Contents

Dear Conference Participant,

On behalf of the organising committee, it is our pleasure to welcome you to the 17th International RAMIRAN conference, held in Wexford, Ireland from 4th to 6th September 2017. The conference is organised by Teagasc, the Irish Agriculture and Food Development Authority. RAMIRAN "Recycling of Agricultural, Municipal and Industrial Residues in Agriculture Network" is a research and expertise network focusing on agronomic use of organic residues and their subsequent impact on the environment. The very first meeting of the network took place back in 1976 in Solna, Sweden, when the network focused solely on animal waste utilisation. Since then the network and RAMIRAN conference has expanded to cover a wide range of topics including organic residue valorisation and the sustainable use of these resources to protect and enhance the environment including water, air, soil and biodiversity.

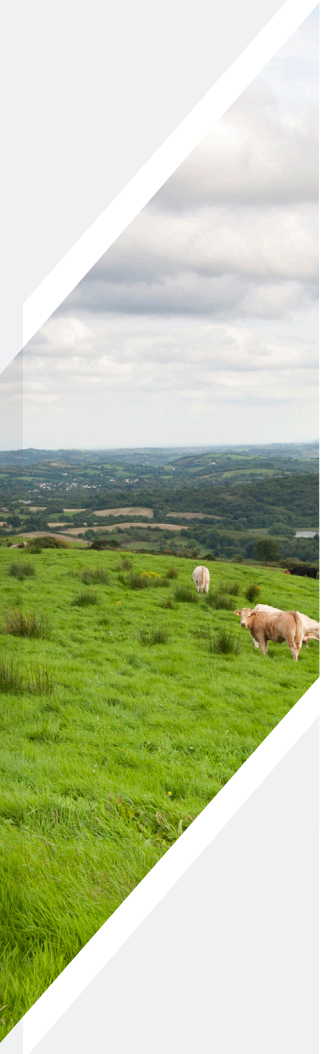
2017 is the "Year of Sustainable Grassland" in Ireland and sees a year long focus by the Department of Agriculture, Food and the Marine, its Agencies and other stakeholders on grass productivity and utilisation, grassland sustainability and the international reputation of Irelands' grass based production systems. An important part of this is Teagascs Grass10 campaign to promote sustainable grassland excellence for Irish livestock. The campaign objective is to increase the number of grazings per paddock to 10 and the amount of grass utilised to 10 tonnes grass dry matter per hectare. RAMIRAN contributes significantly to both challenges as the use and recycling of organic manures and residues on grassland is an important component in the sustainable utilisation of grassland in Ireland.

The 17th International RAMIRAN conference provides a platform to discuss new cutting edge strategies to improve the efficiency of organic residue management across the full spectrum of research, from theory to implementation and adoption by stakeholders. The overall theme of RAMIRAN 2017 is 'Sustainable utilization of manures and residue resources in agriculture', which will be explored under the following sub-themes:

- Advances in technologies
- Crop nutrition
- Gaseous emissions
- Soil & water quality
- Adoption and impact

A total of 114 oral papers and 88 poster papers are being presented at the conference by authors from over 30 countries across 6 continents. The organising committee wish to thank all authors for their written contributions to the proceedings and we look forward to your intellectual contribution throughout the conference. The financial support from all our sponsors is gratefully acknowledged. We hope that you really enjoy both the conference and Wexford.

William Burchill, Karl Richards and Gary Lanigan
Conference Chairs



PROGRAMME AT A GLANCE

SUNDAY SEPTEMBER 3rd	
17.00 – 19.00	Registration & Placement of Posters
20.00 – 22.00	Pre-conference Social gathering-Traditional Irish Music evening (Sky and The Ground pub)
MONDAY SEPTEMBER 4th	
08:00–09:00	Registration & placement of posters
09:00–11:00	**Plenary Session 1** - McLure 1 (Opening addresses & Plenary papers for Themes 1, 2 & 3) **Prof. Vincent O'Flaherty**, NUI Galway **Prof. Lars Stoumann Jensen**, University of Copenhagen **Prof. Claudia Wagner-Riddle**, University of Guelph
11:00–11:30	**Morning tea**
11:30–13:00	**Parallel Session 1 - Sub - Themes 1, 2 & 3** Theme 1 - Advances in Technology - McLure 1 Theme 2 - Crop Nutrition - Oscar Wilde Theme 3 - Gaseous Emissions - Mc Carthy
13:00–14:00	**Lunch**
14:00–15:30	**Parallel Session 2 - Sub - Themes 1, 2, 3, 4 & 5** Theme 1 & 3 - Advances in Technology & Gaseous Emissions - McLure 1 Theme 2&5 - Crop Nutrition & Adoption and Impact - Oscar Wilde Theme 4 - Soil & Water Quality - Mc Carthy
15:30–17:30	**Afternoon Tea & Poster Session 1**
17:30–19:30	RAMIRAN Task Group Meeting (McCarthy)
19:00-20:00	Whiskey tasting - McLure Lobby
20:00	**Gala conference dinner**
TUESDAY SEPTEMBER 5th	
09:00–10:05	**Plenary Session 2 -** (Plenary papers for Themes 4 & 5) **Dr. Gary Feyereisen**, USDA-Agricultural Research Service **John Williams**, RSK-ADAS **Prof. Gary Lanigan**, Teagasc Johnstown Castle
10:05–10:30	**Morning tea**
10:30–11:30	**Parallel Session 3 - Sub - Themes 3, 4 & 5** Theme 3 - Gaseous Emissions - McLure 1 Theme 4 - Soil & Water Quality - McCarthy Sub - Theme 5 - Adoption & Impact - Oscar Wilde
11:30–12:30	**Poster Session 2 - McLure 2**
12:30–13:00	**Lunch & packed lunch distributed for field trips**
13:00–17:00	**Field Trips** (Johnstown Castle Research Centre & Agricultural Catchment Site)
18:00–21:00	**Viking BBQ National Heritage Park**
WEDNESDAY SEPTEMBER 6th	
09:00–10:30	**Parallel Session 4 - Sub -Themes 1, 2,3 & 4** Theme 1 - Advances in Technology - Oscar Wilde Theme 2 & 4 - Crop Nutrition, Soil & Water Quality - McCarthy Theme 3 - Gaseous Emissions - McLure 1
10:30–11:00	**Morning tea – McLure Lobby**
11:00–12:40	**Plenary Session 3** (Co-Chair Rapporteurs Reports for Themes 1, 2,3,4 & 5, Panel Discussion, Poster Prize and Closing Address)
13:00	**Lunch in Terrace Restaurant**
14:00–16:00	**Kick off meeting for New RAMIRAN Task Groups**

Committees

We wish to thank everyone that made the 17th RAMIRAN conference possible. Special thanks to the organisers of the 16th RAMIRAN conference who assisted with the early planning and advised on their lessons learnt. Thank you to the RAMIRAN Network Coordinators, Harald Menzi and Tom Misselbrook for their time, advice and assistance during the conference planning. To the invited speakers for their insightful paper contributions. To all the organisations that contributed financially to the workshop. A special word of thanks to the staff and students of Teagasc for their valuable assistance. And finally to the participants of the Workshop for their contributions to making the 17th RAMIRAN conference successful.

Conference Chairs

William Burchill, Teagasc Johnstown Castle, Wexford

Karl Richards, Teagasc Johnstown Castle, Wexford

Gary Lanigan, Teagasc Johnstown Castle, Wexford

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Zhan, Ximin, National University of Ireland Galway

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Amon, Barbara, Leibniz Institute for Agricultural Engineering, Germany

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Plunkett, Mark, Teagasc Johnstown Castle, Ireland

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Sommer, Sven, University of Southern Denmark, Denmark

Thorman, Rachel, ADAS, United Kingdom

Tremier, Anne, IRSTEA, France

Venglovsky, Jan, University of veterinary medicine and pharmacy, Slovakia

Vinneras, Björn, University of Agricultural Sciences, Sweden

frontiers in Sustainable Food Systems | Waste Management in Agroecosystems

RAMIRAN2017 and Frontiers are partnering to provide an open-access publishing outlet for key research linked to this conference. The Frontiers Open Science for Sustainability initiative is launching a new Journal: Frontiers in Sustainable Food Systems which will feature a Specialty Section on Waste Management in Agroecosystems (the Editorial Board of the section can be found below).

To bring the spotlight to key themes covered by RAMIRAN2017, the Waste Management in Agroecosystems section will launch a Special Issue to showcase a selection of papers on the latest research on the use of livestock manure and other organic residues in agriculture. Further information will be available during the conference.

Author guidelines: http://home.frontiersin.org/about/author-guidelines

Article types: Review or Original Research

Deadlines:

1st September 2017	**Email contribution title to sustainablefoodsystems@frontiersin.org**
21st September 2017	**Submit paper abstract proposal**
1st February 2018	**Deadline for Full paper submission1**

[1]Early submission is possible – all articles are published and appear online as soon as they are peer reviewed and accepted.

Publication Fees: 10 full papers (Original Research or Review) have been sponsored for RAMIRAN2017. In addition there are a large number of institutions with agreements with Frontiers which allow for free publication. Check if your institution has an institutional agreement with Frontiers here: http://home.frontiersin.org/about/institutional-membership. Once all papers in the collection are published, a free e-book of the contributions is published. See example of a topic here: http://journal.frontiersin.org/researchtopic/3423/protein-crops-food-and-feed-for-the-future.

Launching in 2017: Waste Management in Agroecosystems, a Specialty Section of Frontiers in Sustainable Food Systems, publishes original, peer reviewed research on organic waste generation, treatment, agricultural use, soil remediation and environmental impact. The section focuses on the 3Rs concept - Reduce, Recycle, and Reuse - on which the Circular Economy is based. The complete Editorial Board can be found here: http://journal.frontiersin.org/journal/sustainable-food-systems/section/waste-management-in-agroecosystems#editorial-board.

Specialty Chief Editor:

Maria Pilar Bernal, Consejo Superior de Investigaciones Científicas (CSIC), Madrid, Spain

Associate Editors:

Paula Alvarenga, Instituto Superior de Agronomia, Portugal

Maria Cruz Garcia Gonzalez, Instituto Tecnológico Agrario de Castilla y León, Spain

Anne Tremier, Irstea - Centre de Rennes, Rennes, France

Henrique Trindade, University of Trás-os-Montes and Alto Douro, Portugal

Matias B Vanotti, Agricultural Research Service (USDA), USA

Tom Misselbrook, Rothamsted Research (BBSRC), United Kingdom

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Roland W. Melse, Wageningen University and Research Centre, Netherlands

Raul Moral , Universidad Miguel Hernández de Elche, Spain

Francisco Javier Salazar, Remehue Regional Research Center, Institute of Agricultural Research, Chile

RAMIRAN Task Groups

With its participants, RAMIRAN holds a tremendous resource of knowledge and expertise in a wide range of topics across the whole of Europe and, increasingly, other continents. The network represents a unique opportunity to mobilise this resource through network activities beyond the regular conferences. To use this potential, RAMIRAN fosters task groups, short-term teams with a clear task that can be achieved in a defined time of ideally 1-2 years or maximum four years. These Tasks make use of the potential of RAMIRAN arising from its cross-country membership of experts. Example topics include:

- Surveys about management techniques,
- Environmental aspects of manure
- Socio/economic issues related to manure
- Other organic residues
- Interdisciplinary studies
- Past Task group examples include:
- Glossary of terms on livestock and manure management
- Country manure management profiles
- Residual Nitrogen effects from organic residues
- Anaerobic digestion
- Utilization of digestates

The 2017 RAMIRAN Conference presents an ideal opportunity to launch new task groups that will approach new challenging projects to compile and apply knowledge across a range of different countries. To show the potential of the task groups, to motivate you to participate in such activities and to identify promising new topics a **Task group workshop will take place on Monday 4th September 17:30 to 19:30 and on Wednesday 6th September 14:00 to 16:00.** These new ideas and topics can then be discussed throughout the conference until Wednesday, when the task groups for the next two years will be announced so delegates can register their interest to participate. Wednesday afternoon would then also offer the opportunity for some core groups to have a first meeting to plan and organize the work. If you have promising ideas for task groups and/or are interested to contribute to such work, it might therefore be advisable (but not essential) to plan to stay for Wednesday afternoon. Besides the currently running two groups “National Manure Profiles” and “Glossary of Terms” a first new group on “Animal manure processing” has been suggested. We look forward to additional task suggestions.

There will also be an opportunity on Wednesday afternoon to discuss upcoming potential projects for H2020 in the manure management area.

Keynote Speakers

Sub-theme 1: Advances in technologies

Prof. Vincent O'Flaherty

School of Natural Sciences, National University of Ireland Galway

Vincent O'Flaherty is a professor of microbiology at the School of Natural Sciences, National University of Ireland Galway. He has 25 years' experience in the area of anaerobic biofilm and microbial ecology research, focused on: anaerobic biofilm reactor technology for bio-refining, energy production and wastewater treatment; control of biofilms in infectious disease settings and the microbial ecology of anaerobic biofilms and soil ecosystems. Prof. O'Flaherty is the scientific leader of the Sustainability Pillar of the Dairy Processing Technology Centre (www.dptc.ie) funded by the Irish Dairy Industry and Enterprise Ireland and is actively involved in several other projects focused on the development of an indigenous Irish sustainable biomass and bio-refining sector. His group has been heavily involved in the development and application of low-temperature anaerobic biofilm technology towards commercialisation and technology developed in his lab was the basis for the establishment of NVP Energy (www.nvpenergy.com).

Prof. O'Flaherty is also a co-founder of a spin-out company from NUI, Galway - Westway Health, which was formed in 2012 and is focused on the development of an exciting and novel antimicrobial platform for infection control in veterinary and human settings (www.westwayhealth.com). Prof. O'Flaherty teaches microbiology and environmental biotechnology to undergraduate and postgraduate students at all levels, and is head of the School of Natural Sciences. He has published over 250 scientific communications, including 105 papers in leading international, peer-reviewed, journals. http://scholar.google.com/citations?user=dxuO7AYAAAAJ&hl=en&oi=ao

Sub-theme 2: Crop nutrition

Prof. Lars Stoumann Jensen

Dept. of Plant and Environmental Sciences, University of Copenhagen

Prof. Jensen holds a chair in Soil Fertility and Recycling of Organic Waste Resources at UCPH. His research interest and responsibilities covers all aspects of soil fertility, in particular how decomposition processes and nutrient turnover in agro-ecosystems are affected by organic matter inputs, including crop residues, animal manures, composts, sludges and other wastes applied to soils. Studies focus on fundamental biogeochemical processes controlling nutrient and contaminant availability and mobility (often studied using isotope methods), but also more applied aspects like organic waste processing, fertilizer value and formulation, effects on soil quality, gaseous emissions and nutrient losses to the environment. Simulation modelling of soil C and N turnover as well as cropping system productivity and environmental effects, both in the short term (within one growing season) and in the long term (at the cropping system rotation level) as well as the very long-term trend in soil humus have also been covered in his research.

Prof. Jensen heads the Soil & Waste research group with approx. 25 staff, and has recently coordinated the EU-FP7 Marie Curie training network ReUseWaste. He is a member of the EU Nitrogen Expert Panel and of the EIP-Agri Focus Group on Nutrient Recycling. For details of Prof. Jensen's research publications and activities, please refer to his homepage at UCPH http://plen.ku.dk/english/employees/?pure=en/persons/184737.

Sub-theme 3: Gaseous emissions

Prof. Claudia Wagner-Riddle

School of Environmental Sciences, University of Guelph

Claudia Wagner-Riddle is a Professor of Agrometeorology at the School of Environmental Sciences, University of Guelph, Canada. She is an expert in application of micrometeorological flux techniques to measure greenhouse gas emissions (GHG; methane, nitrous oxide and carbon dioxide) from agriculture. Her recent research includes characterization of GHG emissions associated with on-farm biogas production (methane from anaerobic digestate storage and nitrous oxide emissions following digestate application to soils) and assessment of net GHG emissions from annual and perennial dairy cropping system. Prof. Wagner-Riddle is an editor of the international journal Agricultural and Forest Meteorology since 2012 and associate editor of the Journal of Environmental Quality since 2011. She is a member of the Scientific Advisory Group to the 4R Quantification Module Strategy, The Fertilizer Institute and International Plant Nutrition Institute,

United States; the Technical Committee GHG Inventory: Livestock, Environment and Climate Change Canada and was Chair (elected position) of the Climatology and Modelling Section of the American Society of Agronomy in 2013/2014. Prof. Wagner-Riddle has published >100 papers, has had 2724 citations and has an h-index of 26 (Google Scholar).

Sub-theme 4: Soil & water quality

Dr. Gary Feyereisen

USDA-Agricultural Research Service, Minnesota

Dr. Feyereisen is a research agricultural engineer at the USDA-ARS Soil and Water Management Research Unit, St. Paul, MN, who investigates nutrient transport processes and management / conservation practices designed to minimize agricultural impacts on water quality while optimizing production. He is currently working in the areas of tile drainage and manure management with an emphasis on reducing nitrate-N and dissolved P losses from intensively managed dairies. His lab is investigating strategies to optimize N removal in denitrification beds while simultaneously effecting P removal. He has published 42 refereed papers and served as an associate editor for the J. Environmental Quality. He has served as Chair of the Multistate Research Coordinating Committee and Information Exchange Group, Drainage Design and Management Practices to Improve Water Quality, and for the American Society of Agronomy's Managing Denitrification in Agronomic Systems Community.

Additionally, Dr. Feyereisen has inspired others to share their technical expertise in the developing world by speaking of his technical / social engagement in this realm. Prior to entering graduate school as a non-traditional student, Dr. Feyereisen spent 20 years in industry as a processing plant engineer, energy manager, and new product development manager.

Sub-theme 5: Adoption and impact

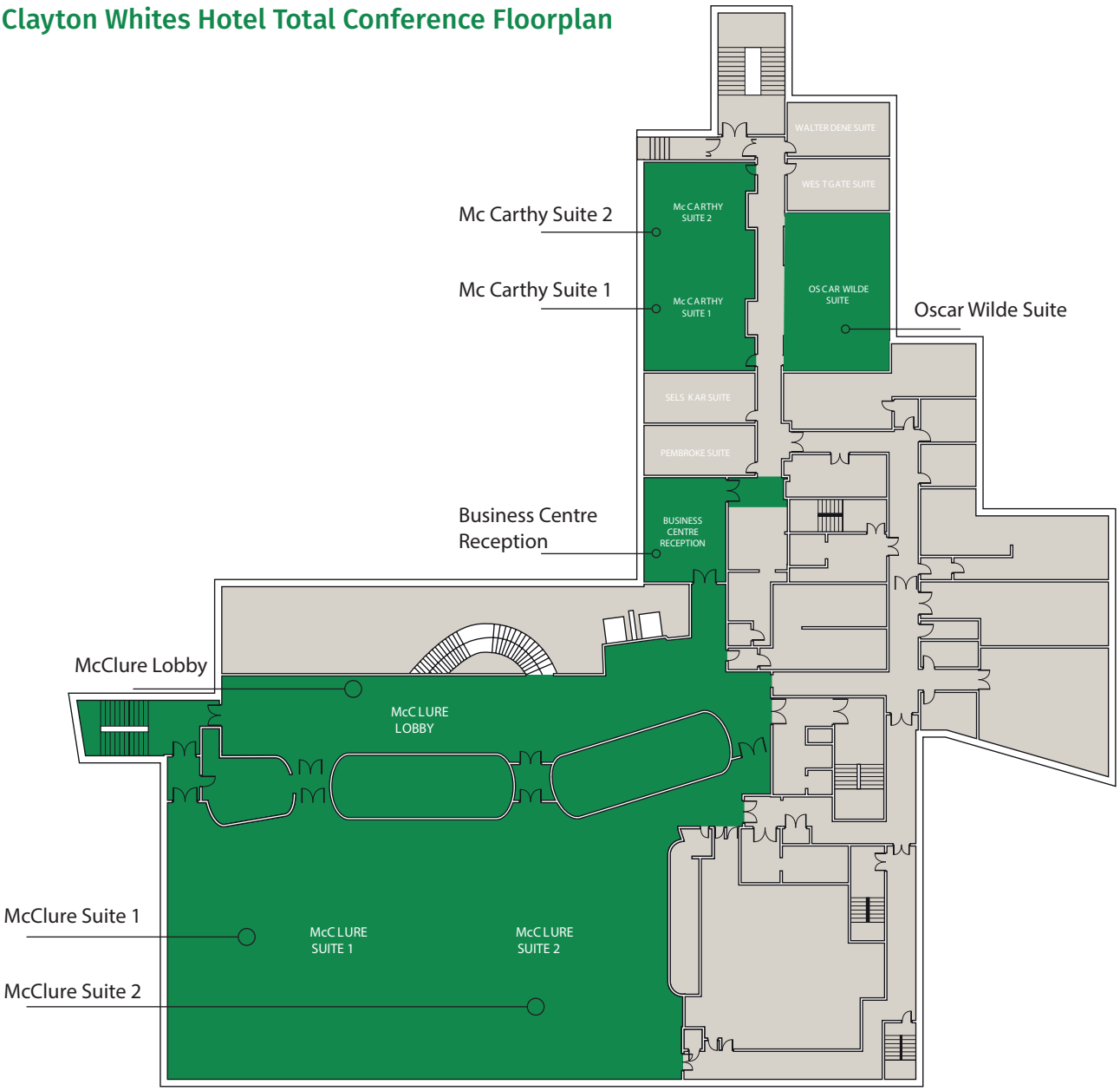
Mr. John Williams

ADAS Boxworth, Cambridge

John Williams is a principal soil scientist with ADAS and his research interests include nutrient management and the mitigation of agricultural diffuse pollution of the air and water environments. Mr Williams has detailed knowledge of national fertiliser recommendation systems having led the revision of the organic manures chapter in AHDB's Fertiliser Manual (RB209) for the UK. John was a Work Package Leader for Defra's GreenHouse Gas Platform Project AC0116 and the WRAP/Defra/Zero Waste Scotland/WRAP Cymru DC-Agri project. Mr Williams also chairs Defra's Research Expert group for the Greenhouse Gas Platform projects. He co-authored the MANNER-NPK nutrient decision support system and is a Technical Adviser for the UK water Industry's Bio-solids Assurance Scheme.

CONFERENCE VENUE / FLOOR PLAN

Clayton Whites Hotel Total Conference Floorplan



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MEET IN IRELAND

Department of Agriculture, Food and the Marine
An Roinn Talmhaíochta, Bia agus Mara

Overview of Irish Agriculture

- The land area of Ireland is 6.9 million hectares, of which 4.5 million hectares or about 65% is used for agriculture. Ireland's national forest estate covers 750,000 hectares (end of 2015), or close to 11% of the land
- Some 81% of agricultural land is devoted to grass (silage, hay & pasture), 11% to rough grazing and 8% to crops, fruit and horticulture production.
- Ireland has an important farm sector dominated by medium-sized farms and its maritime climate favours a grass-based system of agricultural production.
- Demand for Irish agricultural produce is largely driven by the quality appeal of the food produced here, with its low environmental footprint, its grass based system of production, and strict traceability and welfare criteria.
- The agri-food sector is Ireland's largest indigenous manufacturing industry, with total agri-food employment, including on-farm employment in primary agriculture, forestry and fishing, as well as the food processing industry, accounting for over 165,700 jobs.
- The most recent data available shows the agri-food sector accounting for 7.6% of Gross Value Added (2014), 23% of all manufacturing turnover (2014), 8.4% of employment (2015) and 10.7% of merchandise exports (2015).

Current Schemes, Programmes & Support Measures

- The Rural Development Programme, worth almost €4 billion over 7 years, is strongly targeted towards environmental benefits, including knowledge transfer programmes, which will bring the latest innovative sustainability research and practices direct to farmers
- The Green, Low-Carbon, Agri-Environment Scheme (GLAS) offers opportunities to support emission reductions and carbon sequestration through various actions, while at the same time addressing other environmental threats such as biodiversity and water quality.
- The Origin Green programme – the national sustainability auditing and carbon foot-printing programme for the food and drink industry uniting government, the private sector and food producers.
- Knowledge transfer and education-maximising nutrient use efficiency and facilitating ag. advisor development.
- The Beef Data and Genomics Programme (BDGP): lower the intensity of GHG emissions by improving the quality and efficiency of the national beef herd.
- Pasture Profit Index and Pasturebase Ireland aim to optimise grass utilisation.

ABOUT RAMIRAN

The “Recycling of Agricultural, Municipal and Industrial Residues in Agriculture Network (RAMIRAN)” is a research and expertise network dealing with environmental issues relating to the use of livestock manure and other organic residues in agriculture. RAMIRAN evolved in 1996 from the much smaller FAO Animal Waste Network, that had been active since 1978, and the scope was expanded to include other organic residues (industrial and municipal) which can be used on land as a source of nutrients and/or soil conditioners. It is in principal a European network, but has increasingly connected with experts from other parts of the world.

The network provides invaluable means of exchanging ideas, information and experiences on topics that are becoming increasingly important at a national and international level. The main objectives of the network are to:

- Promote the exchange of methodologies, materials and processes;
- Progress knowledge on the environmental assessment of organic residues recycling in agriculture;
- Identify research priorities and initiate innovative collaborative activities that make use of the synergies resulting from the international network

The main activity of RAMIRAN is a scientific conference organized every two years, usually attended by 150-250 participants. The RAMIRAN conferences are respected as the leading event in the field of manure and other organic residues used in agriculture in Europe. They provide an extensive overview of ongoing research and knowledge transfer activities concerning these topics and of the scientists and research groups undertaking them, an important prerequisite to the networking activities that RAMIRAN wants to foster.

RAMIRAN holds a tremendous resource of knowledge and expertise embodied in its members and participants across a wide range of topics particularly for Europe but also including Northern America, Asia and even Oceania. The network represents a unique opportunity to mobilise this resource through joint activities above and beyond the regular conferences. To use this potential, RAMIRAN fosters task groups, short-term teams with a clear task that can be achieved in a defined time of ideally 1-2 years and maximum four years. These tasks make use of the potential of RAMIRAN arising from its membership of experts. This means that, for example, surveys about management techniques, environmental, economic or social issues in connection with manure and other organic residues or interdisciplinary studies are ideal topics for such tasks. One particular success has been the production of a “Glossary of Terms on Livestock Manure Management” which has proved very valuable in harmonizing the use of terms relevant to organic residues and their environmental relevance. This has now been translated into Russian and translation to several other languages is ongoing. Another ongoing task is the development of “Country Manure Profiles” providing an overview of the current practices and knowledge concerning organic residue management in the different countries.

With the theme “’Sustainable utilization of manures and residue resources in agriculture” the 17th RAMIRAN conference in Wexford, Ireland, brings the heart of the RAMIRAN objectives together with the increasing emphasis on sustainable agriculture and sustainable intensification of agricultural systems. With well over 200 participants and over 200 oral and poster contributions at the 17th conference, RAMIRAN continues to go from strength to strength. As Co-chairmen of the Network we thank the organizing and scientific committees for putting together an informative, enjoyable and memorable conference!

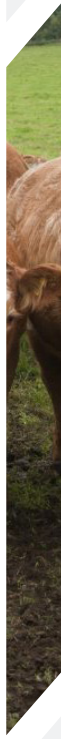
Tom Misselbrook, Harald Menzi

Network Coordinators

RAMIRAN 2017 FULL PROGRAMME

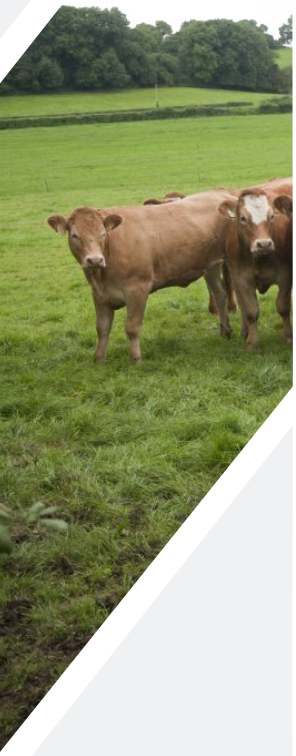
SUNDAY SEPTEMBER 3RD			
17.00 – 19.00	Pre-registration and placement of posters		
20.00 – 22.00	Pre-conference social gathering-Traditional Irish Music evening (Sky and The Ground pub)		
MONDAY SEPTEMBER 4TH			
08:00	Registration and placement of posters		
	Plenary Session 1 McLure 1 *Chair: W. Burchill & G. Lanigan*		
09:00	Welcome from conference organisers		
09:10	Welcome by RAMIRAN network coordinators - **Dr. Harald Menzi & Dr. Tom Misselbrook**		
09:20	Conferencing opening		
09:45 (Keynote)	Sub-Theme 1- Advances in Technologies Paper no. 1 **Prof. Vincent O'Flaherty**, NUI Galway Future advances in waste and organic residue valorisation		
10:10 (Keynote)	Sub-Theme 2 – Crop Nutrition Paper no. 2 **Prof. Lars Stoumann Jensen**, University of Copenhagen Improvement of crop nutrition using manures, wastes and residues		
10:35 (Keynote)	Sub-Theme 3 – Gaseous Emissions Paper no. 3 **Prof. Claudia Wagner-Riddle**, University of Guelph Measurement and abatement of gaseous emissions along the manure management chain		
11:00	**Morning tea & Posters-McLure Lobby and McLure 2**		
	Parallel Session 1		
	McLure 1 *Chair: F. Brennan*	McCarthy *Chair: R. Carolan, L. Rodhe*	Oscar Wilde *Chair: D. Wall*
	B. Sub -Theme 1 – Advances in Technologies	**C. Sub -Theme 3 – Gaseous Emissions**	**D. Sub -Theme 2 – Crop Nutrition**
11:30	**4 Fabrizio Gioelli** Cattle manure bio acidification: effects on gaseous emission and biogas yield.	**14 Alison Carswell** Optimising digestate for reduced nitrogen losses and increased nitrogen use efficiency under a winter wheat crop	**24 Andrea Ehmann** Validation of the fertilizing performance of phosphorus and nitrogen salts recovered from pig manure in on-farm field trials in Germany and Spain
11:45	**5 Younes Bareha** Understanding the organic nitrogen biodegradability during anaerobic digestion: application to ammonium content prediction in digestates.	**15 Jan Huijsmans** Seasonal trends in the emission of ammonia from dairy manure applied to grassland in the Netherlands	**25 Andreas Pacholski** Yield effects and environmental stewardship by application of slurry with nitrification inhibitor to pasture and silage maize

12:00	**6 Sari Luostarinen** Anaerobic digestion of poultry manure in two dry fermentation processes.	**16 Barbara Kitzler** Soil greenhouse gases fluxes from a long term compost experiment in Austria.	**26 David Fangueiro** Slurry acidification using aluminium sulphate: an alternative to sulphuric acid with no limitation on Plant P availability after soil application
12:15	**7 Patrick Dabert** Stability of chemical and microbial composition of digestates along time in agricultural and urban full-scale anaerobic digesters	**17 Harald Menzi** Nitrogen flows of two dairy cows rotational grazing systems with differing diets	**27 Francesc Domingo Olivé** Oil-seed rape yield from residual effect of prolonged manure application on an irrigated maize monoculture system under Mediterranean climate
12:30	**8 Elio Dinuccio** Optimisation of maize stover harvesting chain for biogas production	**18 Sven Gjedde Sommer** Nitrous oxide emission from manure applied to grassland in New Zealand – effect on soil air exchange	**28 Martin Chantigny** Towards efficient use of manure in integrated crop-livestock systems – Soil organic nitrogen matters
12:45-3 min oral	**9 Anne Trémier** May an aerobic pretreatment improve the anaerobic digestion of food waste?	**19 Travis Naylor** Open Path Fourier Transform Infra-red Spectroscopy based technique for measuring emissions from livestock manure management and mitigation strategies	**29 Richie Hackett** Spent mushroom compost as a nitrogen source for spring barley in Ireland.
12:48-3 min oral	**10 Fabrizio Gioelli** Chemical, thermal and mechanic pre-treatments to increase the methane yield of rice straw	**20 Francisco Salazar** Ammonia volatilisation from dairy slurry as affected by application rate and temperature on a volcanic soil	**30 Patrick Forrestal** Evaluating the mineral fertiliser nitrogen replacement value of poultry manure in spring barley cropping
12:51-3 min oral	**11 Joshua Cabell** Reactor experiments on the co-digestion of salmon smolt sludge and dairy cattle manure: opportunities and challenges for increased gas production and improved nutrient cycling.	**21 Kenneth Casey** Changes in nitrous oxide fluxes from feedlot manure in response to temperature and moisture addition	**31 Francesc Domingo Olivé** Effects of the application of solid and liquid fractions from pig slurry on wheat yield and quality
12:54-3 min oral	**12 William Finnegan** DairyWater: Sustainability and resource efficiency for the Irish dairy processing industry	**22 Dominika Krol** The effect of ruminant urine and dung deposition and synthetic nitrogen fertiliser application to pasture on Irish agricultural N2O profile	**32 Michael Gaffney** Compost in Crop Production: The role of feedstock in predicting nutrient availability
12:57 - 3 min oral	**13 Shuji Yoshizawa** Carbon dioxide reduction via carbon-sequestration by food waste biochar using in farmland from a life-cycle perspective	**23 Andre Bannink** Use of a Tier 3 method for enteric methane to estimate faecal N digestibility and ammoniacal N excretion in dairy cows	**33 Ian Fox** Effect of soil type on phosphorus availability from dairy slurry.



13:00	Lunch-Terrace Restaurant		
	Parallel Session 2		
	McLure 1 *Chair: A. Tremier*	McCarthy *Chair: O. Carton, O. Fenton*	Oscar Wilde *Chair: G. Shortle*
	E. Sub-Theme 1 – Advances in Technologies & Sub-Theme 3 – Gaseous Emissions	**F. Sub-Theme 4 – Soil & Water Quality**	**G. Sub-Theme 5 – Adoption & Impact & Sub -Themes 2 – Crop Nutrition**
14:00-15 min oral	**34 Philip Moore** Inexpensive Alternatives to Alum for Reducing Ammonia Emissions and Phosphorus Runoff from Manure *Sub-Theme 1*	**48 Denis Angers** Animal manure and sequestration of atmospheric carbon in soils	**62 Iris Beckert** Verification of gaseous emissions from land-applied manure – Revision of the VERA test protocol "land applied manure"
14:15-15 min oral	**35 Tavs Nyord** On-line monitoring of nutrients (NPK) in liquid manure by a nuclear magnetic resonance (NMR) sensor installed directly at a spreader *Sub-Theme 1*	**49 Ivan Dragicevic** Environmental implications of aluminium and chromium release from soils amended with biogas digestates	**63 Pat Murphy** NMP-Online – A nutrient management planning system to support improved efficiency and environmental outcomes from organic and chemical fertiliser application on Irish farms
14:30-15 min oral	**36 Michael Gaffney** Characterisation of various composted wastes: using multivariate data analysis to assess the influence of feedstock and potential nutrient availability *Sub-Theme 1*	**50 Patricia Garnier** PAH dynamic in agricultural soils amended with composts: experiments and modeling with the "VSOIL" platform	**64 Piet Derikx** Handheld NIR method to distinguish between heated and unheated manure fractions
14:45-15 min oral	**37 Mônica Sarolli Silva De Mendonça Costa** Reduction of the composting time of agro-industrial wastes: effect on the main control parameters *Sub-Theme 1*	**51 Francis Larney** Legacy effects of one-time applications of manure amendments to artificially eroded soils	**65 Silvia Silvestri** A new method and integrated approach for sustainable management of animal manure and slurry in alpine ecosystems.
15:00-3 min oral	**38 Francoise Watteau** Microplastic detection in soil amended with municipal solid waste composts as revealed by microscopy and pyrolysis/GC/MS *Sub-Theme 1*	**52 Fiona Nicholson** Effect of repeated organic material additions on soil quality	**66 Rachael Carolan** Relative contribution of manure phosphorous fractions to soluble and plant available soil phosphorous following simulated land application *Sub-Theme 5*

15:03-3 min oral	**39 Thomas Ducey** Hydrothermal carbonization of livestock waste for the elimination of pathogens, antibiotic resistance genes, and the creation of sustainable byproducts for re-use in the agricultural sector. *Sub-Theme 1*	**53 Paula Alvarenga** Effects on soil chemical and biochemical status from recycling organic wastes to agricultural land: results from a field experiment	**67 María Alejandra Herrero** Development of a manure management decision support tool for dairy farmers in Argentina *Sub-Theme 5*
15:06-3 min oral	**40 Raul Moral** Effect of inorganic carbon and natural organic matter in the efficiency of nitrogen recovery from liquid waste fluxes using gas-permeable membranes *Sub-Theme 1*	**54 Michael Müller** Monitoring heavy metal accumulation in Swiss grassland soils	**68 Carlos Ortiz** An integrated management of nitrogen: from farm to soil. LIFE+ project FUTUR AGRARI *Sub-Theme 5*
15:09-3 min oral	**41 Mônica Sarolli Silva De Mendonça Costa** Optimization of the composting lenght of agro-industrial wastes and its effects on compost maturity *Sub-Theme 1*	**55 Julen Urra** Long-term influence of sewage sludge on the presence and abundance of mobile genetic elements and antibiotic resistance genes in soil	**69 Patricia Garnier** Effect of organic fertilizers and sugarcane mulch mixture on decomposition rate, CO2 and N2O Emissions *Sub-Theme 5*
15:12-3 min oral	**42 Brigitte Eurich-Menden** Assessment of emission factors for different dairy cattle housing systems in germany – measurement approach and first results *Sub-Theme 3*	**56 Josefine Elving** Survival of pathogens and indicator organisms during storage of digested residues following pre- or post-hygienization	**70 Renaldas Žydelis** The effect of different organic fertilizers on grain maize under cool climate *Sub-Theme 2*
15:15-3 min oral	**43 Maria Cruz Garcia-gonzalez** Gas-permeable membranes to abate ammonia emissions from livestock wastes: developing the life project ammonia trapping *Sub-Theme 3*	**57 Agathe Auer** Survival of enteroviruses in mesophilic anaerobic digesters	**71 Susanne Eich-Greatorex** Presented by Trine Sogn Biogas digestate as NPK fertilizer *Sub-Theme 2*
15:18-3 min oral	**44 Cecilia Palmborg** Low nitrogen losses indoors compared to outdoor storage for sheep deep litter in northern Sweden *Sub-Theme 3*	**58 David Flynn** Effects of Long-term Nutrient Fertilization on Root Decomposition in an Agricultural Grassland	**72 Ziadi Noura** Effect of biochar amendments on greenhouse crop productivity and on the nutrient and water use efficiency *Sub-Theme 2*



15:21-3 min oral	**45 Ian Kavanagh** Mitigation of ammonia and greenhouse gas emissions from stored cattle slurry using acidifiers and chemical amendments *Sub-Theme 3*	**59 Paula Alvarenga** Chemical and ecotoxicological effects of the use of drinking-water treatment residuals for the remediation of soils degraded by mining activities	**73 Marta Aranguren** Nitrate and ammonium dynamic in soil solution after applying animal manure in a wheat greenhouse experiment *Sub-Theme 2*
15:24-3 min oral	**46 Fabrice Guiziou** Impact of digestate post-processing strategies on gaseous emission *Sub-Theme 3*	**60 Daniela Bona** Application of an early monitoring tool to assess the effects on soil microbial biomass of organic fertilizers and soil conditioners in different soils	**74 Etienne Michel** Effect of phosphorus fractionation in sludge on P dynamics in agroecosystem *Sub-Theme 2*
15:27-3 min oral	**47 David Kelleghan** Modelling ammonia emissions from broiler production in Cavan and Monaghan *Sub-Theme 3*	**61 Jan Klir** The fate of the nitrogen leached from the heaps of farmyard manure into the soil	**75 S.M. Ashekuzzaman** Seasonal assessment of major and micro nutrients content in dairy processing sludge: what potential for agricultural re-use? *Sub-Theme 2*
15:30	**Afternoon tea (McLure Lobby)**		
15.30-17.30	**Poster Session 1 (Mclure 2)**		
17:30-19:30	**RAMIRAN Task Group Meetings (McCarthy)**		
19:00-20:00	**Whiskey Tasting**		
20:00	**Conference Dinner (McLure 1 & 2)**		
TUESDAY SEPTEMBER 5TH			
	Plenary Session 2 McLure 1 *Chair: S. Bittman, S. Lalor*		
9:00 (Keynote)	H. Sub-Theme 4 - Soil & Water Quality **Paper no.76** **Dr. Gary Feyereisen**, USDA-Agricultural Research Service Land-applied Manures & Residues: Water and Soil Quality Considerations		
9:25 (Keynote)	Sub-Theme 5 - Adoption & Impact **Paper no. 77** **John Williams**, RSK-ADAS Science into Action – How do we get the messages across?		
9:50 (Keynote)	Sub-Theme 3 – Gaseous Emissions **Paper no. 78** **Prof. Gary Lanigan**, Teagasc Johnstown Castle Optimising Manure Management in Ireland		
10:05	**Morning tea & Posters-McLure Lobby**		

Parallel Session 3			
	McLure 1 *Chair: K. Casey*	McCarthy *Chair: B. Eurich-Menden, J.Venglovsky*	Oscar Wilde *Chair: T. Boland, M. Plunkett*
	I.Sub -Theme 3- Gaseous Emissions	**J. Sub -Theme 4 – Soil & Water Quality**	**K. Sub-Theme 5 – Adoption & Impact**
10:30-15 min oral	**79 David Rowlings** Composting as a means of minimising greenhouse gas emissions from the Australian intensive animal industry manure supply chain	**87 Mark Healy** Treatment of agricultural wastewater using chemical amendments – a summary of 8 years of research	**95 Michael Holly** Environmental impact of Dairy Production Trends in the United States and Recommendations for Abatement
10:45-15 min oral	**80 Nicholas Hutchings** Reducing GHG emissions from manure as a contribution to achieving Effort Sharing Regulation targets	**88 Andrew Sharpley** Sustainable Manure Management and Water Quality: Regulatory Constraints and Practical Realities	**96 Ina Körner** Challenges of kitchen waste collection for decentralized systems
11:00-15 min oral	**81 Nicolas Auvinet** On-site quantification of methane leaks from an agricultural biogas plant through three different methods	**89 Shabtai Bittman** Towards regional integration of waste resources in a peri-urban region in Canada	**97 Veronica Charlon** Environmental regulations on dairy waste management in South America countries
11:15-3 min oral	**82 Rachael Carolan** Gross nitrogen transformations in 15N labelled cattle slurry under simulated winter storage conditions	**90 Daniel Munro** Nutrient losses from solid manures stored in temporary field heaps	**98 María Alejandra Herrero** Manure management in dairy farms in Argentina and brazil: perceptions and demands from dairy professionals and farmers
11:18-3 min oral	**83 Stuart Kirwan** Effect of supplementary carbohydrate source on nitrogen excretion in beef heifers	**91 David Fangueiro** Effect of slurry treatment by acid or DMPP addition on nitrification potential after soil application	**99 Sari Luostarinen** Normative manure system as a tool towards enhanced manure use in Finland
11:21-3 min oral	**84 Juliette Maire** Identifying excreta patches on intensively grazed grassland using aerial imagery captured from an Unmanned Aerial Vehicles (UAV)	**92 Jan Venglovsky** Pollution of surface and ground water by non-point sources related to agricultural activities	**100 Masayuki Hojito** Nitrogen Flow in an Organically Managed Beef Farm in Hokkaido, Japan
11:24-3 min oral	**85 Yael Laor** Effects of pomegranate nutritional additives on the dynamics of VOCs and odorants emissions from cattle manure	**93 Karoline D'Haene** Effectiveness of unfertilised cultivated buffer strips to reduce phosphorus loads	

11:27-3 min oral	**86 Zuzana Palkovičová** Differences in amounts of greenhouse gas emission factors and emissions from enteric fermentation and manure management of Slovakian dairy cows between 2014 and 2015	**94 Julie Jimenez** Deciphering the organic matter kinetics of fresh and dried cattle farmyard manure thanks to organic matter fractionation and litter bags soil incubation assay	**102 Laurence Loyon** Manure management in France: a review of current data available for poultry, cattle and pig production
11:30	**Poster Session 2 (McLure 2)**		
12:30	**Packed lunch distributed for Field Trips**		
13.00–17.30	**Field Trips**		
	Johnstown Castle Research Centre	Agricultural Catchment Site	
18:00-21:00	**Viking BBQ at the National Heritage Park, Ferrycarrig, Wexford**		
WEDNESDAY SEPTEMBER 5TH			
	Parallel Session 4		
	McLure 1 *Chair: P. Balsari, T. Curran*	*McCarthy* *Chair: P. Forrestal, A. Sharpley*	Oscar Wilde *Chair: C. Marques-dos-Santos Cordovil*
	L. Sub -Theme 3 – Gaseous Emissions	**M. Sub -Theme 2 – Crop Nutrition & Sub -Theme 4 – Soil & Water Quality**	**N. Sub -Theme 1 – Advances in Technology**
9:00	**103 John McIlroy** Measurement and abatement of ammonia emissions (NH3) from naturally ventilated dairy cow house concrete floor surfaces under simulated north-west European conditions	**109 Eeva-liisa Viskari** Fertilizer potential and environmental benefits of the use of source separated urine as fertilizer Sub-theme 2	**115 Co Daatselaar** Economic, environmental and social sustainability of bioecosim, an innovative manure processing technology
9:15	**104 Romain Girault** Impact of the experimental design on the quantification of gaseous emissions during the storage of solid digestate: a lab–scale study	**110 Sofia Delin** Optimal placement of pelleted organic fertilizers *Sub-theme 2*	**116 Maria Pilar Bernal** Evaluation of the slurry treatment system in a pig farm based on solid-liquid separation and composting
9:30	**105 Anders Leegaard Riis** The effect of pH stability and ammonia emission on the frequency of acidification treatment of the slurry in a pig house	**111 Peter Sørensen** Anaerobic co-digestion of cattle manure and straw causes sulphate immobilisation in soil irrespective of digestion temperature *Sub-theme 2*	**117 Marie-Line Daumer** Substitution of chemical acidification by a biological process to dissolve phosphorus and produce struvite upstream from anaerobic digestion of pig slurry
9:45	**106 Francesca Perazzolo** Modelling ammonia emissions from slurry storage	**112 Stephen Nolan** Pathogen survival in anaerobic co-digestion of slurry with organic waste *Sub-theme 4*	**118 Matias Vanotti** Recovery of amino acids and phosphorus from manure

10:00	**107 William Burchill** Ammonia emissions from naturally ventilated buildings in Ireland	**113 Qing Chen** Phosphorus transformation affected by manure application in alkaline soil *Sub-theme 4*	**119 Giorgio Provolo** Effect of additives on phosphorus, copper and zinc separation in raw and digested animal slurries
10:15	**108 Lena Rodhe** Greenhouse gases from cattle slurry in full-scale storage during summer – crust treatments to reduce nitrous oxide emissions	**114 Susanne Eich-Greatorex** Soil amendment effects of biogas digestates *Sub-theme 4*	**120 Lydia Fryda** Can Biochar bring more manure in the soil? Exploring options and concepts
10:30	**Morning tea-McLure Lobby**		
	Plenary Session 3 McLure 1 *Chair: H. Menzi, T. Misselbrook*		
11.00	**Co-Chair Reports for Sub -Themes 1, 2, 3, 4 and 5**		
12:00	**Open Discussion** –focused on conference outcomes and their implications for research, policy, knowledge transfer and implementation at farm level to achieve sustainable utilisation of manures and residue resources in agriculture		
12:45	**Conference Summary, Poster Prize, announcement of New RAMIRAN Task groups, announcement of next RAMIRAN organisers & close**		
13.00	**End of conference- lunch in Terrace Restaurant**		
14:00-16:00	**Kick off meeting for New RAMIRAN Task Groups**		