

JOINT INTERNATIONAL SYMPOSIUM

XVth International Symposium on Horticultural Economics and Management

Vth International Symposium on Horticultural Education, Research, Training and Consultancy

Book of Abstracts

Editor

Peter J. Batt

Lotus Pang Suan Kaew Hotel
Chiang Mai
THAILAND

June 28 - July 2, 2009

Curtin 
University of Technology



 THE UNIVERSITY OF
MELBOURNE



Notes



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BOOK OF ABSTRACTS

**XVIth International Symposium on Horticultural Economics
and Management**

**Vth International Symposium on Horticultural Education,
Research, Training and Consultancy**

Editor

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Chiang Mai
THAILAND**

**June 28 – July 02
2009**

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Notes

WELCOME

Dr Peter Oppenheim, Commissioner, Economics and Management,
Dr Errol Hewett, Commissioner, Horticultural Education, Research, Training and
Consultancy,
Dr Daniel Lineberger, distinguished keynote speaker,
Distinguished guests,
Ladies and Gentlemen,

Good Morning

On behalf of Maejo University, it is an honour and a pleasure for me to welcome the participants from Australia, France, Sweden, Germany, Japan, United States of America, United Kingdom, Canada, Belgium, The Netherlands, Iran, India, Hungary, South Africa, China, Chile, Nigeria, Egypt, Israel, New Zealand, and of course Thailand to Maejo University.

We are very proud to be a part of this international symposium organized by the International Society for Horticultural Science as we celebrate the 75th anniversary of our university.

Founded on June 7, 1934, as the Northern Agricultural Teachers' Training School by our beloved Head Master Prachuang Kasetsilapakan, Maejo University is the only university in Thailand named after a village.

We are very proud of our heritage and of our graduate students. Students of Maejo are trained to work hard regardless of their background, which makes a Maejo student unique, friendly, down to earth and always willing to give a helping hand to the community.

Over the past 75 years, Maejo University has changed for the better, with more buildings, more students and more achievements, not to mention more fame, as well as more international relations. But the Maejo spirit that is implanted in each of us lingers.

I would like to extend our thanks and appreciation to the International Society for Horticultural Science for this great opportunity to co-host this international conference as a tribute to our university.

Our Agriculture Fair offers exhibitions, competitions on orchids, ornamentals, landscaped gardens, and new breeds of fruit and vegetables that will delight the eye and heart of the beholder.

I trust you will enjoy your short stay at Maejo University.

Professor Dr. Thep Phongparnich
President
Maejo University

Welcome

On behalf of the International Society for Horticultural Science, I would like to welcome you to the VIXth International Symposium on Horticultural Economics and Management. Since the first meeting on Horticultural Economics in 1969 at Reading in the United Kingdom, International Horticultural Economics Symposia have been held at intervals in various countries around the world. However this is the very first time that a Horticultural Economics Symposium has been convened in Thailand. In fact when I reviewed the localities where the international symposia have been held, I found that 13 of the Symposia have been held in European countries, while two have been held in the USA. The person behind the move to organize this symposium in Thailand was Associate Professor Peter Batt, who has in recent years run several successful meetings in South East Asia. The Commission for Horticultural Economics and Management is very grateful for the considerable amount of work that Peter has undertaken to ensure that this Symposium will be successful.

I know that some of us have been members of the International Society for Horticultural Science for many years. For those among us who have only recently joined the Society, you may be interested to know that the Society was formally constituted in 1959. Today, it has more than 7000 members from over 150 countries. It is the world's leading independent organization of horticultural scientists. The Society is administered by the ISHS Secretariat, based in Leuven, Belgium. In addition to the Council and various sub-committees, the Executive Committee manages the scientific program. It is made up of the Chairs of the Sections and Commissions. It is via these groups that ISHS communicates with its members, all of whom have specific research interests covering many areas of horticultural science. Sections cover all horticultural crops grown around the world, while the Commissions relate to different scientific and technical disciplines within horticulture.

A major benefit of ISHS membership is the privilege of attending the World Horticultural Congress every four years at a discounted rate. The Congresses are normally attended by more than 2,000 delegates and cover all areas of horticultural science. The Congress provides an opportunity for individuals to exhibit posters and to make oral presentations on their current research work. The next Congress will be held in 2010 at Lisbon in Portugal. A special seminar of interest to horticultural economists will be incorporated into the Congress program. I do encourage you to participate and hope that I will see you there.

In welcoming you to this symposium, I would like to wish everyone an enjoyable and profitable time in Thailand. Gathered as we are in Chiang Mai provides us with a unique opportunity to exchange ideas and network. Hopefully this symposium will be remembered for all the right reasons – and one of those will be the collaborations that we will develop during this week in Thailand.

Dr Peter P. Oppenheim
ISHS Chair
Commission for Horticultural Economics and Management

Notes

Peter J. Batt
Curtin University of Technology
Australia

Nipon Jayamangkala
Maejo University
Thailand

Peter P. Oppenheim
Deakin University
Australia

Peter J. Batt
Curtin University of Technology
Australia

Bridget Behe
Vera Bitsch
Wolfgang Bokelmann
Nico de Groot
Jennifer Dennis
Lena Ekelund
Dick Funt
Raúl Cabrera Graña
John Hall
Wolfgang Lentz
David Midmore
Patrik Mouron
Peter Oppenheim
Hanneke Pompe
Allan Rae
Marlo Rankin
Jean Russell
Andrew Shepherd
Sukhphal Singh
Nicole Taragola

Michigan State University
Michigan State University
Humboldt University
Wageningen University
Purdue University
Swedish University of Agricultural Science
Ohio State University
ESPAFIBRAC
Deakin University
University of Applied Sciences
Central Queensland University
AgroCourage
Deakin University
Wageningen University
Massey University
University of Queensland
University of Queensland
FAO Rome
Centre for Management in Agriculture
Institute for Agricultural and Fisheries Research

Welcome,

On behalf of the International Society for Horticultural Science, welcome to Chiang Mai, Thailand and to this, the Vth International Symposium on Horticultural Education, Research, Training and Consultancy. At a time when horticulture is recognised as a driver for economic growth, for enhancement of living standards in rural environments, for assisting in alleviating malnutrition and poverty in developing countries, there is a major international shortage of well trained horticultural graduates available to provide scientific leadership in fruit, vegetable, flowers, ornamentals and amenity research, management, extension and supply chain businesses involved with food, nutrition and wellbeing of society.

The theme of this Symposium: *Staff, Student, Institution and Industry Partnerships in a Changing World* addresses the changing research training and extension pressures on production, postharvest and environmental horticulture programs internationally, how to effectively deal with issues of research training and extension in horticultural science, what are the relevant curricula needed to develop the relevant knowledge and skills for staff, students and industry into the next decade, and how can we partner and market persuasive cases to sustain research training and extension in horticulture at education and training into the future. A number of presentations also address models for the delivery of horticultural education that could arrest student decline, the role of industry in training, marketing horticultural training programs education and training models for collaboration between institutions and industry.

All papers presented at the symposium have been peer refereed. ISHS acknowledges and appreciates the very significant contributions made by all of the external reviewers in making a significant contribution to improving the quality of this symposium.

Finally, as the success of this symposium is ultimately measured by the quality of the papers and posters submitted, and by the active outcomes of your deliberations, we wish to thank you, the delegates, for your willingness to share your thoughts as well as your teaching, research and extension experiences.

Errol Hewett
Chair
ISHS Commission of Education, Research Training and Consultancy

David Aldous
Vice Chair
ISHS Commission of Education, Research Training and Consultancy

Notes

Notes

Conveners

Peter J. Batt
Curtin University of Technology
Australia

Nipon Jayamangkala
Maejo University
Thailand

David Aldous
University of Melbourne
Australia

Conference secretariat

Peter J. Batt
Curtin University of Technology
Australia

Referees

David Aldous
Philip Brown
Rebecca L. Darnell
Keith Fennell
Errol W. Hewett
Paul Kristiansen
Margaret Sedgley
W.J. (Bill) Simpson
Zora Singh
Bruce Mackay
Acram Taji
Karen K. Tanino
Mardie Townsend
Richard Williams

University of Melbourne
University of Tasmania
University of Florida
Massey University
Massey University
University of New England
University of New England
Pershore College
Curtin University of Technology
Massey University
Queensland University of Technology
University of Saskatchewan
Deakin University
University of Queensland

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Lotus Pang Suan Kaew hotel, Chiang Mai, Thailand, June 28 – July 02, 2009

Sunday: June 28

4.00 – 9.00	<p>Registration: Muen Kam Kong restaurant Level 6: Huay Kaew wing</p>
6.00 – 9.00	<p>Cocktail reception: Muen Kam Kong restaurant</p> <p>Official welcome: Peter Oppenheim, ISHS Commissioner, Economics and Marketing</p> <p>Official opening: Professor Dr. Thep Phongpanich, President, Maejo University</p>

Monday: June 29

9.00 – 10.30	<p>PLENARY SESSION 1: Bann Pantone</p> <p>Chair: Errol Hewett, ISHS Commissioner, Education, Research, Training and Consultancy</p> <p>Plenary address: Evolution of web-based collaborative learning environments in horticulture R. Daniel Lineberger, Texas A&M University</p>
10.30 – 11.00	<p>Morning tea</p>

Notes

Sara Spendrup
Swedish University of Agricultural Sciences
PO Box 88, 23053 Alnarp, SWEDEN
Email: sara.spendrup@ltj.slu.se

Tim Sun
University of Queensland
Gatton, QLD 4343, AUSTRALIA
Email: t.sun@uq.edu.au

Nicole Taragola
Institute for Agricultural and Fisheries Research (ILVO)
Burg van Gansberghelaan 115 B2, 9820 Merelbeke, BELGIUM
Email: nicole.taragola@ilvo.vlaanderen.be

Pusanisa Thechatakerng.
Maejo University
Sansia, Chiang Mai 50290, THAILAND
Email: thepusanisa@yahoo.com

Anthony Tuleda
Northern Marianas College
PO Box 501250, Crees, Saipan MP 96950, NORTHERN MARIANUS ISLANDS
Email: dilipn@nmcnet.edu

Chengyan Yue
University of Minnesota – Twin Cities
1970 Folwell Ave, St Paul, MN 55108, USA
Email: yuechy@umn.edu

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11.00 – 12.30	<p>PLENARY SESSION 2: Bann Pantone Chair: Nipon Jayamangkala</p> <p>Economic evaluation of different irrigation regimes in mango production in Northern Thailand K. Saticenperakul, P. Manochai, S. Ongprasert, W. Spreer and J. Müller</p> <p>Quality management and commodity flow of horticultural produce in Nay Pyi Taw, Myanmar H.M. Thu, S.N.C. Tun, T.H. Moe, M.Z.N. Aung and S.H.L. Htoo</p> <p>Attitudes and motivations towards organic agricultural products among Thai consumers P. Thechatakerng</p> <p>Problems and potential in the conversion to organic farming in Chiang Mai, Thailand N. Jayamangkala</p>
12.30 – 2.00	Lunch: Muen Kam Kong restaurant

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2.00 – 3.30	<p>Concurrent session 1A: Bann Pantone Chair: David Pearson</p> <p>Korean consumers' view of genetic modification of fruit and vegetables W.J. Florkowski and D.K Suh</p> <p>Cost price calculations for organic and conventional grown vegetables in Sweden B. Håkansson, J. Ascard and M. Söderlind</p> <p>Sustainable horticultural supply chains: the case of local food networks in the United Kingdom D. Pearson and A. Bailey</p>
3.30 – 4.00	<p>Concurrent session 1B: Huay Sam Poi 1 + 2 Chair: Wolfgang Bokelmann</p> <p>Citrus farmers' accessibility to horticultural information in South Western Nigeria O.O. Oyedele and M.K. Yahaya</p> <p>Farmer's knowledge management in banana cultivation in a village of West Bengal, India: a reflection of farmer managed technology adaption and transfer in horticulture D. Basu, S. Banerjee and R. Goswami</p> <p>Need-based innovation motivates attitude change in farmers: an evaluation of the PROSAB approach U.M. Nwankwo, R.C. Bett, K.J. Peters and W. Bokelmann</p> <p>Tea/coffee break</p>

Mei Pei-Pei
College of Resources and Environmental Sciences
China Agricultural University, CHINA
Email: meipeipei@cau.edu.cn

Irit Prigojin
Agricultural Research Organization
PO Box 6, Bet-Dagan, 50250 ISRAEL
Email: veirit@volcani.agri.gov.il

David Puflett
Royal New Zealand Institute of Horticulture
61 Patumahoe Rd., RD 4 Pukekohe 2679, NEW ZEALAND
Email: rnzih@ps.gen.nz

John Rayner
University of Melbourne
Burnley campus, 500 Yarra Boulevard, Richmond, VIC 3121, AUSTRALIA
Email: jrayner@unimelb.edu.au

Bettina Riedel
University of Humboldt
Harzofen 4, 67454 Hassloch, GERMANY
Email: bettinariedel@gmx.net

Kaj Rolf
Swedish University of Agricultural Sciences
PO Box 66, 23053 Alnarp, SWEDEN
Email: kaj.rolf@ltj.slu.se

Eric Runkle
Michigan State University
A240 C PSSB, East Lansing, MI 48824, USA
Email: runkleer@msu.edu

Kanitta Satienperakul
Maejo University
Chiang Mai 50290, THAILAND
Email: kanitta@mju.ac.th

Michael Schmeisser
University of Stellenbosch
Private Bag 11, Matieland 7602, SOUTH AFRICA
Email: schmeisser@sun.ac.za

Saad Shama
University of Alexandria
PO Box 21531, Bolkley, Alexandria, EGYPT
Email: shamasaad@yahoo.com

Joel Magnusson
Swedish University of Agricultural Sciences
PO Box 52, SE 230 53, Alnarp, SWEDEN
Email: joel.magnusson@adm.slu.se

Thomas Marler
University of Guam
UOG Station, Mangilao, Guam 96923, USA
Email: tmarler@uog.edu

Robert L. Morris
University of Nevada Cooperative Extension
8050 Paradise Rd, Las Vegas, NEVADA 89123, USA
Email: morrisr@unce.unr.edu

Mike Murray
University of California Cooperative Extension
PO Box 180, Colusa, CA 95932, USA
Email: mmurray@ucdavis.edu

Roy Murray-Prior
Muresk Institute
PMB 1, Northam, WA 6401, AUSTRALIA
Email: r.murray-prior@curtin.edu.au

Dilip Nandwani
Northern Marianas College
PO Box 501250, Crees, Saipan MP 96950, NORTHERN MARIANUS ISLANDS
Email: dilipn@nmcnet.edu

Yasutaka Niisato
University of Toyama
3190 Gofuku, Toyama 930-8555, JAPAN
Email: niisato@eco.u-toyama.ac.jp

Olutola O. Oyedele
National Horticultural Research Institute
P.M.B. 5432 Idi Ishin, Jericho Ibadan, Oyo State, NIGERIA
Email: toyink2@yahoo.com

Peter P. Oppenheim
Deakin University
221 Burwood Highway, Burwood, Victoria 3125, AUSTRALIA
Email: peter.oppenheim@deakin.edu.au

David Pearson
University of Reading
Reading, RG2 7JR, UNITED KINGDOM
Email: d.pearson@reading.ac.uk

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4.00 – 5.30	<p>Concurrent session 2A: Bann Pantone Chair: Robert Morris</p> <p>Consumer choice of retail outlet: focus group interviews in Malaysia N. Chamhuri and P.J. Batt</p> <p>Identifying farmers' market organizational structure: an Indiana case study C. Hofmann, J.H. Dennis and M. Marshall</p> <p>Development of small-scale vegetable and fruit producers for an expanding urban market in Las Vegas, Nevada R.L. Morris, H. Gatzke and K.R. Curtis</p> <p>Concurrent session 2B: Huay Sam Poi 1 + 2 Chair: Roy Murray-Prior</p> <p>The role of private sector researchers in improving the field and post-harvest performance of grapes in Egypt S. Shama, O.M. Barbary, and M.A.Aly</p> <p>Trends in the development of collaboration between horticultural research and education and the industry J. Larsson, L. Ekelund and M. Carlsson</p> <p>Establishing partnerships between private sector and government to deliver extension and training to smallholder farmers in the PNG coffee industry F. Api, L. Aroga, R. Murray-Prior and P.J. Batt</p> <p>Business meeting: Economics and Management Commission: Ban Pantone</p>
5.30 –	

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Tuesday: June 30

9.00 – 10.30	<p>Concurrent session 3A: Bann Pantone Chair: Jennifer Dennis</p> <p>Factors affecting US consumer patronage of garden centres and mass-merchandisers C. Yue, B.K. Behe and J.H. Dennis</p> <p>Age influences gardening purchases, participation, and customer satisfaction and regret B.K. Behe and J.H. Dennis</p> <p>Regret and the changing American gardener J.H. Dennis and B.K. Behe</p>
10.30 – 11.00	<p>Concurrent session 3B: Huay Sam Poi 1 + 2 Chair: Mike Murray</p> <p>Implementing multiple cooperation with the horticultural sector to increase relevance of higher education: an integrated concept S. Hofmann, P. Mei, M.H. Nguyen Thi, S. Zakaria and J. Larsson</p> <p>An international and multi institutional cooperative desert horticulture program for Southern Nevada R.L. Morris, M. Norton, D. Devitt, E. Zamora, R. Heflebower and R. Call</p> <p>The Leslie J. Nickels Estate: challenging the paradigm of funding public research and extension M. Murray and J.P. Edstrom</p> <p>Tea/coffee break</p>

Errol W. Hewett
Massey University
PO Box 158, Oneroa, Waiheke Island, Auckland, NEW ZEALAND
Email: ewmrhewett@xtra.co.nz

Majid Javanmard
Iranian Research Organization for Science & Technology
PO Box 15815-3538, Tehran, IRAN
Email: javanmard@irost.ir

Nipon Jayamangkala
Maejo University
Sansai, Chiang Mai 50290, THAILAND
Email: nipon@mju.ac.th

Eike Kaim
Geisenheim Research Centre
Von Lade Str 1, D – 65366, Geisenheim, GERMANY
Email: e.kaim@fa-gm.de

John Kent
Charles Sturt University
Locked Bag 588, Wagga Wagga NSW 2678, AUSTRALIA
Email: jhkent@csu.edu.au

Kenichi Kohno
Japan Research Institute Ltd
16 Ichiban-cho, Chiyoda-ku, Tokyo 102 0082, JAPAN
Email: kohno.kenichi@jri.co.jp

Jan Larsson
Swedish University of Agricultural sciences
PO Box 88, SE 230 53, Alnarp, SWEDEN
Email: jan.larsson@ltj.slu.se

Daniel Lineberger
Texas A+M University
507 Horticulture/Forest Science Building, College Station, TX 77843-2133, USA
Email: dan-lineberger@tamu.edu

Gerard Logan
Eastern Institute of Technology
Private Bag 1201, Hawkes Bay Mail Centre, Napier 4142, NEW ZEALAND
Email: glogan@eit.ac.nz

Peter F. McSweeney
The University of Melbourne
500 Yarra Boulevard, Richmond, VIC 3121, AUSTRALIA
Email: peterm1@unimelb.edu.au

Nico de Groot
Wageningen University Research
PO Box 29703, 2502 LS The Hague, THE NETHERLANDS
Email: nico.degroot@wur.nl

Jennifer Dennis
Purdue University
625 Agriculture Hall Drive, West Lafayette, IN 47906, USA
Email: jhdennis@purdue.edu

V.S. Devadas
Kerala Agriculture University
Ambalavayal - 673 593, Wayanad, Kerala, INDIA
Email: vsdevadas@yahoo.com

Tony Dunne
University of Queensland
Gatton, QLD 4343, AUSTRALIA
Email: t.dunne@uq.edu.au

Edward Evans
University of Florida
18905 SW 280th St., Homestead, FL 33031, USA
Email: eaevas@ufl.edu

Fredrik Fernqvist
Swedish University of Agricultural Sciences
PO Box 88, 23053 Alnarp, SWEDEN
Email: Fredrik.fernqvist@ltj.slu.se

Wojciech J. Florkowski
University of Georgia
1109 Experiment St, Griffin, GA 30223-1797, USA
Email: wojciech@uga.edu

Claudio Fredes
Universidad Catolica del Maule
Carmen 684, Curico, CHILE
Email: cfredes@ucm.cl

Dennis Greer
Charles Sturt University
Locked Bag 588, Wagga Wagga NSW 2678, AUSTRALIA
Email: dgreer@csu.edu.au

Bengt Hakansson
Swedish University of Agricultural sciences
PO Box 88, SE 230 53, Alnarp, SWEDEN
Email: bentg.hakansson@ltj.slu.se

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11.00 – 12.30	<p>Concurrent session 4A: Bann Pantone Chair: Kenichi Kohno</p> <p>Tulip bulb industry in Japan since 1988 Y. Niisato</p> <p>How to improve production of tropical flowers in French Caribbean Islands C. Amar</p> <p>Changes in demand for floriculture products in Japan since the 1990s K. Kohno</p>
12.30 – 2.00	<p>Concurrent session 4B: Huay Sam Poi 1 + 2 Chair: Claudio Fredes</p> <p>Enhancing the teaching and evaluation of graduate attributes in wine science and viticulture degree level courses S. Savocchia, J. Thompson, D. Greer, M. Meunier, J. Gray, A. Clark and W. Adlong</p> <p>Information and communication technology (ICT) adoption in horticulture: comparison of the EFITA, ISHS and ILVO questionnaires N. Taragola, D. van Lierde and E. Gelb</p> <p>Computer software to aid in instruction of wine industry students C.A. Fredes, F. Pizarro, J.R. Pérez-Correa and E. Agosin</p> <p>Lunch: Muen Kam Kong restaurant</p>

2.00 – 3.30	<p>Concurrent session 5A: Bann Pantone Chair: Nico de Groot</p> <p>Analysis of supply chain management: case studies on the market for nursery products in Germany E. Kaim and S. Mueller</p> <p>Factors influencing the introduction of reduction techniques for pesticides and nutrients by ornamental plant growers D. van Lierde, N. Taragola, A. Vandenbergh and A-M. Cools</p> <p>Towards a low emission greenhouse horticulture M.N.A. Ruijs, J.B. Campen and M.G.M. Raaphorst</p>
3.30 – 4.00	<p>Concurrent session 5B: Huay Sam Poi 1 + 2 Chair: Tony Dunne</p> <p>Where to now for horticultural higher education in Australia? J. Rayner, P. McSweeney, K. Raynor and D.E. Aldous</p> <p>Optimisation of undergraduate horticulture course design at Charles Sturt University: a structure for the future Y. Guisard and J. Kent</p> <p>Can dual degrees help arrest the decline in tertiary enrolments in horticulture: a case study from the University of Queensland, Australia R.J. Collins and A.J. Dunne</p> <p>Tea/coffee break</p>

List of participants

David Aldous
University of Melbourne
500 Yarra Boulevard, Richmond VIC 3121, AUSTRALIA
Email: dealdous@gmail.com

Claire Amar
CIRAD
Station de Petit Morne, BP 214 97285, Le Lamentin, MARTINIQUE
Email: amar@cirad.fr

S. P. Baliyan
Department of Agricultural Research
Ministry of Agriculture, PO Box 151, Maun, REPUBLIC OF BOTSWANA
Email: spbaliyan@yahoo.com

Debabrata Basu
Bidhan Chandra Krishi Viswavidyalaya
PO Box Mohanpur, Nadia 741235, West Bengal, INDIA
Email: drdbasu@gmail.com

Peter J. Batt
Curtin University of Technology
GPO Box U1987, Perth, WA 6845, AUSTRALIA
Email: p.batt@curtin.edu.au

Madhusudan Bhattarai
AVRDC - The World Vegetable Center
P.O. Box 42, Shanhua, Tainan 74199, TAIWAN
Email: madhu.bhattarai@worldveg.org

Wolfgang Bokelmann
Humboldt University
Harzofen 4, 67454 Hassloch, GERMANY
Email: w.bokelmann@agrar.hu-berlin.de

Brian Calcinaï
Eastern Institute of Technology
Private Bag 1201, Hawkes Bay Mail Centre, Napier 4142, NEW ZEALAND
Email: brian@eit.ac.nz

Norshamliza Chamhuri
Curtin University of Technology
GPO Box U1987, Perth, WA 6845, AUSTRALIA
Email: n.chamhuri@postgrad.curtin.edu.au

Shashidhar G. Chiniwar
KLS Institute of Management Education and Research
77 Vadgaon Rd, Adarsh Nagar, Hindwadi, Belgaum 590 016, Karnataka, INDIA
Email: sgchiniwar@gmail.com

expectations and the fact that potato is considered as a bulk product. This attitude among retailers is reflected by the very limited marketing efforts undertaken for potatoes. Extra sales activities are very rare and they are primarily concentrated on national holidays. If the potato industry wants to increase profitability, they need to differentiate the product. Increased differentiation by producers/packers will probably increase the bargaining power of these actors in relation to the retail sector.

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4.00 – 5.30	<p>Concurrent session 6A: Bann Pantone Chair: Fredrik Fernqvist</p> <p>Forecasting price trends in the US avocado (<i>Persea americana</i> Mill.) market E.A. Evans and S. Nalampang</p> <p>Factors influencing the purchase of fresh potatoes in retail stores in Perth, Western Australia P.J. Batt</p> <p>Consumer attitudes to potatoes and possible differentiation paths for the commodity: the case of Sweden F. Fernqvist and L. Ekelund</p> <p>Concurrent session 6B: Huay Sam Poi 1 + 2 Chair: David Aldous</p> <p>Respecting the complexity of cultural differences in multicultural horticulture instruction T.E. Marler and S.T. Smith</p> <p>Developments in Australian horticultural vocational education P. McSweeney, K. Raynor, J. Rayner and D.E. Aldous</p> <p>Urban and national parks in Australia: role, responsibilities, careers and educational pathways D.E. Aldous</p>
6.30 –	<p>Assemble in hotel foyer Conference dinner: Khum kantok</p>

Wednesday: July 1

6.30 am	Assemble in hotel foyer
7.00 -	<p>Depart for Doi Angkhang – the Royal Project</p> <p>organic vegetable production vegetable, fruit and flower research projects agro-tourism packaging house</p>
6.30 pm	Return Chiang Mai
7.30 -	Buffet dinner: Muen Kam Kong restaurant

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Poster presentations

Proposed integral model for the learning of floriculture crops

L. Imhof, M. Rosmini and E. Bambozzi
Universidad Católica de Córdoba
ARGENTINA

G. Facciuto
Instituto de Floricultura (INTA)
ARGENTINA

Increased floriculture production and a new model of management has increased the need to educate graduates with specialized training in floriculture in Argentina. We propose to introduce a course on floriculture crops into the curricula for the degree of Agronomic Engineer (Facultad de Ciencias Agropecuarias, Universidad Católica de Córdoba (UCC). This learning model integrates the different areas of research, production technology and extension. Invited professors belonging to national research projects will participate in the program. Students will be involved in one of the stages of the research and will relate the data obtained with the information found in scientific papers. In the technological area, the course will combine theoretical and practical knowledge with case studies (PBL, problem-based learning). A colloquium will link academic teaching with stakeholders of the value chain in order to study production and commercialization cases. This structure will be complemented with virtual classes for the purpose of analyzing different aspects of ornamental crops. This learning will encourage the student to constantly look at the environment in which the professional must act. In addition, the student will have to build a skill matrix in order to be able to act in real situations.

From agricultural commodity to differentiated horticulture delicacy – the potato in Sweden

S. Spendrup and L. Ekelund
Swedish University of Agricultural Sciences
SWEDEN

The Swedish supermarket potato assortment is in general dominated by a limited assortment of unpacked potatoes in large bins, in combination with pre-packed organic potatoes. This lack of diversity is most surprising, since the potato has had an important role in the Swedish diet for more than 200 years. During the last forty years, consumption has decreased and other staple carbohydrates such as pasta, rice and bulgur, have gained market shares from the potato. Our research is based on ten telephone interviews conducted in September 2007 with industry representatives. Despite recent developments towards an increased assortment, our results show that half of the managers believe that potato consumption will decrease even more in the near future. The results imply that on-going development of the product is necessary, since many consumers are seeking more convenient alternatives. The majority of interviewed managers believe that development within this segment could increase the sales volume and they especially identify the need to improve the design of the packages. The recent introduction of new products may be constrained by the fact that the existing situation, dominated by unpacked potatoes, is regarded as superior. The development is also restrained by the retailers' low

Factors affecting US consumers' patronage of garden centres and mass-merchandisers

C. Yue	B.K. Behe	J.H. Dennis
University of Minnesota	Michigan State University	Purdue University
USA	USA	USA

When mass-merchandisers began to sell ornamental plants, they offered consumers more choices and increased retail competition. We used consumer panel data collected by the American Floral Endowment from 1992 to 2005 to analyze consumers' choice of garden centres and mass-merchandisers. We found that over time there was a decrease in the percentage of transactions made in garden centres and an increase in the percentage of transactions that occurred in mass-merchandisers. However, mean expenditures in garden centres were significantly higher than in mass-merchandisers. There were some regional differences in consumers' choice of the two types of stores and consumers' socio-demographics affected their choice. In addition, we found consumers bought different types of products in the two types of stores. They cited different reasons why they choose one type of store instead of the other. Impulse purchasing behaviour was more likely to occur in mass-merchandisers than garden centres.

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Thursday: July 2

9.00 – 10.30	Concurrent session 7A: Bann Pantone Chair: Peter J Batt Residue-free and convenience vegetables in Vietnam: how do consumers' perceptions matter in the valuation? M. Mergenthaler, C. Schipmann, K. Weinberger and M. Qaim Quality management factors: trust and reward I. Prigojin and Y. Gal Global trends in food quality: an exploratory study in fresh produce supply chains P.J. Batt and J. Noonan
	Concurrent session 7B: Huay Sam Poi 1 + 2 Chair: David Puflett Food safety compliance training for horticulture: collaborative course development by institutions and industry B. Calcinai The Floriculture College of Knowledge: a certificate program for greenhouse growers E.S. Runkle, S.J. Allen, T.A. Dudek, J.M. Himmelein and D.M. Krauskopf Horticulture industry based training: does it really work? D. Puflett
10.30 – 11.00	Tea/coffee break

11.00 – 12.30	<p>Concurrent session 8A: Bann Pantone Chair: Peter J. Batt</p> <p>Comparing business relationships of horticultural firms in supply chains between China and Australia R. Collins and X. Sun</p> <p>Concentration processes in the German vegetable-growing sector and the meaning of business networks K. Müller and W. Bokelmann</p> <p>Overcoming constraints to the establishment of collaborative marketing groups for coffee growers in the highlands of PNG R. Murray-Prior, R. Sengere and P.J. Batt</p>
	<p>Concurrent session 8B: Huay Sam Poi 1 + 2 Chair: Gerard Logan</p> <p>Building pedagogical horticultural facilities for improved learning in horticultural education J. Magnusson, K. Rolf and G. Svedelius</p> <p>Technology-mediated instruction: shifting the paradigm of horticultural education R.D. Lineberger</p> <p>Contract lecturing in horticultural science post-secondary education G.A. Logan</p>
12.30 – 2.00	<p>Lunch: Muen Kam Kong restaurant</p>

Quality management and commodity flow of horticultural produce in Nay Pyi Taw, Myanmar

H.M. Thu, S.N.C. Tun, T.H. Moe, M.Z.N. Aung and S.H.L. Htoo
Yezin Agricultural University
MYANMAR

This study was conducted to examine how the participants involved in the commodity flow of cabbage, Chinese-aster and coconut managed the quality of products before and after harvest. A stratified random sampling method was used to interview 73 respondents. The data collected was analyzed using descriptive statistics. Cabbage, Chinese-aster and coconut are the most widely produced horticultural crops in Myanmar. During the pre-harvest period, quality management was mainly achieved by using good production resources and traditional practices. During the harvest period, produce was placed in a well-ventilated shaded area to cool down. In the post-harvest phase, produce was cleaned and those with defects discarded. Produce was then selected by physical parameters and packed using different materials depending on the means of transport. The study showed that participants in the production and marketing of this produce performed quality management according to traditional techniques. Farmers indicated that an increased yield and a higher market price, together with a reduction in production costs, were seen as being more important than quality.

Factors influencing the introduction of reduction techniques for pesticides and nutrients by ornamental plant growers

D. van Lierde, N. Taragola, A. Vandenberghe and A-M. Cools
Institute for Agricultural and Fisheries Research (ILVO)
BELGIUM

Although the external pressure for sustainable, environmentally sound production is lower than for edible horticultural products, a reduction in the use of pesticides and nutrients is also important for ornamental plants. The objective of this research was to get an insight into the factors that influenced the adoption of techniques to reduce the application of pesticides and nutrients in ornamental plant production, and to compare them with those in other horticultural sectors. After the selection of the most appropriate reduction techniques by a panel of experts, a survey of 80 businesses specialising in the production of ornamental plants and 168 other horticultural businesses was undertaken. For each business, an environmental score was calculated on the basis of the number of adopted reduction techniques. Based on a theoretical framework, the personal characteristics of the business manager (biographical characteristics, attitudes, communication behaviour) and business characteristics (business size) on the environmental score was analysed. By means of principal component analysis, the explanatory variables were reduced to 5 independent dimensions. For ornamental plant producers, regression analysis revealed a significant influence on the attitude towards environmentally sound production, whereas for vegetable producers, communication behaviour was important. No significant influence of the investigated factors was found for fruit producers. The differences can be explained by the fact that the external pressure for environmentally sound production is different for each sector. Also the different commercialisation structure and resulting system of knowledge exchange was important. The results of the research show that stimulating the adoption of reduction techniques will be more difficult in the ornamental plants sector, where a change in the attitude of the grower is needed.

Information and communication technology (ICT) adoption in horticulture: comparison of the EFITA, ISHS and ILVO questionnaires

N. Taragola and D. van Lierde
Institute for Agricultural and Fisheries Research (ILVO)
BELGIUM

E. Gelb
Center for Research on Agricultural Economics
ISRAEL

Sustainable agricultural and rural development are currently issues of universal strategic importance. Information and Communication Technologies (ICT) have the potential to deliver significant economic, social and environmental benefits. In this context, constraints for the adoption of ICT in agriculture and horticulture are reviewed. Past surveys of the European Federation for Information Technology in Agriculture (EFITA) indicate that despite potential ICT benefits, adoption of ICT in agriculture remains a significant problem. The EFITA surveys, in the form of questionnaires, have been conducted every two years since 1999 and provide a baseline for two comparative surveys in horticulture: one in 2004 at the ISHS symposium on horticultural economics and management in Berlin and another in 2005 organised by the Institute for Agricultural and Fisheries Research (ILVO). Comparing their results provides insights which suggest remedial steps to expedite the adoption of ICT and prioritize the necessary research. The ISHS survey results identified the following ICT adoption constraints: end user (ICT) proficiency, lack of training, ICT benefit awareness, time, cost of technology, system integration and software availability. Participants from developed countries stressed as constraints: no perceived economic benefits, do not understand the value of ICT, not enough time to spend on technology and how to get a benefit from the use of ICT. Respondents from developing countries stressed the importance of the cost of technology and lack of technological infrastructure. The results of the ILVO questionnaire are in line with the ISHS survey and the EFITA surveys over time, indicating a shift from ICT technical proficiency as a limiting factor towards the lack of understanding how to derive benefits from the various ICT options.

Attitudes and motivations toward organic agricultural products among Thai consumers

P. Thechatakerng
Maejo University
THAILAND

This research paper focuses on demographic differences in Thai consumers' attitudes and motivations toward organic agricultural products. The study explores consumers' attitudes towards behavioural beliefs, normative beliefs and control beliefs. Related attitudes and motivations add clarity to the objectives of the study. Using a structured questionnaire, 258 respondents were interviewed. The majority of respondents, particularly women aged more than 30 years, had very positive attitudes towards organic produce. Their perceptions of organic agricultural products came primarily from magazines and TV. One of the main reasons to consume organic food was social responsibility and reducing environmental pollution. However, there was still some doubt as to whether organic produce was completely free of toxic products. The most important purchase criteria among Thai consumers was the quality of the produce, which included freshness and cleanliness, in contrast to previous European studies which show that consumers prefer taste. Sourcing organic produce is still problematic. Distribution needs to improve to increase market acceptance and penetration.

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2.00 – 3.30	<p>Concurrent session 9A: Bann Pantone Chair: Tim Sun</p> <p>Export of pomegranates from Karnataka: a study of the role of KAPPEC S. Chiniwar</p> <p>Regional competitiveness of fresh vegetable production in Europe – a cluster and value chain perspective B. Riedel, W. Bokelmann and M. Canavari</p> <p>An approach to identifying potential post-FTA opportunities for agribusinesses to access the Chinese market: an Australian case study X. Sun and R. Collins</p> <p>Concurrent session 9B: Huay Sam Poi 3 Chair: Madhusudan Bhattarai</p> <p>A SWOT analysis of organic grapefruit production in Iran M. Javanmard</p> <p>Production and marketing problems in small scale horticultural farming in Botswana S.P. Baliyan and D.L. Kgathi</p> <p>Socioeconomic Analysis and Participatory Risk Assessment of Chili Cultivation in Central Java, Indonesia M. Bhattarai and J. Mariyono</p> <p>Concurrent session 9C: Huay Sam Poi 1 + 2 Business meeting: Education, Research, Training and Consultancy Tea/coffee break</p>
3.30 – 4.00	

CONFERENCE CONCLUDES

Poster presentations

Proposed integral model for the learning of floriculture crops

L. Imhof, M. Rosmini, E. Bambozzi and G. Facciuto

From agricultural commodity to differentiated horticulture delicacy – the potato in Sweden

S. Spendrup and L. Ekelund

The role of private sector researchers in improving the field and post-harvest performance of grapes in Egypt

S. Shama, O.M. Barbary and M.A. Aly
 University of Alexandria
 EGYPT

Egypt has a highly developed fruit industry geared for the export of a large percentage of its product. From an economic viewpoint, table grapes rank first for export to the Arab World and European countries. Horticultural crops, particularly fruit, are produced throughout Egypt. However, Alexandria and Behira are very important areas for grape production. Horticultural research is presently being conducted at several research institutes, all of which are part of the newly founded Agricultural Research Centre (ARC). The ARC is a statutory body with a mandate to conduct research, development and technology transfer along with several universities all over the country. Several private organizations also conduct research and development aimed at furthering the production of specific horticultural commodities. This research focused on grape production with funding coming from a private company working in conjunction with university members. Often the private sector has good contact with industry and provides lower overhead costs than government agencies. Furthermore, they are more flexible and experienced in their field. Flame seedless grape has been recently introduced to the Egyptian market. However, little is known about its specific post-harvest requirements. The objective of our project was to define and evaluate post-harvest handling in order to improve the keeping quality during cold storage. The grape samples were quick release fumigated (QRF) with different percentages of sulphur dioxide (SO₂), pre-cooled and then six different quantities of commercial slow release fumigation pads (SRFP) were applied before the fruit was cold stored for 8 weeks. All samples were analyzed for their sensory, physiochemical and pathological characteristics. The results revealed that QRF treatments with 0.1% SO₂ showed sensory, physiochemical and pathological quality better than 0.5% treatments. QRF with 0.1% SO₂, along with 3.5 or 4.2 g SRFP resulted in the best keeping quality.

An approach to identifying potential post-FTA opportunities for agribusinesses to access the Chinese market: an Australian case study

X. Sun and R. Collins
 University of Queensland
 AUSTRALIA

With a population of approximately 1.3 billion people, China is Asia's second largest food and beverage market by value. Post-WTO, the opening of Chinese markets represents a significant opportunity for countries wishing to export fresh food to China. This is particularly true for Australian agribusiness as a Free Trade Agreement (FTA) is being negotiated between the two countries. At the same time, China is experiencing great difficulty in establishing and enforcing a code of practice for food quality, safety and traceability, especially for domestically produced food products. This study proposes an approach to evaluate the potential for Australian fruit and vegetable exports to China in a free trade environment. The approach is based on scaled evaluation criteria that encompass the major factors constraining food exports from Australia to China. This includes tariffs and tariff barriers, evidence of recent export activity, price sensitivity, potential future demand, demand stability, opportunities for chain improvement and overall competitiveness. A study of 12 Australian food categories revealed six with the highest potential, including fruit. The outlook for vegetables was less optimistic. The evaluation approach used can be applied to any country wishing to evaluate potential opportunities to export horticultural produce to China.

scarce resource, water saving irrigation methods are being investigated with respect to their potential to increase water use efficiency (WUE). So far, two methods of reduced irrigation have been explored for their potential to save water. One is regulated deficit irrigation (RDI), where a certain percentage of evapotranspiration (ET) is replaced by irrigation applied over the entire root zone. The other is partial root zone drying (PRD), where at each irrigation time only one side of the tree row is watered while the other side is left dry, before being irrigated on the next occasion. Stress on the plant's dry side is thought to reduce vegetative growth in favour of fruit growth and thus, increase WUE. Based on data from four years of field trials, a yield response function to water availability for 'Chok Anan' mangoes was developed. Data about the fruit size distribution were recorded and graded according to locally used systems. The increase in farmers' income due to irrigation was estimated as a function of yield quantity and quality in terms of fruit size. The costs for different irrigation systems were calculated based on data from local sellers for surface, drip and micro-sprinkler irrigation systems. Break even points and pay-back period for the installation costs were calculated. Maintenance of the irrigation system, water price and pumping costs were calculated as variable costs of irrigation. Three different scenarios in terms of water price and price of energy have been calculated in order to evaluate the applicability of deficit irrigation strategies.

Enhancing the teaching and evaluation of graduate attributes in wine science and viticulture degree level courses

S. Savocchia, J. Thompson, D. Greer, M. Meunier, J. Gray, A. Clark and W. Adlong
Charles Sturt University
AUSTRALIA

This paper explores the development of protocols to evaluate and enhance graduate attributes for wine science and viticulture degree courses at Charles Sturt University. The project aimed to determine the extent to which graduate attributes were fostered within specific subjects and to identify any perceived deficiencies. This objective required a critical discourse about the importance of graduate attributes in teaching and learning and subsequent evaluation of the coverage of key graduate attributes in subject assessments. These attributes were then compared to those identified by first and third year students during focus group discussions. Overall, there was a good consistency between the attributes identified by students and those identified by academic staff. Attributes such as teamwork, verbal skills and computer literacy were less evident than conceptual knowledge in the teaching of the viticulture and wine science courses. Industry awareness and initiative were identified as important attributes by focus group students. The ensuing thematic analysis of student responses provided academic staff with new insights into how graduate attributes can be integrated into the learning design for future offerings of wine science and viticulture subjects.

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Key note presentation

Evolution of web-based collaborative learning environments in horticulture

R.D. Lineberger
Texas A&M University
USA

Once limited by the ability to navigate from topic to topic by browsing linked pages, the power of the World Wide Web as an information-sharing, extraordinarily rich learning environment, was unleashed by the successive development of dynamic, database-driven Web pages, text indexing search engines, powerful accessory applications and cross-platform compliant tools. The Web was adopted by extension educators in the mid-1990's because it was a cost effective solution to the dilemma of distributing high quality printed information to clientele quickly and without the associated costs of colour printing, inventory maintenance, handling and postage. The capability for 24-7-365 availability of printed educational materials alone resulted in millions of dollars of cost savings to Web-enabled groups. With the advent of modern applications driven largely by the commercial segment of the Web, extension specialists and educators made rapid strides in the adoption of technology to fulfill their mission to educate their students and clientele. Wikis, blogs, podcasting, Web conferencing and other advanced tools have changed teaching and extension Web sites, and have allowed professionals to expand their missions. An unspoken truth has begun to cloud a story that would be rated otherwise an unqualified success. Fewer professional horticultural educators are employed in extension and university positions, academic horticulture departments are decreasing worldwide, and the shortage in the number of horticulturists with production-oriented training is both real and critical. The development of collaborative teaching and extension programs that allow for distance-independent creation, maintenance and delivery of extension information and academic instruction represents an asset as well as a driving force to ensure future technological advancements in the field of horticulture. However, significant barriers including traditional funding paradigms and "ownership" threaten to undermine potential advancements, but these threats can and *must* be overcome.

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Oral presentations

Urban and national parks in Australia: role, responsibilities, careers and educational pathways

D.E. Aldous
University of Melbourne
AUSTRALIA

Both urban and national parks have great potential to transform and enrich our cities as well as the national estate. The role and responsibilities of these agencies differ in levels and degrees of technical knowledge, business management, human resource management, communication and marketing. Similarly, the service side of the profession offers varied career opportunities that range from recreation, conservation and environment, horticulture, park and resource planning, through to the implementation of urban park services, natural resource management to conservation and outdoor recreation. The objective of this study was to compare the role, responsibilities and functions of the middle level urban and national park manager and to seek out recruitment in terms of experience and training, required knowledge, skills and abilities, the level and type of qualification, and career expectations. Results showed similarities in infrastructure and span of control, and differences in acceptable experience and training, required knowledge, skills and abilities, and the level and type of qualification between the middle level urban and national park manager.

How to improve the production of tropical flowers in French Caribbean Islands

C. Amar
International Centre for Cooperation in Agricultural Research for Development
FRENCH WEST INDIES

Martinique and Guadeloupe are French overseas departments with respective populations of 400 and 480. Tropical flowers have been produced in the French Caribbean islands for more than 30 years and represent a high value crop using only small areas of land. They are considered a clean crop. About twenty different varieties can be found, but producers need to develop a greater diversity to enhance customer loyalty and improve their market shares. CIRAD has implemented a quarantine process in metropolitan France to introduce new ornamental plants to tropical areas in Guadeloupe and Martinique. The main reason for this process is because these plants belong to families like Zingiberaceae, Araceae, Heliconiaceae and Marantaceae and could present important disease risks. After being introduced into France, quarantine can last up to two years. Plants are then imported into the French West Indies for multiplication using tissue culture in our laboratory in Guadeloupe. Our objective is to provide farmers with guaranteed disease free new varieties to develop a competitive and healthy flower industry.

energy concepts without supplementary lighting show that simultaneous production of heat and power and the delivery of electricity to the public grid provides the most favourable energy use and CO₂ emissions. Second best is the conditioned greenhouse. In this energy concept, solar energy is collected in summer, stored and re-used in winter. Conditioned greenhouses may also reduce the use and environmental impact of pesticides.

The Floriculture College of Knowledge: a certificate program for greenhouse growers

E.S. Runkle and S.J. Allen
Michigan State University
USA

T.A. Dudek, J.M. Himmelein and D.M. Krauskopf
Michigan State University Extension
USA

The Floriculture College of Knowledge (CoK) is a certificate program developed specifically for greenhouse growers who want to improve their knowledge and skills in the production of floriculture crops. The CoK was structured so that growers could complete the modules in a relatively short time and at a relatively low cost. The program was developed from 1998 to 2001 by more than 20 people, including faculty and staff at Michigan State University (MSU), other universities and industry professionals. Modules were developed utilizing Microsoft PowerPoint and were delivered in person by academics, extension educators and graduate students in various locations in Michigan and Ohio from 1998 to 2008. The production program consists of 12 four-hour modules, each focused on specific crop categories (e.g. potted plants), growing practices (e.g. growth regulators), or growing principles (e.g. light management). The registration fee includes module notes, handouts and books so that each participant develops a resource library for future use. Participants that passed an exam for each of the 12 modules received a professional certificate recognizing them as a certified greenhouse grower. All 12 of these production modules have been translated into Spanish. Nearly 500 people from 30 US states and four countries have participated in the program and more than 60 people have become certified CoK greenhouse growers. Revenue generated from this program has been used to pay for student materials, speaker honoraria, travel costs and administrative expenses. Proceeds from the program have been used to create an MSU floriculture endowment and to subsidize outreach programs that do not generate revenue. Alternative delivery methods and modifications to the production modules are being considered for the future.

Economic evaluation of different irrigation regimes in mango production in Northern Thailand

K. Satienerakul, P. Manochai and S. Ongprasert
Maejo University
THAILAND

W. Spreer and J. Müller
University of Hohenheim
GERMANY

Thailand is one of the largest mango producing countries in the world. In northern Thailand, mango is produced mainly by small to medium sized farms for the domestic market. 'Chok Anan' is an autochthonous variety in northern Thailand which is locally used for fresh consumption and small-scale processing. It is appreciated for its light to bright yellow colour and its sweet taste. Most of the fruit development takes place during the dry season. As mango trees are drought tolerant, production without supplementary irrigation is possible. However, where applied, irrigation ensures high yields and good fruit quality. As water is an increasingly

Where to now for horticultural higher education in Australia?

J. Rayner, P. McSweeney, K. Raynor and D.E. Aldous
University of Melbourne,
AUSTRALIA

Over the last decade enrolments in undergraduate horticultural programs across Australia have declined. This is in spite of the increasing participation in higher education (HE) and significant growth in the employment and value of horticultural industries. This decline has been caused in part, by structural changes to the Australian HE system and institutional changes to faculties, departments, schools and campuses that have in turn disadvantaged applied science courses, such as horticulture. The decline can also be explained more broadly by perceptions about the content and outcomes of land management based courses. This paper examines and discusses these issues and asks the question "Where to now for horticultural higher education in Australia"? We use the recent history of the Burnley Campus of the University of Melbourne as a case study to examine how these factors have led to changes in horticultural education over the decade since 1997.

Regional competitiveness of fresh vegetable production in Europe – a cluster and value chain perspective

B. Riedel and W. Bokelmann
Humboldt University
GERMANY

M. Canavari
University of Bologna
ITALY

We focus our analysis on the coordination of relationships in horticulture business and its impact on competitiveness. Special attention is given to the question how tighter relationships between retailers and their fresh vegetable suppliers interact with a local production cluster. This paper cites results from two case studies in Germany (Palatinate) and Italy (Emilia-Romagna/Veneto). In-depth interviews with business participants (producers, cooperatives, traders, retailers, plant breeding companies and research institutions) uncovers multifaceted aspects about the imbalance in retailer-supplier relationships, the influence of mentality and tradition on cooperative capability, and the influence of external events on chain governance. Our aim is to develop a causal model to predict the impact of regional horticulture business and value chain coordination in different socio-cultural contexts. This causal model is expected to provide starting points for further research about the interplay of local production networks and value chain coordination.

Towards a low emission greenhouse horticulture

M.N.A. Ruijs, J.B. Campen and M.G.M. Raaphorst
Wageningen University Research
THE NETHERLANDS

For a pilot crop (tomato), a business concept for a low emission greenhouse for the mid term (10 years) has been designed. The study was carried out in cooperation with innovators in the horticultural sector, suppliers and extension services. The business concepts are evaluated for different indicators and compared to the current situation. The focus is on the reduction of energy consumption and CO₂ emissions for cultivation with and without supplementary lighting. The energy concepts differ in the way the heat and power are produced or supplied. The results show that the energy concepts without supplementary lighting have a lower environmental impact and better energy efficiency than the energy concepts with lighting. The

Establishing partnerships between private sector and government to deliver extension and training to smallholder farmers in the PNG coffee industry

F. Api and L. Aroga
Coffee Industry Corporation
PAPUA NEW GUINEA

R. Murray-Prior and P.J. Batt
Curtin University of Technology
AUSTRALIA

Government funded extension in the PNG Department of Agriculture and Livestock and the Coffee Industry Corporation (CIC) has traditionally relied on government employees. Like many countries, they adopted the Training and Visit system promoted by the World Bank in the early 1980s, which unfortunately failed to live up to expectations. More recently, the CIC has adopted a 'demand driven' approach for working with farmer groups known as the Participatory Rural Appraisal and Planning Process (PRAP), which involves contracting out the programs identified in the PRAP process to private service providers. While only in its early stages, it is providing some advantages over the previous system. These advantages are discussed along with some problems. The CIC is also developing partnerships with processing and exporting companies in the coffee industry to collaboratively deliver extension and training services to coffee farmers.

Production and marketing problems in small scale horticultural farming in Botswana

S.P. Baliyan
Department of Agriculture
REPUBLIC OF BOTSWANA

D.L. Kgathi
University of Botswana
REPUBLIC OF BOTSWANA

Production and marketing problems faced by subsistence horticulture farmers in Botswana hinder the potential production which forces the country to import 80% of the fruit and vegetable demand. The local farmers fail to compete with high quality and low priced imported vegetables. Problems associated with the disposal of horticultural produce depress the farmers and this negatively affects local horticultural production and farm income. Commercialization of the small horticultural sector requires the development of market-oriented production, as opposed to the occasional sale of subsistence surplus. Success in commercializing this sector depends on the re-orientation of production to meet market demand and on the removal, or reduction, of a broad range of production and marketing constraints. A survey based study was conducted in Botswana in 2007/08 focusing on the identification of the problems associated with small scale horticultural production and marketing, their causes and possible suggestions. Pareto analysis was used to prioritize (rank) the problems and their causes. Poor access to inputs, high fuel costs, pests and diseases, high input costs, insufficient infrastructure, lack of finance, shortage of skilled labour, and breakdown of irrigation systems were found to be the major production problems (85% contribution). Of the seven problems identified in horticultural marketing; insufficient production and inconsistent supply of local produce, high transportation costs, poor marketing infrastructure, high competition with imports, and lack of marketing skills were the major marketing problems (84% contribution). The causes of each of the marketing problems were also identified and ranked. A subsidized fuel price, an increased area under cultivation, an effective implementation of efficient cropping plans, easy access to finance, building new market places, proper dissemination of market information, the establishment of Agro Service Centres, and revision of existing import policy were among the suggestions to minimize the marketing problems in Botswana.

Farmer's knowledge management in banana cultivation in West Bengal, India: a reflection of farmer managed technology adoption and transfer in horticulture

D. Basu and S. Banerjee
Bidhan Chandra Krishi Viswavidyalaya
INDIA

R. Goswami
Ramakrishna Mission Vivekananda University
INDIA

The role of farmers as extensionists is as important as their much championed role as an experimenter. To illustrate, a case study was conducted at Ghoragachha village of Nadia district, West Bengal on banana cultivation. A focus group discussion was conducted with the farmers along with the employment of some basic RRA and PLA tools. The way the farmers adapted the technology and the extent to which the practice was adapted was a result of farmers own efforts. Organizational, technological, policy and infrastructural interventions are proposed on the basis of the lessons drawn from the positive and negative impacts found in the study area. The study draws attention towards a special knowledge management extension approach, which is very much in vogue informally. It also indicates the possible spheres of intervention the formal, especially public extension agencies can make to their client system.

Factors influencing the purchase of fresh potatoes in retail stores in Perth, Western Australia

P.J. Batt
Curtin University of Technology
AUSTRALIA

Freedom from pests and diseases, freshness, skin condition, firmness and the absence of sprouts are the most important variables influencing the consumers' decision to purchase fresh potatoes in a retail store. Price was of secondary importance, reaffirming that consumers' place more importance on product quality. Principal component analysis identified five underlying constructs which were found to vary in importance between respondents on the basis of gender, age and income. For the majority of consumers, the purchase of potatoes is a low involvement decision, with almost half of the respondents being unable to recall the last price that they paid to buy fresh potatoes. As prices increased, the quantity of potatoes purchased decreased but not in a linear fashion. There was evidence of at least two price points and for some 28% of buyers they will continue to purchase potatoes irrespective of the price. With a superior coefficient of determination (R^2) and a smaller standard error (SE), a quadratic model was found to be a more accurate indicator of the price/quantity relationship.

Global trends in food quality: an exploratory study in fresh produce supply chains

P.J. Batt and J. Noonan
Curtin University of Technology
AUSTRALIA

The provision of safe food which protects customers' integrity and provides consumers with the desired taste is expected to remain the major priority in world food markets in the foreseeable future. While reducing microbial contamination, chemical contaminants and pesticide residues will gain in importance, ethical products and functional foods are the emerging priorities. Food businesses will need to give much greater attention towards minimising water use and pollution, more sustainable production systems, worker welfare and waste management. Recyclable packaging, conservation and biodiversity, food miles and reducing salinity and land degradation are the emerging environmental issues. Country-of-origin is perceived to be the most important

buyers and their expectations has been explored, our knowledge of its social, economic and environmental aspects is minimal. This research contributes by exploring the structure and scope of local food activities in the UK in terms of profiling those specialised retail outlets who provide consumers with the opportunity to purchase locally grown horticultural products.

Quality management factors: trust and reward

I. Prigojin
Volcani Center
ISRAEL

Y. Gal
B.Y. Nihul Ltd
ISRAEL

ECOM

A research study in a dynamic, time-varying environment found that senior management decisions are not sufficient to control quality within an agricultural research organization, specifically, the Volcani Research Centre of the Agricultural Research Organization (ARO) of the Israeli Ministry of Agriculture and Rural Development. The findings regarding knowledge transfer in the ARO are that: hierarchical barriers impede the vertical transfer process; barriers between departments impede the horizontal transfer process; and barriers impede knowledge transfer to and from a newcomer. However, informal knowledge transfer via unofficial networks proceeds horizontally as well as vertically at all levels. The findings are important, both to senior management and to researchers and other team members, because the effect of tight coupling among work processes is usually ignored and any analysis that treats these processes individually will lack an important attribute. In order to improve knowledge transfer within the ARO, it is necessary to reduce the reward effect and minimize the trust gap. In addition, specific measures should be introduced to enhance the knowledge transfer process. Such a measure could be the appointment of a Chief Knowledge Officer (CKO).

Horticulture industry based training: does it really work?

D. Puflett
Royal New Zealand Institute of Horticulture
NEW ZEALAND

New Zealand is renowned for its quality produce and sustainable production systems. Complementing this achievement is an industry-based national training framework which for 15 years has provided skilled and experienced staff to meet the needs of the horticultural industry in New Zealand. An overview is presented of how the horticultural industry has developed practical skill-based training programmes in arboriculture, fruit, vegetables, viticulture, amenity horticulture, floriculture, floristry, landscaping, cut flowers, nursery production and sports turf management. This paper will examine how training programmes have been structured utilising existing resources, as well as establishing compliances needed to ensure a robust and effective national qualification system which meets industry requirements. All national qualifications in New Zealand are competency-based rather than achievement based. This assessment method has been one of many effective tools used to make a successful horticultural training system. Success obtained demonstrates that industry based training is valuable, providing support from the horticultural industry exists initially and training systems and regulations are created to provide relevant national qualifications that meet the skill needs of a growing economy.

knowledge for massive value in achievement using knowledge.

innovation, the problem of resource allocation for maximum utility also affects individual decisions. Innovation availability, affordability and workability are sine qua non to agricultural development therefore they ought to work both technically and commercially. Both a semi-structured questionnaire and personal interviews were administered to a total of 560 farmers from four local government areas in Borno State, Nigeria. Farmers faced numerous constraints, with fertiliser availability and affordability being the highest (18%), followed by weed problems (17%). Only 18% had access to information for problem solutions and only 36% received information that was relevant to farming needs. Within 3 years of PROSAB's (Promoting Sustainable Agriculture in Borno State) activities in the state, the majority of the respondents have adopted new crop varieties. Soybean (*Glycine max*) was not cultivated in the region before. The effect of participation on the adoption decision was statistically significant at $p < 0.0001$. Some 77% of respondents were core farmers, while 73% make their living through farming with a mean of 23.8 years experience. The soybean planting-harvesting ratio was 1:53 kg and maize (*Zea mays*) 0.14:23 kg. Innovation attributes were ranked in order of priority; economic needs were ranked higher than religious or cultural priorities. The claims that indigenous farmers resist change are not always the case due to approaches which solicit their opinion. This paper has underscored this observation and diffused the misconception. It is clear that farmers can change when presented with sustainable alternatives through consultation.

Citrus farmers' accessibility to horticultural information in South Western Nigeria

O.O. Oyedele
National Horticultural Research Institute
NIGERIA

M.K. Yahaya
University of Ibadan
NIGERIA

Proven horticultural technologies developed from research efforts to advance the citrus industry, as well as address the needs of resource poor farmers, will have no impact if the intended end users cannot access such technologies. Inaccessibility of citrus farmers to information on improved techniques for citrus production has resulted in low productivity among citrus farmers in South-western Nigeria. Identifying areas where citrus farmers lack access to information could provide a solution to this problem. Using a multi-stage sampling technique, 321 citrus farmers were interviewed from four states in South-western Nigeria. Data collected through the use of pre-tested questionnaires were analyzed using frequency counts, percentages and Pearson Product Moment Correlation. More than 50% of citrus farmers had no access to information on improved nursery practices. Most farmers (64%) had access to information on improved methods of land preparation for orchard establishment. A significant relationship existed between information accessibility and the information needs of citrus farmers ($p < 0.05$). This suggests that more extension efforts should be geared towards making information on nursery practices accessible to citrus farmers.

Sustainable horticultural supply chains: the case of local food networks in the United Kingdom

D. Pearson and A. Bailey
University of Reading
UNITED KINGDOM

In the UK, there is widespread support from Government, media and consumers for local food networks. These have the potential to provide a more sustainable supply chain and are well suited to the unique production and consumption characteristics of horticultural products. In terms of food marketing, local food is in its relative infancy and is still without any formal definition. This lack of clarity hampers research activities. Although the profile of local food

indicator of food quality both now and in the foreseeable future. Identifying which food preservatives, food colourings and flavour enhancing compounds have been used in the food will continue to grow in importance as consumers move towards more natural, unadulterated food products. Identifying the presence of potential allergens is critically important for the growing number of susceptible consumers. The food energy content and the use of sugar and artificial sweeteners are emerging issues, with the presence of genetically modified organisms and eco-labelling poised to become more prominent in the long-term. *market maturity?*

Age influences gardening purchases, participation, and customer satisfaction and regret

B.K. Behe
Michigan State University
USA

J.H. Dennis
Purdue University
USA

In September 2004, an internet study was conducted to evaluate and determine differences in gardening participation, purchases, and levels of customer satisfaction and regret by age. A representative sample of US consumers was asked to identify their participation in seven gardening activities and the purchase of 12 gardening products. The 1591 responses were stratified by income with analyses conducted using SPSS. The number of differences in garden-related participation and purchases decreased as income level increased across age groups. Where differences were observed, younger consumers purchased garden-related products and participated in gardening-related activities to a lesser extent than older consumers. At every income level, older consumers had a higher mean satisfaction and factor scores, and higher regret mean and factor scores. This indicated that older consumers experienced greater satisfaction and less regret than younger persons, regardless of income. For marketers, this shows a heterogeneous market at lower-income levels and a more homogeneous market at upper-income levels. Age could be used as a basis for market segmentation, especially at lower income levels. Longitudinal research will show if this is a static or dynamic trend.

Socioeconomic Analysis and Participatory Risk Assessment of Chilli Cultivation in Central Java, Indonesia

M. Bhattarai and J. Mariyono
AVRDC - The World Vegetable Center
TAIWAN

Prato Analysis?
in preline

This study provides an overview of socioeconomic factors affecting farmers' decisions to grow chilli and allocate acreage to the crop. Chilli is very popular and widely cultivated throughout Indonesia, even though most of the chilli growers surveyed reported chilli cultivation is a very risky enterprise compared with growing other vegetables and paddy. Nevertheless, the relatively high price chilli fetches at the market provides a positive incentive to millions of small-scale farmers to grow chilli. Using a Participatory Risk and Return Trade-off analysis, we assessed farmers' perceived risk associated with cultivation of chilli and other vegetables. The results suggest farmers consider chilli cultivation to be about four times more profitable but also four times more risky than paddy cultivation. An index value was assigned on relative risk, return, and working capital requirements for each of the crops selected, and these indexes vary across 11 crops. This analytical technique also can be included in participatory appraisals and stakeholder analyses of rural development projects.

Food safety compliance training for horticulture: collaborative course development by institutions and industry

B. Calcinai
Eastern Institute of Technology
NEW ZEALAND

The groundswell of public opinion on environmental issues, particularly those relating to food safety, has impacted greatly on on-farm requirements. New Zealand primary industry must conform to strict compliance programs determined both by NZ legislation and by international market requirements. Training courses were developed to enable the rural sector to meet these compliance conditions, but primary producers are often reluctant to participate in the programs, based on their perception of the course content and its relevance to their on-farm activities. Distinct differences in acceptance arise between agricultural and horticultural producers. A new and collaborative approach between both educational institutions and industry has helped overcome resistance, with farmers responding positively to an education curriculum which their own industry helped develop. Details of this successful training course will be outlined and the outcomes discussed.

Consumer choice of retail outlet: focus group interviews in Malaysia

N. Chamhuri and P.J. Batt
Curtin University of Technology
AUSTRALIA

Focus group interviews were used to explore the preferred place to purchase fresh fruit and vegetables among Malaysian consumers. Results indicate that a competitive price, convenience, variety, freshness, sales promotion and a pleasant environment were the major variables which influenced the decision to purchase from a modern retail outlet or the traditional market. The traditional market is still the preferred place to buy fresh fruit and vegetables despite the expansion in modern retail outlets.

Export of pomegranates from Karnataka: a study of the role of KAPPEC

S. Chiniwar
KLS Institute of Management Education & Research
INDIA

India is the world's leading producer of pomegranate (*Punica granatum*). There is tremendous potential for Indian pomegranates in the global market. Karnataka and Maharashtra are the leading producers of pomegranates in India. The Karnataka State Agricultural Produce Processing and Export Corporation (KAPPEC) has enabled pomegranate farmers in Karnataka to become internationally competitive in global markets. The present study is aimed at understanding the growth of pomegranate exports from India. It examines the various activities undertaken by KAPPEC in the development of pomegranate exports from Karnataka and the effectiveness of the means used by KAPPEC to communicate its role to the farmers. The study revealed that the growth of pomegranate exports from India is moderate in comparison to the potential for its exports. It also revealed that although the right activities have been undertaken by KAPPEC to support the growth of exports, the corporation has not been effective in reaching and educating a large proportion of the target farmers. The study has identified some possible improvements that KAPPEC may adopt to improve the effectiveness of the reach and to educate pomegranate farmers.

Overcoming constraints to the establishment of collaborative marketing groups for coffee growers in the Highlands of PNG

R. Murray-Prior and P.J. Batt
Curtin University of Technology
AUSTRALIA

R. Sengere
Coffee Industry Corporation
PAPUA NEW GUINEA

In PNG, colonial governments promoted both cooperatives and Rural Progress Societies, however, most failed due to abuse of process, mismanagement and mistrust. Despite the failures, government, aid agencies and NGOs still promote them to link semi-subsistence farmers to profitable markets. While cooperatives may be desirable for linking semi-subsistence farmers to profitable markets, given their previous history in PNG, new systems need to be found to ensure their sustainability. This paper reviews the literature on collaborative groups and uses case-study evidence from two existing collaborative structures in the PNG coffee industry that address some of the reasons for failure. The structures include an alliance between the cooperative and a commercial company. Political theory is also hypothesised to provide some theoretical insights for structuring cooperatives in the transitional economies.

Tulip bulb industry in Japan since 1988

Y. Niisato
University of Toyama
JAPAN

Plant quarantine measures for tulip and lily bulbs were abolished in 1988. The removal of the quarantine barriers forced Japanese bulb growers to face international competition. Since then the imports of bulbs, mainly from Holland, has increased rapidly and bulb prices have tended to decline gradually, while the Japanese production of bulbs has not decreased. Imports also introduced new varieties of bulbs to Japan. The demand for tulip bulbs increased greatly until the late 1990's, but since then, the Japanese bulb market has stagnated. Bulb prices decreased and the domestic production of bulbs decreased sharply, which caused a great reduction in the number of bulb farmers. Consequently, the rate of self-sufficiency for producing tulip bulbs in Japan decreased from 80% in 1988 to 20% in 2006. This paper analyzes the supply and demand conditions for tulip bulbs and estimates the Japanese demand and supply functions for tulip bulbs using regression analysis. Demand depends upon the real price (in terms of consumption goods) for tulip bulbs negatively and the real national income positively. The demand curve shifted forward until 2001 and then shifted backwards. Domestic supply depends upon the prices of tulip bulbs and the rice prices positively.

Need-based innovation motivates attitude change in farmers: an evaluation of the PROSAB approach

U.M. Nwankwo, R.C. Bett, K.J. Peters and W. Bokelmann
Humboldt University
GERMANY

The assumption that indigenous farmers resist change is shallow, explained only by a lack of thorough investigation of what the change agents intend to communicate, how they intend to communicate it and the intended beneficiaries. The adoption-decision is complex and affected by the innovation's attributes, information-communication perception, and the socio-economic, institutional and policy environment. Besides the high risk of being the first to try a new

Concentration processes in the German vegetable growing sector and the meaning of business networks

K. Müller and W. Bokelmann
Humboldt University
GERMANY

In open, global competition, location is not insignificant. According to Porter (1990), location is an important factor influencing the competitiveness of enterprises. This study sought to identify if regional clusters are also prevalent in the horticultural sector and to specifically answer the question why horticultural production centres in some regions of Germany have developed more rapidly than others. To be able to answer these question satisfactorily, two different tasks had to be undertaken: (1) identify the increasing spatial concentration of production; and (2) identify the factors explaining increased spatial concentration and competitiveness. The production area for vegetables in Germany has increased by 30% of the last 12 years. However, production was observed to increase in certain areas, but not all. This can be described by the HERFINDAHL concentration index. The index can vary between 0.003 across all 327 administrative districts to 1 in just one district. The index increased in the time period from 1992 to 1996 from 0.016 to 0.017 and 0.023 in 2004. Based on expert interviews as well as different models found in the literature, a conceptual framework was developed. The results show that a critical number of enterprises should exist in a region. Traditional locational factors (natural conditions, proximity to the market and political support) are no longer able to explain competitive advantage. To improve efficiency and gain advantages from innovation, social networks are a pre-requisite. Only where there is sufficient communication will innovation spread quickly.

The Leslie J. Nickels Estate: challenging the paradigm of funding public research and extension

M. Murray and J.P. Edstrom
University of California Cooperative Extension
USA

A unique public-private collaboration was initiated in 1968, when Mr. Leslie J. Nickels bequeathed an 80+ hectare property to support public research, by establishing a Trust. The University of California Cooperative Extension (UCCE) was named in the original land bequest and has been facilitating applied research projects, mostly focusing on almond production, through a formal agreement. The original bequest consisted of a non-irrigated almond orchard, with little equipment or financial resources. The early years were devoted to installing irrigation systems, planting new orchards and acquiring equipment. Today, the Nickels Soil Laboratory (NSL) commercially farms over 40 hectares of almonds, with minor plantings of walnuts and olives. The facility is supported through crop returns and no public monies support the facility. There are currently over 20 applied research projects being conducted at NSL, involving the USDA and University faculty. NSL is widely recognized as the origin of California almond micro-irrigation technology, almond variety evaluations and walnut high density planting techniques. There is an annual "hands-on" field day attracting over 200 participants from around California and international locations. NSL is acknowledged as being the largest facility dedicated to almond research in the US and funding is augmented annually with grower research dollars. The structure, evolution and accomplishments of this unique partnership is the focus of this paper.

Can dual degrees help arrest the decline in tertiary enrolments in horticulture: a case study from the University of Queensland, Australia

R.J. Collins and A.J. Dunne
University of Queensland
AUSTRALIA

Enrolments in agricultural and horticultural degrees around the world are declining. In Australia there is an estimated need for 2000 agricultural graduates in 2008 that will be met by a supply of 600-700 graduates. Enrolments in Agribusiness at the University of Queensland (UQ) have fallen by about 50% over five years and enrolments in horticulture have fallen to single figures. Paradoxically, the UQ Agribusiness curriculum in 2007 won a coveted national Carrick Award for university programs (across all disciplines) for its ability to meet the needs of industry and provide high quality learning experiences. Within the Agribusiness program, the number of students undertaking dual degrees, which combine two three-year degrees into an integrated four year program, has increased from zero seven years ago to about half the first year enrolment in 2008. Students report that combining business and applied science degrees provides a more balanced educational experience which adds only one year to their studies and significantly expands their employment options. Every Agribusiness degree student gets on-course international research experience, extensive industry exposure and the opportunity to study overseas for one semester as part of their degree. Tapping into the increasing interest in dual degrees by providing exciting, relevant international experiences could form part of a strategy to stem the decline in horticultural enrolments.

Comparing business relationships of horticultural firms in supply chains between China and Australia

R. Collins and X. Sun
University of Queensland
AUSTRALIA

Chain $\left\{ \begin{array}{l} \text{personal relationships} \\ \text{market relationships} \end{array} \right.$

Supply chain related problems are a major impediment to doing business with China, especially where perishable products are concerned. Previous research attributes much of the blame to unsophisticated Chinese logistics and distribution systems, and difficulties in implementing supply chain management (SCM) practices as defined by western literature. One suggestion is that Chinese firms have not yet realized the benefits of SCM, or are not yet at a stage where they can implement them. By comparison, in western countries, SCM principles and practices are better understood, in particular the need for strong relationships among supply chain members. As trade with China opens up under WTO agreements, it will become more important to understand the differences in how relationships with others in the supply chain are managed between Chinese and western firms. This research compared the management of business relationships among firms in supply chains between China and Australia. Data was gathered from detailed surveys of 84 food firms in China and 22 Australian food exporters. Results indicate that both Chinese and Australian firms clearly understand the benefits that can flow from good SCM practices. However, Chinese firms essentially act in the belief that their key suppliers and customers are not honest, while Australian firms assume the opposite. As a result, Chinese firms show less trust and commitment to their key suppliers and key customers than Australian firms. Australian firms therefore have a limited range of chain-building strategies open to them and should adopt a conservative approach. These lessons could apply equally well to horticultural exporters in any western country wishing to establish supply chains with Chinese importers.

Regret and the changing American gardener

J.H. Dennis
Purdue University
USA

B.K. Behe
Michigan State University
USA

Research has shown that gardening purchases are stagnant. Understanding customer segments and examining overall consumption experiences may be one way to increase consumer purchases. An awareness of homogenous customer groups such as African-Americans, Asian-Americans and Hispanic-Americans is important, yet very little information exists. A study was conducted to examine differences in the level of regret for gardening purchases by ethnicity. This information provides insight into the overall consumption experience of the ethnic gardening consumer.

Forecasting price trends in the US avocado (*Persea americana* Mill.) market

E.A. Evans and S. Nalampang
University of Florida
USA

The United States is the world's second largest avocado producer after Mexico. Since the late 1980s, the United States has shifted from being a net exporter of avocados to being a net importer, bypassing France, in 2002, to become the world's number one importer of avocados. The US consumption of avocados has increased considerably within recent times, from a per capital level of 0.69 kg in 1998 to 1.48 kg in 2007. Several factors are responsible for the increased US consumption of avocados, including year-round availability of fresh avocados (due to imports), a rapidly growing Hispanic population, promotion of the health benefits of avocados and increased disposable income. There are, however, concerns that the US avocado market is becoming saturated, which could have dire consequences for avocado prices. This paper discusses growth factors and, with the help of a multi-regression analysis, forecasts the likely impact on avocado prices up to 2012.

Consumer attitudes to potatoes and possible differentiation paths for the commodity: the case of Sweden

F. Fernqvist and L. Ekelund
Swedish University of Agricultural Sciences
SWEDEN

Potato has traditionally been one of the main sources of carbohydrate in the Swedish diet. In the last 30 years, however, consumption has decreased from approximately 90 to 50 kg per person per year. The potato has lost market share to substitutes like pasta, rice and various breads, which are often described as convenience food. While other vegetables like tomato, pepper and lettuce, have become highly differentiated during the last decade, the potato has remained an undifferentiated commodity, mainly associated with low price, unstable quality and low status. This paper describes Swedish consumers' attitudes to potato. In our study, 202 respondents were interviewed. The results show that Swedish consumers prefer to buy unpackaged potatoes. However, earlier studies show that while consumers say they prefer unpackaged fruit and vegetables to packaged ones, in a real buying situation, given the choice, they picked the packed produce. The reasons for not buying packaged potatoes were that the existing packages were too big. Our study indicates that the range of potato varieties could be increased in store; both as packaged and unpackaged products. Packaging could provide benefits to the consumers, like

as much as USD 16 per kg for fresh vegetables shipped overnight from markets in California, Arizona, Utah and the Midwestern US. Virtually all of the food imported into Las Vegas comes from distances greater than 250 miles away, with more than 99% of it coming from another state. Every dollar spent on imported food is one dollar lost from the local economy. The Maine Organic Farmers and Gardeners Association estimate that if every family in Maine spent \$10 dollars a week on local food, it would put \$104 million into their local economy. Southern Nevada has little experience in production agriculture because of its reliance on tourism and the large service industry, the lack of a land grant (agricultural) university, and the region's geographic isolation and harsh, desert climate. Although prices and local acceptance by chefs for locally produced fresh fruit and vegetables potentially make production in southern Nevada economically feasible, two primary barriers have yet to be surmounted: local production of sufficient quantities of high quality food by inexperienced growers and adequate marketing and distribution channels. A research and demonstration area of the University of Nevada is aiming to stimulate local production of fresh food by rural producers in close proximity to Las Vegas and to assist these producers in developing appropriate marketing channels.

An international and multi-institutional cooperative desert horticulture program for Southern Nevada

R.L. Morris
University of Nevada Cooperative Extension
USA

M. Norton
University of California Cooperative Extension
USA

D. Devitt
University of Nevada
USA

E. Zamora
University of Sonora
MEXICO

R. Heflebower
Utah State University Cooperative Extension
USA

R. Call
University of Arizona Cooperative Extension
USA

Southern Nevada, which contains the rapidly growing city of Las Vegas, is located on the eastern edge of the Mojave Desert and is home to 6000 new residents each month. Las Vegas has one of the largest food service industries in North America, feeding nearly 40 million visitors each year. However, Southern Nevada has little history of production agriculture since the nature of its economy is driven by tourism and gaming. This consumer-driven economy generates a huge demand for fresh produce, derived almost entirely from the surrounding states of California, Arizona, Utah and more recently Mexico. All of these regions have production areas in arid or desert environments with University and extension faculty trained in food production. Due to downsizing, the University of Nevada has few remaining faculty in horticulture or ancillary disciplines such as irrigation or pest management. In 1997, the University of Nevada Cooperative Extension (UNCE) established a fruit research and demonstration orchard near Las Vegas staffed entirely by volunteers. The experimental orchard and vineyard was established to evaluate potential cultivars and to develop cultural and pest management practices that are appropriate for the severe desert climate of the region. From 2003 - 2006, informal strategic partnerships were formed between UNCE, University of California Cooperative Extension, Utah State University Cooperative Extension, University of Arizona Cooperative Extension and the University of Sonora-Hermosillo, Mexico, for the purpose of training volunteers, small-scale producers and the general public in fruit production and marketing methods. Workshops, seminars, field demonstrations and an electronic newsletter targeting potential small-scale farmers and home gardeners were developed focusing on fruit, vegetable and edible cactus production.

Building pedagogical horticultural facilities for improved learning in horticultural education

J. Magnusson, K. Rolf and G. Svedelius
Swedish University of Agricultural Sciences
SWEDEN

In order to engage students more deeply in the learning process and to create a learning atmosphere beyond the scope of classroom teaching and textbooks, at Alnarp Horticultural Laboratory, we have established a variety of Pedagogical Horticultural Facilities (PHFs). A PHF is a greenhouse or field facility, where specially built horticultural arrangements are integrated with Information and Communication Technology (ICT). In these facilities, students carry out different practical horticultural tasks and experiments. These PHFs are located with some of the university's field research and development projects, together with applied projects in cooperation with companies and organisations. Three PHFs are presented in this paper, Alnarp Salicetum, Alnarp Plant Protection Trail and Alnarp Soil Library.

Residue-free and convenience vegetables in Vietnam: how consumers' perceptions matter in the valuation

M. Mergenthaler and C. Schipmann
University of Hohenheim
GERMANY

WTP for Safety & Convenience Attributes

K. Weinberger
World Vegetable Center (AVRDC)
TAIWAN

M. Qaim
Georg-August University of Göttingen
GERMANY

Food systems in developing countries are currently undergoing a profound transformation towards high-value products. Appropriate policies are needed to guide this transformation, presupposing a good understanding of consumer preferences. We analyze consumers' valuation of different vegetable attributes in metropolitan areas of Vietnam, using contingent valuation techniques and a mediation framework for two specific examples. Consumers are willing to pay an average price premium of 60% for Chinese mustard that is free of chemical residues and 19% for different convenience attributes of potatoes. Income levels and media have positive impacts on the willingness to pay, partly mediated through different consumer perceptions like food safety concerns, openness towards new food products and price consciousness. These results deepen our understanding on how consumers' value new food attributes.

Development of small-scale vegetable and fruit producers for an expanding urban market in Las Vegas, Nevada

R.L. Morris and H. Gatzke
University of Nevada Cooperative Extension
USA

K.R. Curtis
University of Nevada, Reno
USA

Southern Nevada, located along the eastern edge of the Mojave Desert, contains the rapidly growing city of Las Vegas, home to nearly two million people and attracting 40 million visitors each year. Las Vegas has one of the largest food service industries in North America and has emerged as a restaurant destination for tourists due to the growth in quantity and quality of gourmet restaurants. Many of these gourmet restaurants were opened by chefs who have a history of using locally grown fresh fruit and vegetables. These chefs have been known to pay

improved print information and additional features such as packages for cooking in microwave ovens or even semi-prepared potatoes. Changes in consumer behaviour and a rapidly changing market for fruit and vegetables (potato included) put the potato growers and wholesalers in a new situation where it will be necessary to transform the potato from a low status bulk product into a differentiated product which better fulfils consumer demands.

Korean consumers' view of genetic modification of fruit and vegetables

W.J. Florkowski
University of Georgia
USA

D-K Suh
Rural Development Administration
REPUBLIC OF KOREA

A survey among 1,100 women primary responsible for meal preparation residing in major urban areas of the Republic of Korea provided insights about the attitudes towards fruit and vegetable genetic modification of five attributes: colour, spoilage reduction, vitamin content, beneficial ingredients other than vitamins and taste. Results suggest that whereas the conventional socio-demographic variables have an inconsistent affect on the likelihood of support for genetic modification, location and opinions and preferences of consumers have a strong significant influence. Given the deficiency in the consumption of some vitamins and trace elements by some segments of the Korean society, while vegetable consumption is generally high, decision makers, breeders and growers need to reduce the deficiencies through breeding, domestic production and forms of marketing.

Computer software to aid in instruction of wine industry students

C.A. Fredes
Universidad Católica del Maule
CHILE

F. Pizarro, J.R. Pérez-Correa and E. Agosin
Pontificia Universidad Católica de Chile
CHILE

The Maule Wine Industry Network was created to regulate the formal education system in wine-related disciplines and enhance students' competencies. Accordingly, the Centro de Aromas of the Pontificia Universidad Católica de Chile has developed three software packages to improve the learning outcomes of students. The first package is a virtual tour through several stages of a wine-making process, where students can find relevant information about performance criteria, evidence of competencies and knowledge for each unit of competency as defined by the Network. This visually attractive software contains videos, photos and diagrams to show the process of wine-making and illustrate the key competencies required. A questionnaire, randomly generated from a database, aids the evaluation of students. The second package is an alcoholic fermentation simulator which helps students to understand the influence of key fermentation parameters - such as tank temperature, initial nitrogen and grape soluble solids on the fermentation outcome as wine fermentation profiles, length and product yields. The final software package is a simulator which teaches students the basic operation of a pressure-filter. Students select the appropriate filtering media and follow the correct operating sequence to achieve a successful filtration for a given wine. We expect that these packages will help students to learn and retain the necessary competencies involved in the wine-making processes involved.

Optimisation of undergraduate horticulture course design at Charles Sturt University: a structure for the future

Y. Guisard and J. Kent
Charles Sturt University
AUSTRALIA

Australian agricultural and horticultural industries are facing a major shortage of graduates at a time when enrolments in these courses at most universities are in decline. This paper reports on the optimisation of the horticultural curriculum at Charles Sturt University to adapt to this changing environment and to ensure good graduate outcomes. Two main strategies were adopted: (1) a strategic vision which combined two horticultural courses into a single degree with specialisations (production horticulture and environmental and amenity horticulture) with consequent rationalisation of subjects; and (2) the adoption of a flexible web-based learning environment, CSU Interact, to facilitate cross-campus subject delivery, improve efficiencies and enhance student learning. Academic staff have developed new skills to optimise the delivery of fully electronic teaching material to on-campus and distance education students to complement the traditional face-to-face classes and practical sessions.

Cost price calculations for organic and conventional grown vegetables in Sweden

B. Håkansson	J. Ascard
Swedish University of Agricultural Sciences	Jordbruksverket
SWEDEN	SWEDEN

M. Söderlind
LRF-GRO
SWEDEN

Environmental considerations are important in Swedish agricultural policy and organic farming is being promoted for its positive contribution towards environmental goals. To help growers evaluate the economics of organic production, a calculation project was initiated by the Swedish Board of Agriculture. Cost price calculations were made for four types of farms: (1) a small organic farm growing various vegetables on a total of 1 ha; (2) a slightly more mechanised and specialised organic farm with vegetables on 3 ha; (3) a highly specialised organic or conventional farm growing two vegetable crops on 40 ha; and (4) an organic or conventional agricultural farm growing vegetables on contract to the food industry. These calculations were primarily aimed as starting points for growers to use when calculating the outcomes of their own crops, but also provide a picture of the current production costs of vegetables. For the large, mechanised Type 3 farms, the production costs of organic vegetables are between 45% (carrot) and 85% (cabbage) higher than for conventionally produced crops due to higher yield and lower labour requirement in conventional production. The production costs for the small, diversified Type 1 grower are between 46% (cabbage) and 113% (onion) higher than for the large Type 3 grower. Much more manual labour is used on the small farm due to less mechanisation. For large-scale organic production to be viable, the cost price must be 50-100% higher than conventional products. Small producers cannot compete in this market and they usually sell their products directly to consumers from their own farm shops or to local markets.

information to cater for a range of learning styles is discussed. Difficulties with communication in distance learning, resulting from the contract lecturer's partial absence from campus are identified. Techniques to overcome these are examined.

Developments in Australian horticultural vocational education

P. McSweeney, K. Raynor, J. Rayner and D.E. Aldous
University of Melbourne
AUSTRALIA

Australia's higher education and vocational education and training (VET) systems have undergone major structural change over the last 30 years with significant ramifications for horticultural education and training. Unlike higher education, where the number of horticulture students and programs are in decline, Australia's VET sector has experienced much growth in program diversity, providers and student numbers. The significant changes that have occurred within this sector include: (i) the evolution of a national curriculum framework, (ii) a shift to a competency-based model of education, and (iii) an expansion in the organizational profile of education and training providers. This paper focuses on structural changes in the VET sector, with emphasis on the Victorian education and training system. Trends indicate that VET horticulture, in the current form of the Amenity Horticultural Training Package, will continue to evolve and grow, particularly in the private sector. Employees and institutions appear to accept the overall sense of order achieved by VET sector reforms, although there are specific concerns on the adequacy of industry competency standards that include issues of duplication, the practicalities of providing practical work placements, workplace assessments on a large scale, their ability to service recognition-of-prior learning (RPL), and concerns over quality control.

Respecting the complexity of cultural differences in multi-cultural horticulture instruction

T.E. Marler and S.T. Smith
University of Guam
USA

Information for improving instruction in universities represented by an assemblage of contrasting cultures may not be readily available to horticulture educators. We convey two factors important in defining cultural values and discuss them within the context of multi-cultural horticulture instruction. First, the level of collectivism that defines one's culture is of critical importance in characterizing classroom interactions. Learners from collectivist cultures avoid activities that draw attention to the individual and are eager to encourage the performance of peers. In contrast, learners from individualistic cultures are comfortable with pursuing self-interests and invest less into compliance with group demands. Second, the level of power distance instilled in one's values defines the student's initial view of classroom relationships and the sorts of changes that are required to alter those initial views. Students embracing low power distance values may address a teacher informally and disagree with their teacher without hesitation. Students embodying high power distance values avoid doing things that challenge the teacher's authority. These students refrain from asking questions and their behaviour is governed by a personal assessment of differences in socio-economic and cultural status between themselves and their classmates. Collectivist and status-based issues should be integrated in the learning approach when horticulture classroom demographics are defined by a mix of cultures. The nature of assignments, the instructor's approach to building rapport with individual learners and expectations of student-student relationships during class are some issues that must be modified in order to fully respect the complexity of a multi-cultural horticulture class.

member, academic and student point of view. Results from a recently made evaluation of this partnership are presented. Results show that the partner companies and organisations were very content with the collaboration, as were the academics and students who participated in Partnership Alnarp. Firms and organisations tend to favour applied and short term research over more basic research, which could initiate some serious discussions about the role of science. Collaboration between students and firms is highly appreciated by both parties and may lead to higher student employability. Networking, closeness and personal relationships play a crucial role in the success.

Technology-mediated instruction: shifting the paradigm of horticultural education

R.D. Lineberger
Texas A&M University
USA

Second Life Virtual Campus

Technology-mediated instruction is the term applied collectively to a variety of methods that use digital technology in its many forms to facilitate the acquisition of knowledge by students. Although the origins of technology-mediated instruction pre-date the development of the World Wide Web, there is little doubt that the rapid rise in the use of instructional technology has been enabled by the widespread availability of internet connectivity. Early adopters used the Web to archive and deliver instructional materials such as class notes, slide sets and assignments. Concomitant with the development of advanced Web browsers and wider availability of broadband connections, a whole host of interactive tools, including streaming video delivery and desktop conferencing, have enabled instructors to create a virtual classroom that is independent of distance and time. Horticultural educators are adopting technology for a variety of reasons. The decline in the number of professional horticulturists and the number of academic departments offering courses in horticultural specialties has necessitated the creation of regional teaching collaboratives. These regional teaching collaboratives use Web technology to design, develop and deliver academic coursework. The growing importance of providing continuing education and "re-education" to former students who are changing careers has meant that traditional semester-long, on-campus approaches to degree programs must be altered. Currently, employed students who are place bound by work or family obligations require distance-delivered degree programs. Furthermore, the rate of change of horticultural production technology has increased to the point that all practitioners need to be in a mode of constant learning and educators must update their course offerings constantly. Paradigm-shifting educational methods often encounter significant resistance. Barriers include the distribution of tuition and fees among the employing institutions of collaborating faculty and performance evaluation of teams of professionals rather than individual achievement. Adoption of technology is expensive for both the educator and the student, and these costs are exacerbated by the rapid rate at which digital technology becomes obsolete.

Contract lecturing in horticultural science post-secondary education

G.A. Logan
Eastern Institute of Technology
NEW ZEALAND

Contract lecturers fill a valuable role in post-secondary education. Suitable experts can be employed to teach in specialist areas, without institutions having to create extra full time positions. This paper considers how specific horticultural science subjects may be suited to contract lecturing. It identifies challenges and examines the impact of these on pedagogical techniques, the student learning environment and on the lecturer. The dissemination of specific

Implementing multiple cooperation with the horticultural sector to increase the relevance of higher education: an integrated concept

S. Hofmann
Humboldt University
GERMANY

P. Mei
China Agricultural University
CHINA

M.H. Nguyen Thi
Hanoi Agriculture University
VIETNAM

S. Zakaria
Syiah Kuala University
INDONESIA

J. Larsson
Swedish University of Agricultural Sciences
SWEDEN

Within the joint Asian-European project DOCUMAP, three Asian universities are being introduced into an integrated horticultural study program in an effort to respond to the demands of graduates seeking jobs in a rapidly changing horticultural food sector in China, Indonesia and Vietnam. The concept focuses on supply chain management and the post-harvest technology of fresh fruit and vegetables. The innovative aspect lies in the simultaneous integration of different cooperation approaches and supporting institutions. In this paper, an overview is given of the basic concepts used by higher educational institutions to increase the relevance of higher education including problem-based learning in its various forms, competency-based curriculum development, internships and mentoring programs. Furthermore, the paper describes the concept of multiple university-industry cooperation developed in the DOCUMAP project. Through interviews with stakeholders within and outside the universities, the study identifies stakeholders' attitudes, as well as the barriers and factors conducive for implementing university-industry cooperation activities. These are discussed against the experiences made by other higher educational institutions with similar initiatives and conclusions are drawn for the refinement of the concept.

Identifying farmers' market organizational structure: an Indiana case study

C. Hofmann, J.H. Dennis and M. Marshall
Purdue University
USA

Nationally, the number of farmers' markets has increased 111% from 1,755 markets in 1994 to 3,706 in 2004 (AMS 2006). Indiana's farmers' markets have increased at double the rate in the same time frame. Despite the increase in farmers' markets, little information is known about the structure of these markets in Indiana. The primary objective of this study was to establish a baseline of information from Indiana markets by collecting information on the market location, examining who (producers, consumers, community revitalization) was most influential in supporting the market and determining operational issues that needed improvement. To obtain the information, an internet and mail census was sent to market managers. All markets sold fresh vegetables and most sold fruit (96%). Most markets (over 50%) had public restrooms and hand washing facilities. A great number of respondents (70%) stated that supply and demand were equal. Results show that there is no difference in organizational structure between large and small markets except for insurance and access to utilities, which was an issue for the smaller markets.

Problems and potential in the conversion to organic farming in Chiang Mai, Thailand

N. Jayamangkala
Maejo University
THAILAND

Thailand has always been a major exporter of agricultural commodities. It is the world's leading exporter of rice, tapioca, fruit and vegetables. However, agriculture in Thailand needs to be highly efficient in order to be competitive and to sustain farmer livelihoods. At the same time, production methods need to be environmentally friendly and sustainable and the food produced must be safe for consumers. The Government of Thailand placed organic agriculture on the national agenda in January 2006 and established the National Committee to promote and strengthen the production and consumption of organic products in Thailand and to facilitate production processes that meet both domestic and international standards. In 2006, approximately 21,700 hectares of farmland was certified organic in Thailand, about 0.1% of the total farmland. Organic rice had the highest share of the planted area (80%), followed by vegetables (11%), field crops (5%), fruits (4%) and other crops (1%). The market share for organic vegetables is still relatively small, even although it has grown 60% since 2003. In 2005, the organic vegetable market was valued at Bht 255.8 million, up from Bht 160.03 million in 2003. Thailand's organic vegetable exports have good potential because of the growing demand in the world market and farmers and consumers are also interested in improving health and well-being, which is the key driver for organic products. However, the expansion in the planting area for organic crops is slowing because of the problems encountered during conversion; low yield and quality, limited marketing opportunities, no price incentive, low soil fertility, pest and disease pressure and the lack of post-harvest technology.

A SWOT analysis of organic grapefruit production in Iran

M. Javanmard
Iranian Research Organization for Science and Technology
IRAN

The aim of this study is to examine the Iranian organic grapefruit industry. A SWOT analysis was conducted with respect to production, processing and marketing. Data was gathered using two methods, firstly documentary studies and secondly a survey. The results are presented in a SWOT framework and are divided into four categories. The strengths include the increasing demand and low costs of production. Weaknesses include the lack of research and development of high yielding varieties, a lack of cool and controlled atmosphere storage facilities in the region, the absence of a national logo and standards for organic products. Opportunities include the geo-strategic position of Iran which is the fastest growing market for organic consumption in the world. The threats include competition, transportation costs, drought and climate change.

Analysis of supply chain management: case studies on the market for nursery products in Germany

E. Kaim
Geisenheim Research Centre
GERMANY

S. Mueller
University of South Australia
AUSTRALIA

Substantial changes in the market for nursery products in Germany have transformed the way that supply chain partners perform transactions and interact with each other. This paper focuses on the interaction between producers and retailers of nursery products. Three case studies investigating three distinct retailer types: an owner managed garden centre, a chain store garden centre and a Do-It-Yourself store company, are analysed utilising transaction cost theory. The structure and communication of the supply chain interfaces are analysed for all three retail types to determine the nature of the transaction relationship. Recommendations are provided on how to improve the transaction relationship between producers and retailers of nursery products. The degree of trust, information sharing and the usage of information sharing systems are found to be key points for future improvement.

Changes in the demand for floriculture products in Japan since the 1990s

K. Kohno
Japan Research Institute Ltd
JAPAN

The market for floriculture products (cut flowers, potted plants and bedding plants) is declining in Japan. The retail market share for florists, which are the major retail channel for flowers have been decreasing, while the market share for mass retail channels such as supermarkets and home improvement centres, have been increasing. In terms of the demand, the household consumption of cut flowers has increased. However, since 2000, there has been a significant retrenchment in the demand for cut flowers, particularly among households whose head belongs to the 40 to 49 age group. Decreasing trends have also been observed in the percent of households purchasing potted plants and bedding plants. This situation could continue, exacerbated by a range of factors, unless the entire floriculture industry takes action to increase consumer demand.

Trends in the development of collaboration between horticultural research, education and the industry

J. Larsson, L. Ekelund and M. Carlsson
Swedish University of Agricultural Sciences
SWEDEN

Research and teaching skills are no longer the only requirements for qualified scholars who are now expected to have skills in facilitation and the ability to collaborate. One example of how such cooperation can be organised is Partnership Alnarp, an organisation of representatives of the Swedish University of Agricultural Sciences (SLU) and member companies or organisations within the industry. The structure of research, higher and professional education and advisory services have been described as constituting the Agricultural Knowledge System (AKS), when applied to agriculture as a whole. The scope of this paper is to describe and discuss the Triple Helix Concept of cooperation between academia, industry and government, changes in the Agricultural Knowledge System (AKS) of research, higher and professional education and advisory services, and the organisation of collaboration between the university (SLU) and the industry in Partnership Alnarp. Some experiences of this cooperation are provided from the