signatory of the Convention on Biological Diversity, New Zealand is required to create a strategy outlining how it intends to preserve biodiversity. New Zealand released this strategy in February 2000. This research is intended to investigate the factors effecting the potential achievement of the government's response to the decline of New Zealand's indigenous biodiversity on private land. A case study site is used to look at the government's proposed actions and analyse their effect on landowner incentives toward conservation choices.

LAWES, R.A. & M.K. WEGENER

A dynamic and linear programming analysis of sugarcane harvest scheduling on farms in the Tully mill area
Key words: sugarcane, dynamic programming, linear programming, databases, sql

Sugarcane in a perennial crop harvested annually over a six-month season from June to December. Each crop cycle consists of a plant crop followed by several ratoon crops. Time of harvest influences both sugar content in the current season and yield in the following season. Legislative requirements force growers to harvest some of their cane during sub-optimal periods and growers have to decide the order in which to harvest blocks when both yield and sugar content that determine block returns are uncertain. Industry data about yield and sugar content stored in a MS Access database were used in a dynamic programming analysis of potential harvest sequences. Optimal harvest patterns were identified given industry constraints on cane harvested in several equal time periods during the season.

LAWSON, LARTEY, JEANETTE BRUUN, TIM COELLI, JENS F. AGGER & MOGENS LUND

Effects of reported reproduction disorders on technical efficiency of Danish dairy cattle herds. A stochastic frontier production function approach

Key words: Animal health economics, dairy herd technical efficiency, reproduction disorders and stochastic frontier function

The economic or financial implication of reproduction disorders like dystocia (calf delivery that require veterinary assistance or caesarean section), retained placenta, metritis, ovarian cysts and other reproductive disorders as a group for dairy farms can not be over emphasised. Farms constantly exposed to reproduction disorders experience loss of milk production. In addition, the farms experience longer days to first-service, lower conception rate with resulting increase in the days to conception and calving intervals which delays milk production needed to maintain the farms production level. The disorders might also lead to premature culling or disposal of production stock with subsequent increase in production costs related to insemination and accelerated replacements. It is known from veterinary epidemiology that, these disorders might act as risk factors for other diseases and may subsequently increase the cost of veterinary services. The economics and welfare implications of these disorders make them as subjects of genetic evaluations. There is evident that the selection of cows only for milk production traits leads to high occurrence of production diseases and poor reproduction performance. Furthermore, the genetic source of reproduction disorders and calving problems is evident from the attempts of several countries and among them the Scandinavian ones to include selection for calving ease, disease and cow fertility traits in selection evaluations of new production stock. Therefore, the economic implication of these disorders is not only higher veterinary costs, but the combined effect of all the above factors, which can be captured in an analysis of technical efficiency. The purpose of this study therefore, is to investigate the relationship between technical inefficiency and the level of reported reproduction disorders for dairy farm units using a stochastic production function approach. Furthermore, the study seeks to identify inefficient farms for policies of animal health and general farm services that ensure improvements in management to sustain their economic survival.

LETCHER, REBECCA

Where should out water go? Assessing trade-offs in water allocation in the Namoi River Catchment

The Namoi river catchment in northern NSW is an important irrigation region. Water resources in this region are increasingly stressed. Both surface and groundwater supplies are overallocated in many areas of the catchment. Management options to reduce allocations in line with available supply and environmental requirements are expected to have long term social, economic and environmental implications. One water resource, off-allocation water, is currently unallocated. This means that no user is currently given a property right to this resource and it is available for re-

allocation to alternative users, including the environment. This paper looks at an integrated modelling tool which has been developed to assess long term outcomes of management options for off-allocation water. The framework of this tool has been developed to be general enough for reapplication to water allocation issues in other catchments. Results from the model for a number of different water allocation scenarios are presented, along with a discussion of feedback on the model from the local community and relevant policy makers.

LIU, PATRICIA, DR KATE OWEN & DR WAN GUANGHUA

A survey of household demand for dairy products in China

This paper reports on a recent household survey of the demand for dairy products in Shanghai, China using the Tobit model. The survey is part of a larger study into dairy product demand in China that is funded through the Australian Dairy Research and Development Corporation. In this paper we provide an overview and discussion of significant changes in the consumption of dairy products in China and, particularly, in Shanghai. The Tobit model is used to analyse household behaviour in dairy products consumption. The effect of economic and demographic determinants including income, age, family size, occupation, and etc are discussed.

LIU, XI-AN, QING-FANG GUO & HUA-YONG TENG

Animal Husbandry Industry in China's Developed Regions: The Case of Zhejiang Province

Key words: China, Dairy Demand

Due to the dominant role of household animal raising in China's animal production, an improved understanding of household animal raising practices is essential to study China's feedgrain markets. It is also noted that the level of local economic development affects animal raising practices and the development of feedgrain markets. This paper reports the findings from a rural household survey we conducted recently in a China's coastal and developed province. It was specially designed to examine issues related to household animal raising practices such as animal raising scale, sources of feed, feed processing and feeding efficiency in a developed area. Discussed also are implications of the findings on China's regional feedgrain markets.

LLEWELLYN, RICK S., ROBERT K. LINDNER, DAVID J. PANNELL & STEPHEN B. POWLES

Impacts of extension on adoption of herbicide resistance management practices by Australian grain growers

Extension programs in Australia are encouraging farmers to adopt integrated weed management (IWM) practices, in order to delay the development of herbicide resistance in weeds infesting cropping land. Impacts of specific extension activities have rarely been measured. A logistic regression model was developed, based on survey data from Western Australian grain growers, some of whom attended a specific extension workshop. A range of factors was shown to influence IWM adoption, including perceptions of IWM practices and the herbicide resource. Attendance at the workshop was found to influence farmer perceptions and adoption of some IWM practices.

LOBB, ALEXANDRA

Monopoly Pricing Policies and Profit Margins under Different Objectives — A Case of AWB Ltd.

The objectives of the AWB Ltd., have been changing since the semi-privatisation of the Australian Wheat Board under the Wheat Marketing Act, 1989. The inevitable shift from a state trading enterprise to a more liberal institution has had great impacts on the pricing policies and profit margins of the AWB Ltd. This study investigates a relative risk averse firm's ability to price discriminate in an overseas and domestic market, given uncertain demand functions, under a revenue and profit maximizing scenario.

MACAULAY, PROFESSOR GORDON

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uncertain demand functions, under a revenue and profit maximizing scenario.

MACAULAY, T.G., GREG HERTZLER, & SALLY P. MARSH

Policy Analysis Using a Village Model: Land-Use in Vietnam

Key words: Land-use policy, village model, agricultural development

Land-use in Vietnam is an important issue in the future economic growth of the country. There is a long history of many radical changes in land-use policy. Vietnam has become a leading exporter of rice (its main agricultural crop) and thus is subject to the variability of world prices. The impact at the village level of allowing more flexible land transfers and land consolidation along with shifts in aggregate level rice price policies are considered. A model designed to reflect some of the basic economic behaviour of a village is used to examine various policy alternatives.

LOCH, ADAM, JOHN ROLFE AND JEFF BENNETT

Framing Effects and Benefit Transfer in the Fitzroy Basin.

Key words: Choice modelling, framing, benefit transfer, irrigation, environment.

Policy makers are often interested in how estimates of the value of an environmental asset may be disaggregated into component pieces. This is particularly the case when they are seeking to transfer benefit estimates made in one situation to related circumstances. This is the case for the environmental values of the Fitzroy River basin in Central Queensland. The basin comprises several smaller catchments that share similar development opportunities, environmental issues and water resource constraints. This paper describes an application of the choice modelling technique to estimate values for the basin as a whole and two of the smaller catchments to determine how values may be related. Comparisons are undertaken to assess the validity of the choice modelling approach to benefit transfer issues in environmental valuation studies.

MACLEOD, NEIL & JIM CROSTHWAITE

Some issues in establishing private conservation values for native vegetation on Australian grazing properties: The potential contribution of case studies.

There is considerable private and community interest in conserving native vegetation and its associated biodiversity within Australian landscapes. By far the biggest agency of threat to native vegetation has historically been, and remains, agricultural land uses. An issue confronting both private and public land managers and policy-makers remains that of generally scarce information on the economic value of native vegetation and the ecological services that it provides. Without this information, making informed decisions on allocating scarce resources to the conservation of native vegetation, including its wider-scale rehabilitation is genuinely problematic. The paper describes some recent case-study work undertaken in eastern Australia (Victoria and Queensland) that sought to identify the private value of native vegetation on grazing properties. It explores some important issues in determining values, including tradeoffs between different components of the vegetation matrix that are either complementary (herbage) or competitive (trees) with livestock production.

MALCOLM, B., C. LIGHTFOOT & C. GOURLEY

Investing in Phosphorus in Dairy Farming: Analysing the Decision

Farm management economists long for soundly formulated response functions of farm production processes. Scientific research sometimes provides such information. The Phosphorus for Dairy farming research project at Ellinbank Dairy Research Institute provided a response function for phosphorus (Olsen P status of soils) to milk solids for a given dairy grazing system. As well, information is available about sources and uses of phosphorus in dairy systems and about rates of change in soil Olsen P status for various types of soils. All of these types of information can be put together into analysing decisions about investing in phosphorus in dairyfarming.

MALLAWAARACHCHI, THILAK

Assessing Best-Practice Environmental Management Options at the decision scale: a model for technology choice and policy analysis

Key words: Externalities, sugar industry, land management

Management of environmental externalities of agricultural production has become a necessity to attain sustainable resource use and efficient use of resources. Policies to promote externality mitigation are moving away from command and control toward industry self-management guided through best-practice

guidelines and incentive structures. Assessment of such policies thus entails careful examination of options at operational and strategic levels to ensure optimal compliance at least cost. An integrated modelling approach that links activities at a farm and regional scale is outlined in this paper as a tool for technology assessment and policy analysis. Models are developed to address externalities in Australian sugar cane production in a coastal environment, but may be applicable in a wider context in examining ways to enhance greater environmental compliance through best practice management.

MANSON, ANDREW

The potential impact of water market reform and dairy deregulation for the Lower Murray Reclaimed Irrigation Areas

Key words: Dairy farming, water market reform, irrigation infrastructure

A linear programming model is utilised here to reduce the uncertainty around the impacts of dairy deregulation and water market reform on the future productivity and profitability of irrigated farming in the Lower Murray Reclaimed Irrigation Areas. This information may be valuable in evaluating the timing and mix of irrigation infrastructure investments under consideration.
Possible future milk prices received and water rights (including likely allocations and trade restrictions), together with assumed improvements in on farm productivity are assumed in this regionally based model. The model results suggest that some dairy farmers will consider withdrawing from dairying and selling water allocation under a range of potential future milk and water prices.

MAQBOOL, DR. ASIM

A Comparison of Alternate Farming Systems Using Farm Level Economic Model For Emissions Credit

Key words: Farming Systems, Carbon Crediting, Energy Use, Economic Framework

A Farm Level Economic Model for Emissions Credit (FLEMEC) is developed to compare competing farming systems on the basis of selected attributes. The attributes are farm profitability, energy use, carbon sequestration and greenhouse gas (GHG) emissions. The model is an analytical tool for exploring farm economics and environmental tradeoffs with or without a carbon market. The exogenous variables are yields, inputs, prices, farm size and a number of science based coefficients. The model also allows undertaking sensitivity analysis. Preliminary results show that a significant price incentive for carbon credit will motivate farmers to switch from conventional to conservation tillage practices.

MARSH, SALLY P. & T. GORDON MACAULAY

Farm size and land use changes in Vietnam following land reforms: evidence from household surveys

Key words: Transitional economy, agricultural development

Over the last decade, following the doi moi reforms, the Vietnamese government has instigated land reforms which recognise the household as the basic unit of production and allocate land use rights to households. Under the 1993 Land Law these rights can be transferred, exchanged, leased, inherited, and mortgaged. During 2001, 400 farm households were surveyed in four provinces in Vietnam: Ha Tay, Yen Bai, Binh Duong and Can Tho. Along with basic production and consumption data, we sought evidence of land accumulation and consolidation, land use changes, and attitudes to land reform issues. Data from the survey suggest that there is little evidence of land transfer, but considerable interest and activity in various forms of leasing arrangements. The extent of land leasing activity and changes in land use varies substantially between regions. In this paper we comment on results from preliminary analysis of the survey data. A 'land market' is emerging in Vietnam but is still constrained for various reasons. Additionally, lack of flexibility of land use is an issue. As Vietnam moves into the world market and reduces trade barriers in line with ASEAN requirements, farmers are becoming increasingly vulnerable to falling incomes because of lower prices for their produce. This paper gives an overview of land reform policies, issues related to these, and discusses challenges facing Vietnamese agriculture as it strives to move its household farms from subsistence to a more commercial base.

MEKONNEN, KEF & MALCOLM WEGENER

Analysis of irrigation development using micro-storages in Ethiopia

About 86% of the annual Nile River flow originates in Ethiopia. Less than 1% of this

water is used there, while Sudan and Egypt have fully utilised their water resources for agriculture, navigation, and domestic uses. There is continuing fear that water shortages in future will act as a serious brake to irrigation expansion in this water-scarce region. The government of Ethiopia has emphasised the development of irrigated agriculture in its portion of the basin to mitigate the effects of unreliable rainfall by building small-scale water reservoirs and diversion structures. A study that includes field research, and uses hydrological and irrigation models, with mathematical programming and benefit cost analysis is being conducted to guide water resource development.

MEYER-AURICH, ANDREAS & LOTHAR TRÜGGELMANN

Finding the optimal balance between economical and ecological demands on agriculture – research results and model calculations for a bavarian experimental farm

The purpose of this paper is to analyse interactions of the economic and ecological demands on agriculture exemplarily for a farm in Germany with a whole farm modelling approach. Integration of agro-environmental indicators in the model framework enables a multiple goal optimisation and the computation of trade-offs of indicators and economic returns of the farm.
The estimated opportunity costs provide valuable hints on bottlenecks of the integrations of environmental claims into agriculture and help to identify reasonable incentives for environmentally sound agriculture. Furthermore conflicts between divergent goals can be integrated to find optimal pathways of sustainable agricultural development.

MONJARDINO, M., D.J. PANNELL & S. POWLES

The value of Roundup-Ready® canola in a multi-weed farming system

Key words: Roundup-Ready® canola, weed control, bio-economic model, Multi-species RIM

It is likely that a transgenic canola variety resistant to the broad-spectrum herbicide Roundup® (glyphosate) will soon be introduced in Australian agriculture. The perceived advantage of growing this crop is the potential to control weeds with Roundup® after emergence of the crop, hence prolonging the life of selective herbicides (to which important weed species such as ryegrass and wild radish can be highly resistant). This will happen without the yield penalty evident in atrazine-resistant canola currently in use. Therefore, the introduction of Roundup®-Ready canola will, other factors being equal, not only increase the options for weed control, but raise the yield of the one million hectare WA canola crop by 10-20 percent. On the other hand, seed purchase price is likely to be higher than that of other genotypes due to the extra cost of the new technology, and increased usage of Roundup® can result in the evolution of resistance to that herbicide in weeds. The bio-economic Multi-species RIM model was used to investigate these trade-offs.

MUCHAPONDWA, EDWIN

Optimal land-use in areas with wildlife and livestock: A study of CAMPFIRE in Zimbabwe

We characterise three land-use scenarios for areas with wildlife and livestock in Zimbabwe by formulating a bio-economic model with 2 agents and 2 land-uses. Firstly, we analyse the conflict-ridden optimisation that existed at the creation of national parks. Secondly, we consider the optimisation synonymous with a community-based natural resource program called CAMPFIRE, in which communities can reap a limited amount of resource benefits. Thirdly, we analyse unified resource management in which the societal costs and benefits are considered. Poaching is incorporated. The paper recommends welfare improving policies.

MULLEN, JOHN & DEAN PATTON

The role of pastures in mixed livestock/crop systems in the Central West of NSW.

Key words: linear programming, New South Wales, farming systems

An important question being asked by landholders in the Central West of NSW relates to the role of pastures in farming systems, considering that until recently the returns from livestock have been low when compared to those from cropping. The dilemma for landholders is that increasing the proportion of land under crop reduces the proportion of land under pasture, and the expectation is that reducing the length of the pasture phase will eventually have an adverse impact on crop yields and returns. The aim of this paper is to determine the optimal length of pasture using the linear programming model of

farming systems in the Central West of NSW (PRISM Condobolin). The robustness of this optimal rotation is tested for a range of wheat, canola and wool price.

MYERS, LAUREL

Australian agricultural economics. Critical issues that shaped the profession – 1925-1950

Economics established itself as a separate social science in Australia in the early decades of the twentieth century, but it was not until the 1950s that agricultural economics developed strongly in this country. There was considerable mistrust and disagreement between agricultural scientists, agricultural economists and economists in general. The most effective way to get some appreciation of the economic issues associated with agriculture was by public discussion and debate. This paper shows how the ideas of economists and agricultural economists gained prominence in academic journals and public forums throughout the 1925 -1950 period. A wide range of issues, including land settlement, price stabilisation and industry assistance, were openly discussed. In this way the agricultural economics profession grew and became accepted as a legitimate discipline.

NORDBLOM, T., R.E. JONES, & R.W. MEDD

Measuring economic and other benefits of a herbicide dose strategy that accounts for environmental variation

This paper approaches biological and economic risks in association with strategic and tactical decisions on herbicide dose. Underlying sources of the risks investigated are weed seed bank density and the season-to-season variations in weather. In a simulation model these affect the interplay of dryland wheat crops, a selective post-emergence herbicide and wild oats for different economic and biological outcomes. For fixed and factor-adjusted herbicide dose strategies, our simulation model shows how weather variations result in measurable risks, expressed as cumulative probability distributions of herbicide efficacy, crop yields, changes in weed seed banks in the short and long runs, and economic benefits. Where it is possible to accurately determine the weed densities and weather factors for each spray application, a 'best efficacy-targeting strategy' (BETS) is defined. Simulated results with BETS, run with a long sequence of weather, are better than or equal to best fixed doses for any given weed density in terms of crop yields, weed seed bank reduction and long-run economic benefits. Compared to a strategy of continuous maximum doses, BETS allows for lower over-all herbicide use: 23% less with 128 weeds m^{-2}, 58% less with 32 weeds, and 80% less with 8 weeds.

ODOM, DOREEN, OSCAR CACHO, J.A. SINDEN & G.R. GRIFFITH

Policies for the management of weeds in natural ecosystems: a dynamic programming approach

Key words: environmental weeds, scotch broom, policies, weed management, dynamic programming

Weeds in natural ecosystems are best classified as environmental weeds. Environmental weeds are plants that invade natural ecosystems and are considered to be a serious threat to nature conservation. Environmental weeds have been implicated in the extinction of several indigenous plant species, and they also threaten ecosystem stability and functional complexity. Historically, emphasis has been placed on chemical control, manual pull, excluding tourists and feral pig control measures. Recently, biological control has been introduced to control weed infestations. These methods of control have been applied alternatively, with little consideration of the long- term effectiveness. As the threat from environmental weeds is becoming more fully recognised, an integrated, strategic, ecological and economical approach to weed management is needed. A deterministic dynamic programming model is developed for this purpose in this paper. A case study for an environmental weed scotch broom is presented, to assess the ways in which this approach can address the policy issues that face the community in management of an environmental weed. The model takes account of the weed population dynamics and thirty-two combinations of control developed from the five basic control measures. The dynamic programming model is developed for three different cases, first with weed density as the state variable, second, with weed density and seed bank as state variables and third, with weed density and seed bank as state variables and with a budget constraint for the control variables. Results are presented and policies for managing weeds in natural ecosystems are recommended.

O'DONNELL, CHRISTOPHER J. & C.RICHARD SHUMWAY

Using model averaging to resolve uncertainty concerning functional form
Key words: Bayesian model averaging, profit function, US agriculture

Empirical estimates of economic relationships can be sensitive to choice of functional form. We encounter the problem when estimating a profit function for US agriculture. Rather than "test down" to a single functional form, we average over several functional forms to obtain meta estimates of economic quantities of interest. Bayesian posterior model probabilities are used as weights in the averaging process. We report averaged estimates of elasticities and the effects of a 50% ad valorem tax on US energy prices.

OMURU, ERIC & ROSS KINGWELL

The political economy of funding agricultural R&D in Papua New Guinea: a case study

Key words: political influence, funding agricultural R&D, cocoa and coconut

Adequate and reliable funding of agricultural R&D is critical for sustaining research activities. A breakdown in funding arrangements can be detrimental to the long-term existence of R&D organisations/systems. This paper first, reviews the trends in funding arrangements for agricultural R&D in Papua New Guinea (PNG) in recent years. Second, this paper explores the extent to which political influence affects funding arrangements for agricultural R&D in PNG in terms of a case study. Third, with insights from the case study, which are alleged to reflect the general nature of the way agricultural R&D has been funded in PNG, implications are assessed and suggestions are made about the need to diversify funding sources away from avenues that are dependent directly on political influence. The paper concludes with a brief summary.

OTHMAN, JAMAL & RUSMANI MUSA

Estimating Non-Use Values of a Genetic Resource: Case of Fireflies, Malaysia

Fireflies are seemingly a minute and trivial genetic resource, where it can be readily seen wandering in every corner in the rural areas after sunset in Malaysia. No one cares about its existence when they are in singles, in pairs or in any small numbers. However, a particular firefly species exists in the district of Kuala Selangor where they are found in large numbers, possibly in-groups of thousands, clinging on the twigs and leaves of mangrove trees along a small stretch of the Selangor River. Since the early 1970s the area has been renowned as a famous firefly eco-tourism site drawing thousands of visitors from all over the world. In 1999, there were more than 10,000 recorded visits where international tourists comprised some 40 percent of them. The main attraction is the incandescent fireflies' display in every non-rainy night where they will flash their lights in synchrony with all others. In the words of a foreign tourist, "it is like the twinkling of Christmas tree lights on the eve of Christmas day". Nowhere else in Malaysia and possibly the whole world such fireflies' displays are found. Little is known about its existence and ecology linkages. However, there has been an attempt in Malaysia to replicate the fireflies' attraction in a similar mangrove setting elsewhere but failed. The fireflies' recreation has of late being threatened by the construction of a dam project on the upper section of the Selangor River. It is widely believed that in the long run, the quality of fireflies' recreational service will be adversely affected by the changes in the water flows of the affected river. This study administers the double bounded dichotomous choice CV on some 400 non-visitor respondents in Selangor to estimate the non-use values of fireflies' existence. The study is important as it provides a case example of the importance of incorporating environmental externalities in the appraisals of projects, which affect critical natural and genetic resources in the country.

OTHMAN, JAMAL

Linking Freer Trade, Agricultural Land Demand and Haze Externalities in South East Asia

Reductions of support measures affecting soybean oil in the major soybean producing countries, as a consequence of WTO rules is expected to lead to pronounced expansion in oil palm cultivation in Malaysia and Indonesia, the two main palm oil (soybean oil's chief competitor in the world market) producing and exporting countries. However, it can be shown that the effects of freer trade on land demand and consequently deforestation impacts will depend much on existing policy regimes affecting forestry management in the two countries. Given the relatively more prevalent policy and institutional failures in Indonesia, it is anticipated that deforestation impacts in the country will be more pronounced. This inevitably gives rise to recurring forest fires and haze externalities in the region. This study

employed a multi-country output supply exogenous policy model with explicit factor markets to examine factor market-trade policy linkages in the world vegetable oil markets. In this study vegetable oil was assumed as a homogenous good. The main producers and exporters of vegetable oil, namely Malaysia, Indonesia, an aggregate of soybean oil exporters, and the rest of the world importers of vegetable oil were modeled. Reductions of support measures for soybean oil were simulated and effects on land demand in Malaysia and Indonesia were observed under varying assumptions of forestry policy regimes in the two countries. Inferences on haze externalities were also provided.

OTHMAN, JAMAL & JEFF BENNETT

Estimating Compensating and Equivalent Surplus of Resource Changes in a Single Choice Modelling Application

Most choice modeling (CM) application have focussed on the estimation of either the compensating (CS) or equivalent surplus (ES) measure for marginal changes of environmental attributes. This study develops a CM framework which is able to measure both the CS and ES estimates of marginal changes in a single CM application. It can be shown that this framework has the advantage of efficiency and flexibility in evaluating many management problems facing policy makers and resource managers. An application of the framework is provided to the case of evaluating management plans for Matang Mangrove forest in Malaysia. A comparison of the CM estimates with that of the traditional Contingent Valuation is also illustrated.

OUCHI, HIROMI, JILL J. MCCLUSKEY, KRISTINE M. GRIMSRUD, & THOMAS I. WAHL

Consumer Preferences for Genetically Modified Food Products in Japan

A better understanding of Japanese consumers' attitudes and behavior toward genetically modified food products will be essential for designing market strategies for Japan. In this study, we consider factors that induce certain consumers to choose GM-free food products and their willingness to pay for these products. From the results, we conclude that most consumers will require a significant discount to purchase GM food products.

OWEN, DR KATE, PROFESSOR JORDAN LOUVIERE & JOHN CLARK

Consumer concern and acceptance of GM foods

Key words: genetically modified foods, consumer demand / behaviour

The paper reports on two survey-based studies that examine different aspects of the potential for consumer acceptance of genetically modified foods. The surveys are part of research that is funded by the RIRDC to provide better estimates of the likely demand for genetically engineered foods. In the first of the studies the authors surveyed current consumer concern over genetically modified foods and the existing level of consumer awareness and confidence in organisations responsible for distributing and regulating food. The second study is still in progress. We report preliminary results from a pilot survey that used the stated preference method to identify response parameters for three products that had genetically modified levels: milk, potatoes, and potato crisps.

OWEN, DR KATE, PENINA VATUCAWAQA & JOSEPHINE CHAND

Understanding Food Choices in Fiji

Key words: Food Policy, Developing Country, Consumer Behaviour

The change dietary intake away from traditional foods over the past decade in Fiji has been of ongoing concern to the Ministries of Health and Agriculture, Fisheries and Forests. This paper reports the findings of research into the reasons why consumers make the choices they do. The research is part of a project funded by the Australian Centre for International Agricultural Research that aims to furnish policy makers with information that will assist them to formulate policies that will move the population to better nutritional health and improve the efficiency of the agricultural marketing system.

PAGE, ASHLEY & JIM LONGMIRE

Benefit Cost Analysis of Investment in Conservation Tillage & Soil Conservation

The relative benefits of on-ground soil conservation earthworks have been debated for many years. This study examined the questions of if it was profitable to invest in (a) soil conservation earthworks and (b) reduced tillage systems, which both contribute to

reduced erosion. These questions were investigated from the perspective of the private landholder as well as the social perspective. The key results of this study indicate that there is little if any incentive for landholders to invest in contour banking and other soil conservation earthworks where the private landholder bares 100% of the implementation cost, whereas there is an incentive for society to invest in such works. Further there is a reduced incentive to invest in earthworks when conservation tillage systems are in use.

PAN, JIAN-WEI, NEIL SOUTHORN & LI-ZHONG ZHANG

Animal Husbandry Industry in northern China: Issues and Prospects[i]

Demand for animal products has increased rapidly in China in the past two decades. This places an increasing strain on natural resources. To ensure a sustainable growth of animal products to meet increasing demand, the sustainable utilisation of grassland resources and thus the development of a sustainable animal husbandry economy in China's pastoral areas is of great importance. Northern China (representing five provinces: the Inner Mongolia Autonomous Region, the Xinjiang Uighur Autonomous Region, the Ningxia Hui Autonomous Region, Chinghai province and Gansu province.) is the main grassland animal husbandry area. This paper highlights issues that face the sustainable use of grassland resources and analyses the demand trend of animal products that may affect their sustainable use. This research describes the future prospects of animal husbandry of northern China, and concludes by addressing policy and technology measures for a sustainable use of grassland resources and sustainable development of the animal husbandry economy in northern China.

PANDEY, SUSHIL TRAN CHI THIEN & NGUYEN TRI KHIEM

Market access, food security and upland rice: some micro-economic evidences from northern mountainous regions of Vietnam

Key words: Uplands, food security, commercialization, Vietnam

The paper examines the role of upland rice in the upland systems of northern Vietnam, which is undergoing changes due to an increase in population pressure and an improvement in market access. The food security objective of farmers, however, may constrain the extent of commercialization when marketing infrastructures and institutions are poorly-developed. Based on farm household survey data, econometric and linear programming models were used to investigate the role of upland rice. The results indicate that production of upland rice is critical to attain farmers' food security objectives and an improvement in its productivity will facilitate commercialization of agriculture.

PANNELL, DAVID J.

Prose, persistence and psychopaths: Personal perspectives on publishing

Attempting to publish a paper in a refereed journal raises many questions, including the following. Is it true that every paper has a journal willing to publish it, you just have to find it? How should you choose which journal to target? When should you give up? How should one deal with unreasonable referee's comments or, for that matter, with reasonable ones? Can you argue with the editor? What are typical (and extreme) lag lengths between submitting a paper and receiving referees comments, and between re-submission and acceptance by the editor, and between acceptance and actual publication? Is it all really worth the trouble? How perfect does the paper have to be before you submit it? When can and can't you submit a paper which has already appeared somewhere else? These and other questions will be addressed, spiced with tips and tales from my checkered publishing career.

PETERSEN, ELIZABETH H., STEVEN SCHILIZZI & DAVID BENNETT

An economic assessment of the role of commercial tree crops to achieve greenhouse gas neutrality in predominantly grazing systems of south-western Australia

Key words: Greenhouse; Kyoto Protocol; whole-farm modelling; commercial trees

The accreditation of tree crops as carbon sinks under the Kyoto Protocol is a contentious issue. The findings of this study show that in the presence of greenhouse gas emission restrictions, the accreditation of tree crops can allow predominantly grazing systems of south-western Australia to remain profitable where the farms would otherwise fail. It is argued that a Protocol that encourages tree planting is more likely to be successful, has other benefits such as salinity abatement, and is more likely to encourage greater innovation of green

technologies than one that disallows such accreditation.

PEZZEY, DR JOHN C.V.

Some economics of water resources and use in the ACT

Key words: Water rights, trade, ACT

Key aspects of water resources and use in the ACT are described, in order to estimate the magnitude and distribution of economic benefits if the ACT is allowed to trade water rights with other states over the next half century. Specific attention is given to the ACT's spare dam capacity; its high proportion of return flows; its stable and growing water demand in contrast to the irrigation areas with which it would be likely to trade; and to the likelihood that at first the ACT would simultaneously wish to buy permanent water rights, while leasing temporary rights.

PEZZEY, DR JOHN C.V.

A one-sided sustainability indicator for economies with environmental amenities

Key words: Sustainability test, multiple goods, net national product

In an economy with multiple consumption goods (including environmental amenities) that uniquely maximises present value with constant discounting, a non-positive, augmented green net national product, or non-positive, augmented net investment, at any time implies that the economy is unsustainable then. "Augmented" means that net investment includes the value of time. This allows future exogenous technical progress and changes in world prices to be included in a unified accounting framework. The philosophical tensions of testing sustainability in a present-value maximising, and therefore fully prescribed, development path are discussed, and treating sustainability as a public good is proposed as a solution.

PEZZEY, DR JOHN C.V.

Concern for sustainable development in a sexual world

Key words: Sustainability, mating, children, bequests

Sustainability is analysed in a closed economy with separate generations and sexes, which depletes exhaustible but growing resources. Parents always want their children to be better off, and they also want their children to be as well off either as them or the current generation. If mating is random and bequests are shared between partners, both wants can cause insufficient resource bequests because external benefits are ignored. Policy intervention, such as a resource consumption tax, may then be justified as long as parents do not value sustainability so much that they take individual action to achieve it. Hidden `mating-bequest externalities' may justify sustainability policies in an a sexual world.

PHANEUF, DAN, ROGER VON HAEFEN, & GEORGE PARSONS

Kuhn-Tucker Recreation Demand Models with Large Choice Sets: An Application to Beach Recreation

Key words: Demand systems, corner solutions, recreation demand

The Kuhn-Tucker (KT) demand system model of Wales and Woodland represents a promising strategy for estimating seasonal preferences for outdoor recreation. Empirical applications thus far, however, have relied on highly aggregated site definitions ranging from four to fifteen sites. This paper develops methods for estimating and constructing welfare measures from KT models with arbitrarily large choice sets. These methods are applied to a recreation data set describing day trips by Delaware residents to sixty-two beaches in the Mid-Atlantic region of the United State. The techniques described are relevant to a wide range of consumer demand problems employing household level data in which binding non-negativity constraints are present.

PIGGOTT, NICHOLAS E.

The Nested PIGLOG Model: An Application to U.S. Food Demand

A new demand system is introduced, the Nested PIGLOG model, that nests thirteen other demand systems of which five are also new. This new model is used to estimate an annual time-series model of U.S. food demand that includes food at home (FAH), food away from home (FAFH), and alcoholic beverages. Nested tests and out-of-sample forecasting performance favor generalizing models to a certain degree. Statistically insignificant improvements in maximized likelihood values and even poorer out-of-sample forecast accuracy undermines this practice of further

generalizing models. Based on a subset of preferred models, FAFH is found to be price and income elastic compared to FAH which is price and income inelastic.

QUADE, KATHRYN J. & JOHN P. BRENNAN

Analysing the impact on Australia of ICARDA's research on chickpeas

ICARDA (the International Centre for Agricultural Research in the Dry Areas) in Syria conducts research aimed at developing countries. Australian agriculture has received spillover benefits from that research. This paper reports on a study that aims to quantify the benefits of the spillover impact on Australian agriculture from ICARDA's research into Kabuli chickpeas. Australian producers gain from the improved genetic materials obtained from ICARDA, but face lower prices from the success of ICARDA in other countries. The net spillover benefits for Australia are identified, and the implications of such benefits are discussed.

QURESHI, M.E., J. ARUNAKUMAREN & M.K. WEGENER

Economic and environmental impacts of irrigation management in Burdekin Delta

Key words: Groundwater, hydrologic, economic, optimisation

Burdekin delta in Queensland is the most important area for irrigated sugarcane production in north Queensland. Conjunctive use of groundwater and surface water is a common practice in this area. However, the major reliance of irrigation is on groundwater aquifers and sustainable use of the groundwater systems is critical for the economic and environmental well being of the whole region. The cane yields are amongst the highest but the water consumption per hectare is also high in the nation due to high percolation through delta sediments and the growers are encouraged to use more water to keep the soil wet so that the recharging process can continue. However, there are arguments that system not only increases pumping costs for growers but also causes the risk of seawater intrusion into groundwater aquifers. A groundwater management model has been developed to simulate the behaviour of the groundwater system and to examine various management strategies in order to determine effects that water management might have on the sustainability of the groundwater system on the Burdekin delta. The output from the model is used as input in a regional mathematical programming model along with a plant simulation model to estimate economic impacts of these management strategies in the delta region.

QURESHI, M.E. & M.K. WEGENER.

Implications of alternative mill mud management options in the Australian sugar industry

Key words: Mill mud, by-product, nutrients, mathematical model

Sugar mills produce a range of by-products during the process of sugar extraction. Mill mud is one of the by-products produced in a significant volume. The practice of spreading mill mud over nearby cane fields has been the primary means of disposing mill mud for many years. The continued application of mill mud at high rates, without appropriate recognition of the soil condition, crop requirements, slope and proximity to a environmentally sensitive area has raised a number of concerns in recent years, including over-fertilization, heavy metal contamination, leaching and, offsite impacts from spillage to waterways. This study develops a regional mathematical model to determine optimal rate of mill mud application for various soil types and distances from the mill in Mackay region in central Queensland.

REEVE, RICHARD, P. ALUWIHARE, & J. CREAN

Assessing water sharing options in unregulated rivers in NSW

Key words: Environmental flows, flow sharing rules, low flows, farm-level economic impacts

The new Water Management Act (2000) requires water to be specifically allocated for environmental purposes to try to improve river health. Water sharing plans are being developed which establish extractive and environmental shares to river flows. A key consideration in the development of these plans is the economic trade-offs associated with different allocation options. In unregulated catchments, allocation options typically involve significant restrictions to extractive access at times of low river flows, which also coincides with periods of environmental stress. The highly variable nature of stream flows in unregulated catchments creates challenges not only to the development of plausible sharing options but also to the assessment of their effects. This paper looks at some proposed sharing options in two case study

catchments in Northern NSW. A combination of representative farm and hydrology simulation modelling is used to explore these effects and the role that irrigation infrastructure may play in their mitigation.

RESOSUDARMO, BUDY P.

The Economy-Wide Impact of the Integrated Food Crop Pest Management in Indonesia

The excessive use of pesticides in Indonesia during the 1970s and 1980s caused serious environmental problems such as acute and chronic human pesticide poisoning, animal poisoning and contaminated agricultural products, destruction of both beneficial natural parasites and pest predators, and pesticide resistance in pests. To overcome these environmental problems, since 1989 the Indonesian government has actively adopted a strategy of integrated pest management (IPM). During the first few years of the IPM program's implementation, the program has been able to help farmers reduce the use of pesticides by approximately 56 percent, and increase yields by approximately 10 percent. However, economic literature that analyzes the impact of the IPM program on household incomes and national economic performance is very limited. The general objective of this research is to analyze the impact of the IPM program on Indonesian economy and household incomes for different socioeconomic groups.

ROBERTS, ADAM

Access Arrangements in the Australian Natural Gas Industry

In the Australian natural gas industry the pipelines that transport gas from the supply source to the city gate are typically natural monopolies. In order to enhance competitive market outcomes, the operation of these pipelines is generally governed by access arrangements, which set out the terms and conditions for third party access to these pipelines. An examination of recent access arrangement decisions is undertaken, with an investigation of the impact of these decisions and their implications for the natural gas industry in Australia. The legal and economic bases for these decisions are reviewed. Incentives and preferences are inferred from the actions of market participants — in particular for the preference of pipeline owner/operators for access undertakings as opposed to access arrangements. The relationship between outcomes under a competitive market and outcomes under access arrangements and undertakings are also considered.

ROLA-RUBZEN, MARIA FAY, FE GABUNADA & RIA MESORADO

Marketing System for Small Livestock in the Philippines: The Case of Southern Leyte

In the Philippines, livestock is a main component of smallholder production systems. It is a source of food and secondary income for many small farm households. In recent years, the government is directing more efforts towards increasing the contribution of livestock to farm household income. This however requires an efficient marketing system for livestock. Currently, however, marketing systems, particularly for small livestock, is poorly developed. This is due to a number of factors including the persistence of structural problems, poor farm to market linkages, high costs of arbitrage and poor integration of markets. With the view that poverty results from unequal and inefficient allocation of resources, it is imperative to find ways to improve the efficiency of the market system. This research examined the marketing system for small livestock in Southern Leyte, Philippines. The aim is to provide a clear understanding of the existing marketing systems to smallholder livestock farmers and to formulate recommendations for improving the current marketing systems. Using reconnaissance surveys and focus group interviews, this study determined the institutional, functional and channel systems for livestock marketing in Southern Leyte and identified opportunities for improvement of the market chains.

ROLFE, JOHN, SHIRLEY GREGOR & DON MENZIES

Assessing the costs and benefits of computers and internet use by landholders in Central Queensland

Landholders in rural Australia are increasing their use of computers and the internet. In part, this is because of the increased availability of hardware, software and communications infrastructure at reasonable cost. However, it is unclear what all the costs and benefits of adopting a new technology are. It may be that the primary benefits are simply cost reduction; for example the time saved in financial bookkeeping. Other reasons might include potential gains to production, keeping pace with regulatory and other external changes, or improved marketing opportunities. It is also unclear whether landholders adopt the

technology for short-term returns or view it more as a longer term investment. These issues are explored in relation to the grains and beef industries of the Central Queensland region.

ROLFE, JOHN

Reducing Methane Emissions from Cattle Production in Central Queensland

Key words: Greenhouse, abatement, livestock, valuation

Beef cattle contribute about 7% of national greenhouse gas emissions through the release of methane into the atmosphere. Cattle in northern Australia produce more methane per unit of beef produced because of tropical (C4) grasses and slower average growth rates. In this paper the level of emissions from different herds and some strategies to reduce emissions are modelled. The results indicate that few options exist to reduce methane emissions without reducing beef production. The opportunity costs of reducing methane emissions by reducing stocking rates are estimated at one Central Queensland location at \$35 per ton of CO_2 equivalent.

ROLFE, JOHN, JILL WINDLE & GEOFF BULLPITT

Water Allocation Issues in the Fitzroy Basin

Irrigated agriculture is an important source of economic activity in the Fitzroy Basin. The issue of what water reserves for development remain in the basin and how they might be allocated between different interests groups in the region remains topical. The Water Allocation and Management Plan for the Fitzroy that has been drafted by the Department of Natural Resources and Mining caps overall water extraction from the basin, but allows further development to potentially occur in most of the sub-catchments. In this paper the options for allocating the water resources and the mechanisms by which they might be allocated are discussed. The values that society might have for reserving water resources from development are estimated from a Choice Modelling experiment, and compared to the net production costs available from different development options.

ROLFE, JOHN, KAMALJIT SANGHA & RAJESH JALOTA

Opportunity costs of pasture rundown in Queensland: Is tree clearing viable over the longer term?

Resource development issues remain topical in Queensland, with continued high rates of vegetation clearing and arguments that up to 60 million hectares of tropical woodland areas in the state could be profitably developed. In this paper the contribution of pasture development to beef production in the state is assessed. It appears that the gains from pasture development are partially offset by other losses in pasture production. Potential reasons for these losses are considered. The decline in pasture production following a spike in productivity after tree clearing is considered in some detail. Preliminary values for the opportunity costs of this pasture rundown are assessed.

GIBSON, JOHN & SCOTT ROZELLE

Assessing the Bias from Using Unit-values in Cross Sectional Demand Studies

Key words: Demand, Measurement Errors, Quality

The ratio of household expenditure on a particular food to the quantity consumed is often used as a proxy for market price in demand studies. These unit values are likely to give biased estimates of price elasticities, so Deaton (1990) developed procedures for correcting these biases. Empirical evidence on the bias created by unit values in demand systems is lacking so in this paper we use data collected specially to carry out comparisons with the results of using market prices. Our findings suggest that unit values provide poor approximations to the elasticities calculated with actual market price data.

ROLA-RUBZEN, MARIA FAY & BRIAN BIEN RUBZEN

Information Needs of Western Australian Farmers in Relation to Precision Farming

Key words: Precision farming, GIS, information needs

Precision farming has the potential to increase farm productivity, lower input costs and increase expected returns. Despite these potential benefits, the adoption of precision farming technology in Australia has been

relatively slow. One of the reasons for this is the lack of information regarding the technology. This study investigated the information needs of farmers in relation to precision farming. The study was conducted in Western Australia and involved interviews with about 400 farmers. The study examined the reasons for the slow uptake of precision farming and identified current information gaps and information needs of farmers in relation to precision farming.

SAHA, AMIT KUMAR

Economic efficiencies of the dairy farming systems in Haryana, India : A Stochastic Frontier Approach

Smallholder livestock systems in Haryana with 1-2 buffalo milch animals are found to be sustainable since they have been existing for a long time. Hence the present study analyses the efficiency of milk production by identifiying the existing dairy farming sytems in Haryana. The milk production in the sampled households from these systems were analysed using cobb Douglas and translog frontier models. The seasonal effect , machinery and buildings had a significant impact on efficiency and milk production. The mean economic efficiencies of the systems varied from 67 percent of landless subsistence rainfed dairy farming systems to 81 percent of buffalo based subsistence irrigated dairy farming systems using translog frontier. Hence there was a potential to improve the efficiencies of the systems using the existing technology by about 19 to 33 percent.

SCHAMEL, GÜNTER

The Welfare Economics behind Multifunctionality

Key words: Environment, agricultural trade, multifuntionality

We analyses policy interventions assuming conventional agricultural methods pollute and more benign production methods generate amenity benefits. A joint analysis of policies targeting external costs and amenity benefits captures interaction effects: polluting input taxes reduce the returns and reduce subsidies needed to induce more benign production below its marginal amenity impact. Thus, it is only optimal to subsidise if the additional marginal amenity benefit exceeds the external cost reductions due to a polluting input tax. Terms of trade effects imply that large land abundant exporters have incentives to overvalue external costs while large importers have incentives to overrate non-market benefits. The model is then applied to explain the negotiating positions of major agricultural players within the WTO with respect to multifunctionality.

SCHILIZZI, STEVEN

Valuation of long-term environmental impacts: what role for discounting?

Discounting is a well-known procedure to compare values over time. Over short periods of time, it has proved a useful tool for investment decision-making. Environmental impacts such as resulting from nuclear waste disposal, climate change, and biodiversity losses introduce very long-term impacts, measured in decades or even centuries. With such time scales, conventional discounting seems to fail. It produces unreasonable results. This paper analyses the nature of this difficulty, why there is so little consensus on solutions, and compares some of them. An example involving nuclear waste disposal is used to illustrate extreme time horizons. A preferred solution is suggested.

SCOTT, J. FIONA & RJ FARQUHARSON

Finding a win-win situation for salinity on the Liverpool Plains

The Liverpool Plains catchment faces a number of natural resource issues including dryland salinity, which has been attributed to removal of native vegetation, an increase in rainfall and the use of long fallow cropping systems in recent decades. Opportunity cropping, where a crop is sown once the soil profile has been recharged to a suitable level has been promoted as a more water use efficient system. In this paper, we present results from field trials and APSIM modeling to find if the recommended change to opportunity cropping systems can produce a “win-win” situation, that is increasing profitability whilst at the same time reducing recharge to the groundwater systems that are believed to contribute to dryland salinity.

SCOTT, J. FIONA

Dominance analysis of crop rotation trials

Much of the recent and current agricultural productivity research is concerned with the sustainability of cropping systems. Paddock level gross margin (ie financial) analysis is usually used to get the message across to

farmers about the profitability of different crop rotations, but a system with a high gross margin may also have high costs. This can have implications at the farm level in terms of seasonal borrowing requirements, machinery (and therefore capital) and labour requirements. This paper takes gross margin analysis a step further and applies dominance analysis principles to gauge the returns per dollar invested. The paper concludes by outlining further work needed to conduct more complete economic analyses of sustainable cropping systems.

SEYOUM, EMAYENESH, PROF ELLEN GODDARD, ASSOC.PROF DONALD MACLEARN & DR GARRY GRIFFITH

Modelling World Dairy Trade: The Potential Impact of Officially Supported Export Credit

Key words: Dairy trade, imperfect competition, export credit

Although significant agricultural trade liberalisation has occurred since the formation in 1995 of the World Trade Organization (WTO), many distortions in agricultural markets still remain and not all of the expected benefits have materialized. In particular, the dairy sector remains relatively highly protected through border measures, subsidy payments to domestic producers and export subsidies in a number of countries. The presence of state trading enterprises in major dairy exporting and importing countries such as New Zealand and Japan also serve as additional distortions. Even with the potential lessening of traditional trade barriers, e.g., export subsidies, countries may intervene in international dairy markets using tools not previously used such as export credit. This development may be more prevalent in countries where the existence of state trading enterprises makes the use of export credit particularly easy. Multinational dairy processing firms are now operating in most dairy trading nations. Despite the significant concentration in the multinational dairy processing sector, previous trade liberalization analysis has all been done in the context of perfect competition and existing trade policies. In this paper the implications of imperfect competition and the use of export credits will be examined for the international dairy market with particular emphasis on Australia's exports.

SHARMA, VIJAY PAUL

Trade Liberalization under WTO: Implications for the Indian Dairy Sector

Key words: Trade liberalization, non-tariff barriers, tarrification, export competition, competitiveness.

The last few decades have seen much progress toward trade liberalization around the world. However, liberalization in the agricultural sector has been more difficult as many governments continue to implement restrictive trade policies. One of the agricultural sectors most affected by trade restrictions has been the dairy sector. The Uruguay Round Agreement on Agriculture (URAA) marked an important turning point in the history of international trade negotiations. The URAA led to the conversion of non-tariff barriers to agricultural imports into bound tariffs, and those bound tariffs were subjected to reduction commitments, as are farm production and export subsidies, between 1995 and 2000 for developed countries and 1995-2004 for developing countries. The objective of this paper is to review key issues involved in the implementation of the URAA for the dairy sector and policy options for the next round of negotiations from the perspective of the Indian dairy industry. During the last six years of implementation of the URAA, the experience suggests a mixed picture, both in terms of implementation of its various provisions and its impacts. Many distortions in dairy markets still remain and not all the expected benefits have materialized. In the URAA, member countries agreed to convert all non-tariff barriers to tariffs and to reduce them, however, the experience shows that these new disciplines provided for flexibility in implementation and many developed countries have found ways to limit impacts on their domestic agricultural sectors. The formulas used in the Uruguay Round allowed some countries to inflate the tariff equivalents for particular products and to minimize the rate of reduction in tariffs for sensitive products. In some cases, countries used relatively large cuts on low tariffs and small cuts on high tariffs to meet the overall 36 per cent reduction requirement. Few countries (mainly developed) have the provision of special safeguard clause, which allow them to increase tariffs above the ceiling levels in order to protect their domestic market from a surge in imports or very low world prices.

SHRESTHA, SAMJHANA, MARK BELL & PAUL MARCOTTE

Assessing the Impact of Rice Research in Myanmar

Key words: Myanmar, rice research, impact, collaboration

In the twenty-five years of formal research collaboration between the International Rice Research Institute and the government of Myanmar, rice production in Myanmar increased by 115% as a result of improved rice technologies. An ex-post benefit cost analysis of the collaborative research program shows that the investment has generated a handsome 155% internal rate of return. The total discounted value of economic benefit was estimated to be $140 million. In addition, the program played a critical role in capacity building of agricultural research system of Myanmar. The results justify further investments in agricultural research and extension in Myanmar.

SINDEN, J A

The costs of protecting native vegetation in New South Wales: the case of Moree Plains Shire

Key words: Native Vegetation, Costs, NSW

The Native Vegetation Conservation Act was introduced on January 1st 1998 to limit the clearing of native grassland and woodland in NSW. The Act will limit clearing, will protect bio-diversity, should enhance soil and water conservation, and may improve the amenity of life on the plains. But, as this analysis of farm land values in Moree Plains Shire shows, the Act reduces land values and decreases farm incomes. Empirical estimates of these costs are derived and presented as a basis for the policy discussion. Are the benefits to bio-diversity worth these costs? Can the benefits be obtained more efficiently or more equitably?

SINGH, V.K & J. SINGH

Diversification or Specialisation ! Are We on Right Path — Some Results from Haryana agriculture

High yielding varieties of crops mainly wheat and rice have increased the food production manifold in India. As a result of increase in area under high yielding varieties, the use of modern inputs like chemical fertilisers, pesticides, insecticides and water has increased considerably. The cropping pattern and rotation have also changed to maximise the farm income. The exploitation of natural resources and increased use of farm inputs have created an agro-ecological imbalance. In the wake of present trend, how long our agriculture is sustainable? is an important question to answer. This requires a look into trends in cropping pattern/rotation and the causes and effects of variability in crop production. In this paper we have analysed time series data on area production and productivity of different crops in different agro-climatic regions of Haryana, a leading agricultural state in North-western India. The study reveals that the crop production heading towards crop specialisation rather than diversification which is partially responsible for present day land degradation problems in the state.

SINGH, RAJINDER, JOHN MULLEN, KHALED FAOUR & ROBERT WILLIAMS

Economic analysis of nitrogen use in rice in Australia

Key words: Nitrogen, yield, risk

Nitrogen is a crucial input for the efficient production of rice but there is no pre-sowing test to estimate N requirements and farmers use cropping history to make this decision. Later in the season further nitrogen can be applied on the basis of plant tissue analysis but yield potential has often been established by this time. A further source of yield risk is temperature at flowering. At high rates of nitrogen there is a potential for yield losses at low temperatures. Our objective is to present this problem in a decision tree framework allowing information from soil and tissue tests to be used in a Bayesian framework to inform the probabilities farmers attach to various yield outcomes and hence nitrogen use decisions.

SINGH, RAJINDER, JANELLE JENKINS, ANTHONY FANNING & JOHN BRENNAN

System-specific strategies for ameliorating soil acidity in the South-west Slopes of NSW

Key words: Soil acidity, Liming, Rotations

In the South-west slopes of NSW, soil acidity is a serious problem, with about 60,000 sq kms of dryland soils being classified as acidic with pH levels below 5.0. To ameliorate such soil acidity, the South West Slopes Acid Soils Community Action Group, in conjunction with

the staff working in the Acid Soils Program within NSW Agriculture, are working to identify liming strategies for different cropping systems on soils with different levels of pH and rainfall. Since the response of lime is found to be different in different farming systems, there is a need for liming strategies that are specific to the farming systems involved. Given the high costs of an investment in liming, it is important to estimate the specific benefits of liming on different soils and farming systems before making recommendations for on-farm adoption. The aim of the present study is to analyse the economic benefits of liming from different rotations and farming systems to identify the most rewarding options for ameliorating acid soils, and to analyse the long term economic consequences of both liming and no-liming strategies.

SPIES, AIRTON, MAL WEGENER, S. CHAMALA & BOB BEETON

Sustainability of the pig and poultry industries in Santa Catarina State, Brazil: Challenges for socio-economic researchers, extension professionals and operators

Despite having successfully introduced technical and economic benchmarking procedures to improve producers' performance, sustainability of the pig and poultry industries in Santa Catarina, Brazil might not be assured, because of significant problems such as poor waste management under current production systems.
This study employed a comprehensive methodology, combining quantitative (life cycle assessment), qualitative (survey and focus groups), and economic approaches, including an assessment of externalities, to identify a set of core sustainability indicators. The challenge for professionals servicing these industries lies in developing policies and designing production systems that meet the social and environmental specifications incorporated in the sustainability indicators, rather than relying solely on conventional technical and economic benchmarks.

STONEHAM, EIGENRAAM, DUKE & STRAPPAZZON

Landholder Entry into Environmental Schemes: an empirical examination of Victoria's 'Bushtender' policy

In this paper, we analyse the characteristics of landholders who entered Victoria's Bushtender scheme. Bushtender is an auction-based approach to allocating conservation contacts, that was trialled in two Victorian regions from July through December in 2001. We examine data from a phone questionnaire that asked respondents about their decision regarding entry/non-entry to the Bushtender scheme. We explain how the results could be used to improve similar schemes in the future.

STONEHAM, EIGENRAAM, DUKE & STRAPPAZZON

River pollution: a market-based solution

We analyse a salt trading system that could be applied to the Murray River in Victoria. We propose a system that could take account of both point and non-point polluters that is a variant of the scheme introduced by Stoneham et al. (2001). Specifically, we take account of the fact that salinity can be mitigated not only via engineering works and land use change, but also by water dilution flows.

STRAPPAZZON, LORIS, HA, EIGENRAAM, STONEHAM & DUKE

Environmental Markets and Property Right Structures

There has been a lot of discussion about interactive environmental markets, for example, the combination of carbon, salt and biodiversity markets. Such schemes usually need involvement from farmers since they manage much of the land that is connected with these environmental goods. However, before policy makers start to integrate different environmental markets, they need to consider property right structures; these may affect both efficiency and equity. In this paper, we consider alternative property right structures for an environmental market involving two goods: mitigation (of pollution) and biodiversity. We comment on several different aspects that affect environmental market outcomes: optimal targeting by the agency; the amount of information held by farmers.

STRAPPAZZON, LORIS, MARK EIGENRAAM, RUKMAN WIMALASURIYA & GARY STONEHAM

Estimating Research Benefits when there is Input and Output Substitution: Putting Theory into Practice

Key words: Research benefits; productivity; linear programming; economies of scope

In this paper, we develop a new method for estimating the producer benefits of technical change, taking account of input or output substitution. Our approach is consistent with a

profit function approach to benefit estimation, and can be used to measure the benefits of either a 'cost-reducing', or 'output-expanding', technical change. Our approach combines farm-level linear programming models with index numbers. We use three case studies to illustrate our approach under varying circumstances: (1) when there is no input or output substitution; (2) when there is predominantly output substitution and (3) when there is predominantly input substitution.

TIAN, WEI-MING , ZHANG-YUE ZHOU & JUN-LIN ZHOU

The Emerging Dairy Economy in China: Production, Consumption and Trade Prospects

Key words: Dairy market, China, Agribusiness

Currently per capita consumption of dairy products in China is low. In view of China's strong economic growth and the resulting higher consumer income, whether this would represent a great market potential has drawn much interest from the dairy industry both within and outside China. This paper overviews China's dairy market with up-to-date information and highlights important factors affecting its development. The study shows that the growth of demand for dairy products in China is promising. However, a substantial increase in exports of dairy products to the Chinese market is unlikely in the near future, despite the fact that China's accession to the WTO will result in a substantial reduction of trade barriers. This is due to taste differences between the Chinese and the consumers of those major dairy exporters. Increased understanding of the Chinese dairy markets and increased attention to modifying their products to suit the tastes of the Chinese are essential for diary exporters to succeed in the Chinese market.

TOYNE, CHRIS

Inventories and commodity price volatility: A test of the theory of storage

The theory of storage implies that commodity price volatility is inversely related to inventories, and that as inventories decline, spot prices become relatively more volatile than futures prices, and vice versa. These implications are directly tested using inventory and price data for six non-ferrous metals traded on the London Metal Exchange over the period 1989 to 2000. The conditional variances are specified as multiplicative heteroskedasticity models. For four of the six metals, the observed relationships between the inventories and the variance of spot and futures prices support the implications of the theory of storage. The findings thus lend qualified support to the notion that market fundamentals drive commodity price volatility.

TREWIN, RAY

Analysis of market shares of processed food exports to Japan

Key words: Processed foods, exports, market shares

Processed foods' share of the Japanese food market has been increasing markedly, especially for imported and more western-style foods. Concurrently, Australia's share of this market has been falling, particularly to China and the United States. Are demand-side factors such as Australian products not matching the market's requirements, or supply-side factors such as a loss of Australian competitiveness, driving this declining share? This question is addressed through constant market shares analysis of the food exports of Australia and other key suppliers. This broad analysis leads to more detailed regressions, including frontier regressions capturing unmeasured effects such as management performance.

TRUNG, DANG DINH,

Coffee and subsistence production: complementarity or competition? A case study from an Ede (Rhade) village in Vietnam.

Key words: Subsistence production, coffee production, internal migration.

In the Vietnamese Central Highlands, the Ede economy, previously based on subsistence production has increasingly shifted to coffee. Over the past two decades, coffee has come to dominate Ede agriculture. Meanwhile, land shortages due to various factors, and exhaustion of the forest from extensive internal migration has caused Ede subsistence to deteriorate. Recently a sharp drop in coffee prices has drastically worsened their livelihood, especially the poor. The paper will examine the Ede adoption of coffee production and the interaction between subsistence and coffee production on a daily basis.

VAN BUEREN, MARTIN

An International Review of Environmental Markets and Trading Programs

Key words: Environmental markets, trading programs, property rights.

Over the past year or so, the concept of developing markets for environmental services has attracted unprecedented attention in Australia. For example, environmental credit trading is gaining currency as a potential mechanism for managing dryland salinity, biodiversity, and preserving native vegetation in agricultural regions. The prospect of commercialising environmental services such as carbon sequestration, water filtration, and aquifer recharge is exciting because it would overcome the current situation where public demand for improved environmental quality fails to be communicated to private firms via a market mechanism. However, the creation and trade of property rights in environmental services is still in its infancy and numerous obstacles stand in the way of implementing market programs. This paper reviews the current status of environmental markets in the US and UK and highlights the lessons that can be gleaned from the success and failure of programs in these countries.

VANZETTI, DAVID

Simulating the impact on developing countries of market access reform

For there to be progress in the forthcoming WTO round of multilateral trade negotiations, it is necessary that the interests of developing countries are given greater consideration than previously. The types of market access reforms that will provide most gains (and losses) to individual developing countries and sectors are identified from simulations using ATPSM, a partial equilibrium trade model featuring 36 agricultural commodities, 48 countries and tariff rate quotas. Developing countries appear to gain more from reducing their own tariffs than from obtaining access to developed country markets.

BOB HARRISON & MICHAEL VARDON

Environmental Accounting: Concepts, Practice and Assessment of Sustainable Development

Quantitative assessment of sustainable development requires accounting for the environmental impacts of the economy and the depletion and degradation of natural resources. Environmental accounting provides a system that links economic activities to changes in the environment and natural resources. The United Nations System of Integrated Economic and Environmental Accounting (SIEEA) has guided the development of environmental accounts in Australia and the Australian Bureau of Statistics has produced several accounts that link to the System of National Accounts. This paper describes how SIEEA can be used to assess sustainable development and demonstrates this with Australian examples.

WAN, DR GUANG HUA

Convergence in Food Consumption in Rural China: Evidence from Household Survey Data

Convergence in food consumption not only reflects homogenisation of preferences but may also imply nationalisation or integration of markets. This paper will (a) propose an econometric model for studying consumption convergence; (b) apply the model to a set of panel data from China; and (c) discuss implications of modelling results to government policy makers, business community and China modellers.

WAN, DR GUANG HUA & JIANGAO NIU

Macroeconomic Policy and Household Demand in Rural China: The Role of Precautionary Savings and Liquidity Constraints

To gauge the impact of welfare reforms on domestic demand in China, it is useful to analyse the role of precautionary savings and liquidity constraints among rural consumers. While rural China did not experience welfare reforms, liquidity constraints may have emerged. Findings from this study will help shed light on the causes of sluggish domestic demand in China.

WATSON, BILL, NIGEL HALL, BARRY CROKE AND REBECCA LETCHER

Integrated Catchment Modelling and Management of Salinity: The TARGET Project Case Study

Integrated Catchment Management for salinity is currently a central area of policy concern in Australia In New South Wales the Murray-Darling Basin Commission and the NSW government have initiate a project to support integrated catchment management of salinity in the Lachlan and Macquarie catchments (TARGET). iCAM will be responsible for

developing a conceptual framework for integrated catchment management of salinity involving development of producer sustainability profiles (biophysical, economic and social), Regional Integrated Management Information Systems (RIMIS) and multi-period farm scale models integrating land use, hydrology and salinity management, on a land management unit basis, within catchments.
This paper reviews previous work in the area and provides an overview of the TARGET project –the implications of sustainability profiles, farm profitability impacts and impediments for integrated catchment management of salinity and progress with the development of the RIMIS. In particular, the conceptual framework for Integrated Catchment Modelling, the planned modelling system and preliminary results will be presented.

WEBSTER, STEWART

Private incentives for on-farm management of Ovine Johne's disease

Key words: Disease management, farm profitability, eradication

Ovine Johne's Disease (OJD) affects the financial performance of individual producers through its biological effect on production and regulatory restrictions in the form of trading and stock movement controls. The latter have attempted to minimise the further spread of the disease while scientific data to support long term policy decisions is obtained through the National OJD Control and Evaluation Program. An important consideration in the long term management of OJD is the returns associated with different on-farm management strategies. This paper examines the financial consequences of three OJD management options — status quo, vaccination and eradication through destocking — for individual producers located in the Central Tablelands of NSW, Kangaroo Island, SA, and the Kyneton district, Victoria. The effect of scale, enterprise mix and risk on outcomes is discussed and the implications for wider policy are identified.

WHITE, BEN

Optimal Dynamic Monitoring of Biodiversity Conservation Schemes in Agriculture

Agri-environmental schemes are found in most European countries and account for approximately 4 per cent part of EU expenditure on UK agriculture. A significant part of that expenditure is the cost of monitoring farmer compliance with input restrictions. This paper analyses the design of monitoring schedules for long duration agri-environmental schemes where the aim is to reinstate preferred ecosystems using a Partially Observed Markov Decision Process (POMDP). The approach has much in common with the Arrow-Fisher-Henry model of irreversible land development where there is uncertainty over environmental value.

WHITTEN, STUART & JEFF BENNETT

Targeting incentives for policy: Linking bio-economic modelling to on-ground outcomes

Key words: Environmental policy, optimal policy design

Environmental policy in Australia has assumed a high profile in Australia with recent policies addressing aspects of land degradation (National Heritage Trust and the National Action Plan), forest management (Regional Forests Agreements) and climate change (Greenhouse Gas Abatement Program), among others. These policies are often based on relatively little information on the likely benefits to be generated or cost borne. In this paper, the issue of policy development is directly addressed using a case study of wetland policy. The desirable scale of the policy response to environmental issues is informed by the development of the notion of threshold policy analysis. The suite of policy options that should be adopted is dependent on the scale and type of change desired from the policy. The degree of irreversibility and notion of environmental threshold impacts on the environmental outputs generated also affects the choice and timing of alternative policy options. Timing of policy is therefore a function of quasi-option values – the value of waiting for more information.

WILSON, CHRIS

Forecast errors in global population projections: implications for food

The demographic future of any population is uncertain. However, among the many possible trajectories, some are more likely than others. In recent years demographers have developed sophisticated tools for handling uncertainty within population forecasts. A valuable guide to the degree of uncertainty attaching to current population forecasts is the extent of errors in earlier projections. This paper assesses the extent and nature of errors in past forecasts of

global, regional and national populations. It then considers some of the ways in which these uncertainties could be reduced in the future and how to provide probabilistic estimates of demographic variables relevant to demand for primary products.

WILSON, TREVOR, AND ZOE GLASSON

Re-visiting cost recovery for government services

Key words: Beneficiary pays principle, cost recovery, user charge

Theory indicates that charging for government services provided to identifiable clients should improve resource allocation. The question arises — what level of fees and charges should be applied. One popular theory is that charges should be calculated by dividing costs in proportion to "public" and "private" benefits, with the client paying only the "private" component. This paper suggests it is more logical to recover costs at the point of service delivery. The only basis for subsidising services should be in cases when demand for a particular service is less than acceptable at an unsubsidised cost recovery level.

WINDLE, JILL AND JOHN ROLFE

Whose Values Count: Using Choice Modelling to Assess Values Held by Indigenous People for Floodplain Development.

Considerations of equity are important components of sustainable development criteria, but remain difficult to incorporate in economic analysis. Various non-market environmental valuation techniques have been developed and refined to incorporate environmental factors into economic valuation but little consideration is given to social factors. A recent Choice Modelling (CM) study has examined issues relating to the trade offs between development and conservation in the Fitzroy River Basin. The study assessed the values and opinions of various populations selected on a geographical basis. This paper will describe a complimentary CM survey that examined the related issues, values and opinions of indigenous people in the region. Differences between the two surveys will be examined and the policy implications discussed.

WINTER, TENNILLE, DAVID J PANNELL & LAURA MCCANN

The Economics of Desalination and its Potential Application in Australia

Key words: Desalination, Salinity, Water supply

Future concerns about the quality and quantity of Australia's fresh water supplies from salinisation has necessitated the need for action. Several options exist to secure fresh water supplies for the future, including revegetation, engineering methods, and desalination. Revegetation and engineering options can be very expensive when applied on the scale needed. Desalination has considerable potential as it gives immediate benefits and can be applied anywhere saline water exists, subject to it being suitably cost-effective. This paper shows that, in Australia, based on current prices charged for water, desalination is currently only competitive with traditional water sources in remote locations. There are two ways that this might change. There may be a continuation of advances in technology for desalination, or alternatively the true cost of traditional fresh water sources may rise. Even if the former does not occur, the latter appears certain.

WIRTHGEN, ANTJE

Consumer Preferences for Environmentally Friendly Produced Food

In Europe, environmentally friendly produced food is receiving increasing interest. This can be seen in the growing demand for organic food as well as in some countries policy, e. g. the German 'New Agricultural Policy'. This contribution is part of a interdisciplinary project looking at the central question: How can agriculture and nature conservation be brought in accordance with one another? The main objective of the marketing part was, to identify consumer preferences for environmentally friendly produced food from nature conservation. A consumer survey was undertaken and the results analysed by means of multivariate analysis methods, e.g. Conjoint-Analysis.

WISE, RUSSELL & DR OSCAR CACHO

A bioeconomic analysis of soil carbon sequestration in agro-forests

Key words: Agroforestry, bioeconomics, soil carbon, global warming.

Agroforestry can help in the battle to control global warming by sequestering atmospheric CO_2. Most attention so far has been on the carbon sequestered in trees, but soils can also contain considerable amounts of carbon, some of which is released upon harvest. There has been little quantification of the impact of different land-uses on soil carbon levels due to the high costs and lengthy time periods required to accurately measure soil carbon fluctuations, within and across sites, and over an entire project lifespan. This study attempts to quantify soil carbon changes under agro-forestry systems using a modeling approach. The net effects on carbon storage of implementing agro-forestry depend on the carbon content of the land-use practices that are replaced. Also, agro-forestry projects will impact upon soil carbon levels by preventing land clearing and by maintaining carbon already in the soils. These issues are evaluated from the standpoint of individual landholders, and implications for policy design are discussed.

WUTTISORN, PIYANUCH

Institutional Aspects of Water Policy and Reforms in Thailand

Key words: Water allocation, institution, Thailand

This paper investigates the institutional evolution of Thailand's water economy. The emphasis is on water use in agriculture and irrigation in the Chao Phraya Delta, the area that is progressively challenged by competing claims for water use and the need to better allocate water resources. The paper highlights how the existing administrative system attempts to cope with the challenges, and the water reforms being undertaken as a result. The process of undertaking water reforms in Thailand has resulted from external pressure on domestic institutions. Current trends reveal that the path of water reforms in the country is shifting towards the property-right regime of common-pool resource, and away from conventional approach. However, the evolution of a new institutional structure for water is anticipated to be prolonged because the institutional reforms require more insights and clear understanding on what are available choices for such change, and what would be the most appropriate institutional structure for water under existing Thai cultural, political, environmental and indigenous knowledge and circumstances.

WYNEN, ELS & DAVID VANZETTI

Is an international Soil Convention feasible? A comparative analysis

Recent calls for a UN Convention on Soils begs the question about its feasibility and advisability. International conventions are most likely to be successful where the need for action is compelling, the effects of inaction immediate, dramatic and relatively certain, and there are significant international spillovers. Potential signatories to a convention must believe they would benefit in some way, and that these benefits cannot be obtained if they abstained. We examine the characteristics of six UN conventions related to environmental issues and argue that an international soil convention would not satisfy these and other criteria, and would therefore be difficult to implement.

WYNEN, ELS

The economics of organic cereal-livestock farming in Australia revisited

In 2001 a survey of five organic cereal-livestock farms was undertaken to assess the economics of organic broadacre farming in recent times. In the mid-1980s a similar study carried out in Eastern Australia found that organic farmers were doing as well as their conventionally farming counterparts. Under present conditions of input use and prices, productivity, output premiums and relative output prices, some organic farmers can be close in financial performance to conventional farmers interviewed. Those who have converted to organic management more recently seem to have a bit more of a struggle.

XIN, XIAN, GUANG-HUA WAN & XIAO-YUN LIU

Feedgrain Trade Flows in China and Responses to Price Changes

Using a hybrid transport model, this paper examines feedgrain trade flows among regions in China and possible responses to likely price falls on China's accession to the WTO. Preliminary results indicate that surplus feedgrain in Heilongjiang should go to Hebei, Henan, Fujian and Shanghai, while Jinlin ought to ship its surplus feedgrain to Anhui and Hunan. Liaoning would supply Beijing and Shandong. Most of Inner Mongolia's feedgrain would go to its neighbor, Hebei. The largest pork-producing province, Sichuan, should source feedgrain from its neighbors, Guizhou,

Gansu and Shaanxi. In the long run, both demand and supply react more sensitively to changes in the prices. Interregional trade flow pattern differs under different prices changes. However, these different patterns also share some common features.

YANTI, NURI DEWI & SARAH LUMLEY

Sustainability analysis of local and transmigrant farming systems in tidal swamplands : a case study in South Borneo, Indonesia

Key words : sustainable agriculture; tidal swampland; farming system; transmigrants; Indonesia

Population pressure in Indonesia, especially in the inner islands of Java and Madura, compelled the government to seek other areas to expand agricultural lands as well as to resettle people from these inner islands to the less-populated outer islands, such as Borneo. Tidal swamplands in Borneo offered one alternative to meet land requirements for both purposes. However, due to the unique characteristics of tidal swamplands, farming systems in this ecosystem should be conducted properly, especially by the new settlers who are not familiar with the environments. It is increasingly important to achieve sustainable agriculture which in turn will lead to sustainable development.

ZHANG, LI-QING, WEI-MING TIAN & ZHANG-YUE ZHOU

China's PSE: Are Chinese Farmers Subsidised?

Key words: Producer subsidy estimate, agricultural policies, China

The Chinese government introduced some pro-farmer policies in the mid 1990s. This has caused some concerns from other countries on whether and how such policy initiatives would affect China's agricultural trade. This study uses OECD's methodology to calculate producer support estimates (PSEs) and total support estimates (TSEs) for China. The findings from this study show that recent policy shifts indeed tend to be in favour of the Chinese farmers. However, it is also evident that the Chinese farmers are still taxed even under the current agricultural policies. The paper concludes by addressing likely further changes in agricultural policies following China's joining the WTO and discussing the implications of China's agricultural policy changes.

ZHAO, XUEYAN, KYM ANDERSON AND GLYN WITTWER

Who Gains from Australian Generic Wine R&D and Promotion?

Key words: Economics of R&D, promotion, wine, equilibrium displacement modelling

A multi-sectoral partial equilibrium model of the markets for two types of Australian grapes and wine (premium and non-premium) is developed to study the aggregate returns from different types of research and promotion investments by the industry and their distribution across actors in the market (grapegrowers, winemakers, Wholesalers/ retailers, domestic consumers, the tax office, and foreign consumers). The distinction is made between premium and non-premium, since half the market is non-premium and yet virtually all the R&D and marketing efforts are focused on just premium products in an attempt to raise quality as consumers continue to move up-market. The results show that four-fifths of the gains from R&D go to producers, with wineries faring better than grape growers; that producers get a far larger share of the benefit from promotion when it is targeted abroad than when it focuses on domestic consumers; and that foreign consumers of Australian wine enjoy one-tenth of the benefits of R&D and one-fifth of the benefits (in a willingness-to-pay sense) from promotion of 'Brand Australia' abroad. JEL codes: C69, O33, Q13, Q16

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