



Department
for Environment
Food & Rural Affairs



ASSOCIATION OF APPLIED BIOLOGISTS

President: Professor Christine Watson

A three day conference

at Rothamsted Research,
Harpenden, Herts UK

on 28 – 30 November 2017

PROVISIONAL PROGRAMME

Sustainable Intensification



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PROVISIONAL PROGRAMME

(18 BASIS Points have been awarded as follows: 6CP, 6E & 6PD)

Agriculture accounts for around 70% of the UK land area. It plays an essential role in the rural economy not only through the production of food and other agricultural outputs, but in the delivery of a wide range of additional ecosystem services and environmental outcomes. These include the provision of clean water, the regulation of air quality, flooding, climate and nutrient cycles, biodiversity, cultural, aesthetic and recreational value.

In addition, the global food supply system faces an unprecedented challenge to feed a growing global population and food security is firmly on the political agenda. UN projections of population growth indicate that the global food supply system will have to feed between 9 and ten billion people by 2050 and, furthermore, the world's population is expected to continue growing during the second half of the century.

The challenge for the agricultural sector is therefore one of sustainable intensification. This means increasing food production while simultaneously reducing environmental impacts and enhancing the wide range of interlinked ecosystem services that society needs from land. The UK Department for Environment Food and Rural Affairs (DEFRA) has sought to address this challenge by investing £4 million of research through the Sustainable Intensification Research Platform (SIP) which is due to be concluded in November 2017. This conference will explore the outcomes of SIP and other relevant research.

Tuesday 28 November 2017

10:00 **COFFEE and REGISTRATION**

11:00 **WELCOME and INTRODUCTION**
SIOBHAN SHERRY (Defra, London, UK)

Session 1: Sustainable Intensification, Food Security and Ecosystems
Chair: SIOBHAN SHERRY (Defra, London, UK)

11:10 *Invited speaker*
TBC (Defra, UK)

11:50 **The importance of productivity growth for sustainable intensification of agriculture**
ACHIM DOBERMANN (Rothamsted Research, Harpenden, UK)

12:10 **What can legumes deliver in European farming food systems**
CHRISTINE WATSON (SRUC, Aberdeen, UK)

12:30 **Delivering more with less, increasing yield and resource use efficiency**
MARTIN PARRY (Lancaster University, UK)

12:50 **LUNCH**

Session 2: Knowledge Exchange and Decision Support

Chair: ROB CARLTON (CATE Group Convenor, AAB, UK)

13:50 ***Invited speaker***

TBC

CAROLINE DRUMMOND (LEAF, Warwickshire, UK)

14:20 **Sustainable Intensification: The view from the farm**

CAROL MORRIS (University of Nottingham, UK), ROB FISH (University of Kent, UK),
MATT LOBLEY & MICHAEL WINTER (University of Exeter, UK)

14:40 **Developing a Sustainable Agriculture Demonstration Farm in conjunction with a large food and nutrition producer – a mutually beneficial approach**

DAVID DEVANEY (Teagasc, Co Kilkenny, Ireland) & GER SHORTLE (Teagasc, Co. Wexford, Ireland)

15:00 **I communicate all the time, don't I?**

LYNDA DEEKS (Cranfield University, UK) & CHANTELE JAY (NIAB EMR, East Malling UK)

15:20 **TEA**

15:50 **Transitions to agroecological systems: farmers' viewpoints**

SUSANNE PADEL (Organic Research Centre, Berkshire, UK), JIM EGAN (Game & Wildlife Conservation Trust, Leicester, UK), OLIVER RUBINSTEIN (Organic Research Centre, Berkshire, UK), AMELIA WOOLFORD (Game & Wildlife Conservation Trust, Leicester, UK) & BRUCE PEARCE (Organic Research Centre, Berkshire, UK)

16:10 **Management innovations for sustainable intensification**

DAVID C ROSE, WILLIAM J SUTHERLAND (University of Cambridge, UK) & LYNN V DICKS (University of Cambridge, UK; University of East Anglia, UK)

16:30 **Farmer friendly tools – how can they help support decision making under a changing climate?**

CAIRISTIONA F E TOPP (SRUC, Edinburgh, UK), MORITZ RECKLING (ZALF, Leibniz Centre for Agricultural Landscape Research, Institute of Land Use Systems, Germany), MARJOLEINE HANEGRAAF (NMI, Wageningen, Netherlands), JOHANN BACHINGER (ZALF, Leibniz Centre for Agricultural Landscape Research, Institute of Land Use Systems, Germany), ROBIN L WALKER, SARAH BUCKINGHAM & CHRISTINE WATSON (SRUC, Aberdeen, UK)

16:50 **Cooperation and Sustainable Intensification for upland livestock farmers – highlighting challenges and questioning assumptions**

SOPHIE WYNNE-JONES, JOHN HYLAND, PRYSOR WILLIAMS, TIM PAGELLA, BRIDGET EMMETT & DAVE CHADWICK (Bangor University, UK)

17:10 **END OF SESSION**

17:20 **POSTERS**

Chair: STUART KNIGHT (NIAB, CAMBRIDGE, UK)

The Use of Cover Crops in the UK

TOM STORR & JACQUELINE HANNAM (Cranfield University, UK)

Fixed Effects: A Methodology to estimate Profitable Deviations from Typical farm variable Input Rates
MARK READER (University of Cambridge, UK)

Variety-specific crop management – a possible tool in sustainable intensification
PETER PEPÓ (University of Debrecen, Hungary)

Communicating data from the Rothamsted Long-term experiments
SARAH PERRYMAN, NATHALIE CASTELLS-BROOKE, MARGARET GLENDINING,
CHRIS RAWLINGS & ANDY MACDONALD (Rothamsted Research, Harpenden, UK)

Cattle as a means of controlling bracken could help to sustainably intensify upland farming
RACHEL SIAN ROWLANDS, DAVE CHADWICK, DAVID STYLES & JOHN HEALEY (Bangor University, UK)

Effects of Cover Crops on Phosphorus Cycling in Agro-ecosystems
SAM REYNOLDS, ANDY NEAL (Rothamsted Research, Harpenden, UK) & KARL RITZ (University of Nottingham, UK)

Using factorial design in laboratory incubation experiments to develop simple indicators of greenhouse gas fluxes
ALICE CHARTERIS, NADINE LOICK (Rothamsted Research, North Wyke, UK), KARINA MARSDEN,
DAVE CHADWICK (Bangor University, UK), MICK WHELAN (University of Leicester, UK), SREENIVAS
RAO RAVELLA (Aberystwyth University, UK), ANDREW MEAD (Rothamsted Research, Harpenden, UK)
& LAURA CARDENAS (Rothamsted Research, North Wyke, UK)

Improving the nutrient use efficiency of perennial forage species to enhance the sustainability of grassland based agriculture
ATHOLE MARSHALL, ROSEMARY COLLINS, FIONA CORKE & JOHN DOONAN (Aberystwyth University, UK)

Optimised management of upland pasture for economic and environmental benefits
NON G WILLIAMS, JAMES M GIBBONS & A PRYSOR WILLIAMS (Bangor University, UK)

Almería: A model for intensive sustainable production
FRANCISCO JAVIER EGEA (University of Almería, Spain) & RICHARD GLASS (Eurofins Agroscience Services, Derbyshire, UK)

Is there an ideotype of *Populus nigra* for bioenergy production in drought-prone lands?
JAIME PUÉRTOLAS (Lancaster University, UK), CYRIL DOUTHÉ (Universitat des Illes Balears, Spain),
HAZEL SMITH (University of Southampton, UK), GIOVANNI EMILIANI (IVALSA. CNR, Florence, Italy)
GAIL TAYLOR (University of Southampton, UK) & IAN DODD (Lancaster University, UK)

The role of ‘on-farm’ seed priming for increasing crop disease resistance in the developing world
JAVIER CARRILLO RECHE (University of Stirling, UK)

A novel tool to assess ecosystem services delivered by grassland systems
R A MATTHEWS, M S A BLACKWELL, A L COLLINS, P HARRIS, E MALTBY & H SINT (Rothamsted Research, Harpenden, UK)

Do Cover Crops Give Short Term Benefits for Soil Health?
TOM STORR & JACQUELINE HANNAM (Cranfield University, UK)

Sustainable Intensification – Lessons from the Rothamsted Long-term Experiments
ANDREW MACDONALD, PAUL POULTON, KEITH GOULDING, DAVID POWLSON,
MARGARET GLENDINING & SARAH PERRYMAN (Rothamsted Research, Harpenden, UK)

Strategies for maintaining a functional legume contribution in forage mixtures

ROSEMARY P COLLINS, DAVID C LLOYD & ATHOLE H MARSHALL (Aberystwyth University, UK)

The influence of intensive nutrient supply on the soil features in two long-term fertilizer experiments in Hungary

JÁNOS KÁTAI (University of Debrecen, Hungary)

Stability of soil aggregates estimated by fractions of soil organic carbon and increased by manure application

FRANCESC DOMINGO OLIVÉ (IRTA Mas Badia, Agricultural Experimental Station, Catalonia, Spain), ANGELA D BOSCH SERRA, ROSA YAGÜE (Universitat de Lleida, Catalonia, Spain) & JAUME BOIXADERA LLOBET (Department of Agriculture, Livestock, Fisheries and Food, Catalonia, Spain)

Evaluation of six biomass species fertilized with digestate under arbuscular mycorrhizal fungi inoculation

CARMELO MAUCIERI, ALBERTO BARCO, CATERINA CARUSO & MAURIZIO BORIN (University of Padova, Italy)

The design and establishment of a multifunctional vegetative strip in arable farmland

CLAIRE J BLOWERS (Harper Adams University, Shropshire, UK), HEIDI M CUNNINGHAM (Syngenta, Jealott's Hill, Berkshire, UK), ANDREW WILCOX & NICOLA P RANDALL (Harper Adams University, Shropshire, UK)

Multi-species mixtures enhance yield stability in grasslands subjected to simulated drought

JOHN FINN (Teagasc, Wexford, Ireland), MATTHIAS SUTER (Agroscope, Zürich, Switzerland), EAMON HAUGHEY (Teagasc, Wexford, Ireland; College Dublin, Belfield, Ireland), DANIEL HOFER & ANDREAS LÜSCHER (Agroscope, Zürich, Switzerland)

Sustainable management of water resources in Egypt: A review of past, present and future

HEND IBRAHIM & MAURIZIO BORIN (DAFNAE, Università degli Studi di Padova, Italy)

How do biomass export, straw return and mineral N fertilisation affect the soil carbon content in relation to the productivity of arable cropping systems?

KATHLIN SCHWEITZER, BÄRBEL KROSCHEWSKI & MICHAEL BAUMECKER (Thaer-Institute of Agriculture and Horticulture, Berlin, Germany)

Analysis of trace element and antioxidant content of milk from cows under organic vs conventional management

HANNAH DAVIS & GILLIAN BUTLER (Newcastle University, UK)

Leading and lagging performances of livestock farms in the Less Favoured Areas in England: climate and landscape characteristics as drivers

GEORGE VITTIS, YIORGOS GADANAKIS & SIMON MORTIMER (University of Reading, UK)

Slug invasions: cover crops, establishment methods or just environmental conditions?

FELICITY CROTTY & CHRIS STOATE (The Allerton Project, Game & Wildlife Conservation Trust, Leicestershire, UK)

A Yield Enhancement Network for oilseeds: estimating potential growth and yield

CHRISTINA CLARKE, DANIEL KINDRED, ROGER SYLVESTER-BRADLEY, MARK RAMSDEN (ADAS Boxworth, Cambridge, UK) & PETE BERRY (ADAS High Mowthorpe, York, UK)

Nitrogen losses following food-based digestate and compost applications to agricultural land

DANIEL MUNRO (ADAS Boxworth, Cambridge, UK), FIONA NICHOLSON, ANNE BHOGAL (ADAS Gleadthorpe, Nottinghamshire, UK), LAURA CARDENAS (Rothamsted Research, Devon, UK), DAVE CHADWICK (Bangor University, UK), TOM MISSELBROOK (Rothamsted Research, Devon, UK), ALISON ROLLETT (ADAS Boxworth, Cambridge, UK), MATT TAYLOR (AquaEnviro, Wakefield, UK), RACHEL THORMAN & JOHN WILLIAMS (ADAS Boxworth, Cambridge, UK)

WEDNESDAY 29 November 2017

Session 3: Farming Practices and Systems

Chair: STUART KNIGHT (NIAB, Cambridge, UK)

09:00 ***Invited speaker***

TBC

GUY SMITH (NFU, Warwickshire, UK)

09:30 **Sustainable Intensification of upland sheep systems: can we have our lamb and eat it?**

PRYSOR WILLIAMS, JAMES GIBBONS, DAVID STYLES & DAVE CHADWICK (Bangor University, UK)

09:50 **The role of agroecology in sustainable intensification**

BRUCE PEARCE, NIC LAMPKIN (Organic Research Centre, Berkshire, UK), ALASTAIR LEAKE (Game & Wildlife Conservation Trust, Leicester, UK) & SUSANNE PADEL (Organic Research Centre, Berkshire, UK)

10:10 **Back to basics on arable farms– looking for the practices that deliver environmental resources and sustainable production**

MIKE GREEN (Natural England, Worcester, UK)

10:30 **Yields versus environmental externalities in food production systems**

ROWAN EISNER, RHYS GREEN, ANDREW BALMFORD (University of Cambridge, UK), DAVID EDWARDS (University of Sheffield, UK), ROB FIELD (RSPB, Bedfordshire, UK) & CLAIRE FENIUK (RSPB, Cambridge, UK)

10:50 **COFFEE**

Session 3a, b: Parallel Sessions

Session 3a: Farm Level

Chair: STUART KNIGHT (NIAB, CAMBRIDGE, UK)

11:20 **Cultivation and cover crop practices – evaluation indicators and metrics**

N L MORRIS & R STOBART (NIAB, Norfolk, UK)

11:40 **Understanding cover crops at the farm-scale – a method of sustainable intensification?**

FELICITY CROTTY & CHRIS STOATE (Game & Wildlife Conservation Trust, Leicester, UK)

12:00 **Impacts of management of soil health - site-specific delivery of sustainable agro-ecosystems**

ELIZABETH STOCKDALE (Newcastle University, UK)

12:20 **Evaluating organic fertilisers and their impact on the health, productivity and quality of spelt and rye**

AMELIA MAGISTRALI, CARLO LEIFERT, PAUL BILSBORROW & GILLIAN BUTLER (Newcastle University, UK)

12:40 **From research to practice: Grass-legume mixtures as a pillar for sustainable intensification**
ANDREAS LÜSCHER, OLIVIER HUGUENIN-ELIE, MATTHIAS SUTER (Agroscope, Zürich, Switzerland), JOHN FINN (Teagasc, Wexford, Ireland) & DANIEL SUTER (Agroscope, Zürich, Switzerland)

Session 3b: Landscape level

Chair: NAOMI JONES (Fera Science Limited (FSL), York, UK)

11:20 **The scale problem in tackling the sustainability of agriculture with respect to water quality: insight from the Avon Demonstration Test Catchment**

MATTILDA BIDDULPH (University of Northampton, UK), ADRIAN COLLINS (Rothamsted Research, North Wyke, UK), IAN FOSTER (Rhodes University, Eastern Cape, RSA) & NAOMI HOLMES (Sheffield Hallam University, UK)

11:40 **Landscape scale implementation of interventions through farmer-led collaboration in The Conwy**

AMY THOMAS, JACK COSBY, MILES MARSHALL, PRYSOR WILLIAMS, SOPHIE WYNNE-JONES & BRIDGET EMMETT (Bangor University, UK)

12:00 **Spatial evolution of vegetated buffer strips: environmental benefits and economic opportunities in the low-lying Venetian floodplain**

S E PAPPALARDO, N DAL FERRO & M BORIN (University of Padova, Italy)

12:20 **The potential role of a herbicide for improving catchment management to meet SI objectives**

CHRIS STOATE (Game & Wildlife Conservation Trust, Leicester, UK)

12:40 **Operation Pollinator: Positive action for biodiversity in the arable landscape**

PETER SUTTON, GEOFF COATES, BELINDA BAILEY (Syngenta, Berkshire, UK), MAREK NOWAKOWSKI (Wildlife Farming Company, Bicester, UK), MIKE EDWARDS (Lea-side, West Sussex, UK), ROBIN BLAKE (Compliance Services, Edinburgh, UK), BEN WOODCOCK, CLAIRE CARVELL & RICHARD PYWELL (NERC Centre for Ecology and Hydrology, Wallingford, UK)

13:00 **LUNCH**

Sustainable Intensification Research Network (SIRN) Sponsored Sessions



Session 4: Metrics

Chair: ANDY WHITMORE (Rothamsted Research, Harpenden, UK)

14:00 **Invited speaker**

TBC

PAUL WILSON (University of Nottingham, UK)

14:30 **Estimated differences in economic and environmental performance of dairy herds across the UK**

MATT BELL & PAUL WILSON (University of Nottingham, UK)

14:50 **Trends in uk dairy farms from 2001 to 2014: Evidence of sustainable intensification?**

ALEJANDRA M GONZÁLEZ-MEJÍA, DAVID STYLES (Bangor University, UK), PAUL WILSON (University of Nottingham, UK) & JAMES GIBBONS (Bangor University, UK)

15:10 **Developing novel environmental metrics for beef production systems to account for differences in meat quality**

GRAHAM MCAULIFFE, TARO TAKAHASHI (Rothamsted Research, North Wyke, UK; University of Bristol, UK), ROBERT ORR, PAUL HARRIS (Rothamsted Research, North Wyke, UK), IAN RICHARDSON (University of Bristol, UK) & MICHAEL LEE (Rothamsted Research, North Wyke, UK; University of Bristol, UK)

15:30 **TEA**

16:00 **Sustainable Intensification – application of a theoretical framework within real farms**

NORMAN SIEBRECHT, HARALD SCHMID & KURT-JÜRGEN HÜLSBERGEN (Technical University of Munich, Germany)

16:20 **Redefining sustainability: novel metrics to evaluate farming systems based on the dynamic flow of nutrients**

LAURA CARDENAS (Rothamsted Research, North Wyke, UK), TARO TAKAHASHI (Rothamsted Research, North Wyke, UK; University of Bristol, UK), PAUL HARRIS (Rothamsted Research, North Wyke, UK), ANDREW MEAD (Rothamsted Research, Harpenden, UK) & MICHAEL LEE (Rothamsted Research, North Wyke, UK; University of Bristol, UK)

16:40 **Using CO₂ and N₂O emissions as indicators of nutrient cycling and environmental impacts of different farm managements on the Farm Platform**

NADINE LOICK, ROBERT M DUNN, BRUCE GRIFFITH, TOM MISSELBROOK & LAURA M CARDENAS (Rothamsted Research, North Wyke, UK)

17:00 ***Session 5: SIRN Informal Discussions***

Chair: ADELIA DE PAULA (Rothamsted Research, Harpenden, UK)

18:30 **END OF SESSION**

19:30 **CONFERENCE DINNER**

After Dinner Speaker

TIM LANG (City, University of London, UK)

THURSDAY 30 November 2017

Session 6: Sustainable Land

Chair: MICHAEL WINTER (University of Exeter, UK)

09:00 ***Invited speaker***

TBC

LES FIRBANK (University of Leeds, UK)

09:30 **The Sustainable Development Goals (SDGs) as an opportunity to stimulate sustainable intensification**

L C TODMAN (Rothamsted Research, Harpenden, UK), J GIL, P REIDSMA (Wageningen University, The Netherlands), M H SCHWOOB, S TREYER (IDDRI, Paris, France), M K VAN ITTERSUM (Wageningen University, The Netherlands) & A P WHITMORE (Rothamsted Research, Harpenden, UK)

- 09:50 **Applying and ground-truthing the SIP Dynamic Typologies web tool**
AMY THOMAS, PETER HENRYS, JACK COSBY, JOHN WATKINS (Bangor University, UK) DAVID LEE, STEPHEN ANTHONY (ADAS, Wolverhampton, UK), ANDREW CROWE, NIGEL BOATMAN (Fera Science Limited (FSL), York, UK) & BRIDGET EMMETT (Bangor University, UK).
- 10:10 **England's green and pleasant land: comparing land sparing and sharing in the UK**
TOM FINCH (RSPB Centre for Conservation Science, Sandy, UK; University of Cambridge, UK), ANDREW BALMFORD (University of Cambridge, UK), RHYS GREEN (RSPB Centre for Conservation Science, Sandy, UK; University of Cambridge, UK) & WILL PEACH (RSPB Centre for Conservation Science, Sandy, UK)
- 10:30 **COFFEE**
- Session 7: What comes next?*
- Chairs:** STUART KNIGHT (NIAB, Cambridge, UK)
MICHAEL WINTER (University of Exeter, UK)
- 11:00 *Invited speaker*
Sustainable Intensification in Politics and Practice: Reflecting on the rise (and fall?) of a concept
MICHAEL WINTER (University of Exeter, UK)
- 11:30 **Sustainable Intensification: opportunities, obstacles and risks for UK farms**
STUART KNIGHT (NIAB, Cambridge, UK)
- 11:50 **The ASSIST project: Achieving Sustainable Agricultural Systems**
J STORKEY (Rothamsted Research, Harpenden, UK) & R F PYWELL (Centre for Ecology and Hydrology, Oxfordshire, UK)
- 12:10 **Comparing Sustainable Intensification in the UK and China – what can we learn from each other?**
DAVE CHADWICK (Bangor University, UK), MICHAEL WINTER (University of Exeter, UK), STUART KNIGHT (NIAB, Cambridge, UK), ANDY WHITMORE (Rothamsted Research, Harpenden, UK), TOM MISSELBROOK (Rothamsted Research, North Wyke, Devon, UK), YUELAI LU (University of East Anglia, UK), XUEJUN LIU (China Agricultural University, Beijing, China), SHANGBIN GAO (Agro-Environmental Protection Institute, MoA, Beijing, China) & FUSUO ZHANG (Rothamsted Research, North Wyke, Devon, UK)
- 12:30 **DISCUSSION**
- 13:00 **CLOSING REMARKS**
MICHAEL WINTER (University of Exeter, UK)
- 13:10 **LUNCH**
- 14:00 **SIRN AGM**
- 16:00 **CLOSE**