

International Interdisciplinary Conference on Land Use and Water Quality

Agriculture and the Environment

Aarhus, Denmark, 3–6 June 2019



Volume of Abstracts

Compiled by Brian Kronvang, Dico Fraters and Karel Kovar

Organisation



Co-organisers



LuWQ2019

International Interdisciplinary Conference

on

Land Use and Water Quality Agriculture and the Environment

Aarhus, Denmark,

3 June - 6 June 2019

Final Conference Programme

Version 26 May 2019



International Interdisciplinary Conference on
Land Use and Water Quality
Agriculture and the Environment
Aarhus, Denmark, 3-6 June 2019

Jointly convened by

- DCE - Danish Centre for Environment and Energy, Aarhus University, Denmark
- Department of Bioscience, Aarhus University, Denmark
- National Institute for Public Health and the Environment (RIVM), the Netherlands
- Geological Survey of Denmark and Greenland (GEUS), Denmark
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OUR LAND
AND WATER

Toitū te Whenua,
Toiora te Wai



Tuesday, 4 June 2019

07:30-17:30 Registration / Conference secretariat desk open PowerPoint presentations to be uploaded at the conference secretariat desk			
07:30-15:30 Posters to be installed, see instructions on page 5			
<i>PLENARY Lecture Hall: Mathematics Building Auditoria E</i>			
Session B.ii & C.i : Water quality monitoring & Impact of climate change on land use and water quality Chairs: Chantal Gascuel-Odoux (France) & Roland Stenger (New Zealand)			
08:30 – 09:00 <i>C. Heidecke, S. Klages, B. Osterburg:</i> The impact of agricultural production and policy on water quality during the dry year 2018 (Abstract #160)			
09:00 – 09:20 <i>P.A. Chambers, K.J. Rattan:</i> Hydrological variability affects particulate nitrogen and phosphorus in streams of prairie Canada (Abstract #217)			
09:20 – 09:40 <i>J. Rozemeijer, B. van der Grift:</i> Monitoring for a spatial targeting approach for nutrients (Abstract #195)			
09:40 – 10:00 <i>F. Hilliges:</i> Opportunities and limits of official reporting data for scientific purposes in groundwater protection (Abstract #065)			
10:00-10:45 Coffee break, including 15 minutes' walk to Lakeside building			
<i>Lecture Hall:</i> <i>Eduard Biermann Auditoriet</i>	<i>Lecture Hall:</i> <i>Jeppé Vontilius Auditoriet</i>	<i>Lecture Hall:</i> <i>Merete Barker Auditoriet</i>	<i>Lecture Hall:</i> <i>William Scharff Auditoriet</i>
Session D.iii Evaluation of Action programmes	Session F.i Bufferstrip & wetlands to reduce losses	Session HI.i Economics of programmes & finding effective tools	FAIRWAY Workshop
Chairs: Thomas Harter (USA) & Mariëlle van Vliet (Netherlands)	Chairs: Marianne Bechmann (Norway) & Martin Schönhart (Austria)	Chairs: Bob Middleton (United Kingdom) & Natalie Phillips (United Kingdom)	Chairs: Gerard Velthof (Netherlands)

10:45-11:00 <i>R.D.R. Turner, M.St.J. Warne, R. Wallace, C. Neelamraju, B. Ferguson, R.M. Mann, R.A. Smith, A.M. Davis:</i> The increasing risk of imidacloprid in Australia's Great Barrier Reef catchments (Abstract #144)	10:45-11:00 <i>E. Valkama, K. Usva, M. Saarinen, J. Uusi-Kämppä:</i> Nitrogen retention by buffer zones in surface runoff and groundwater: A meta-analysis (Abstract #017)	10:45-11:00 <i>P. Thorburn, J. Biggs, L. McMillan, T. Webster, Y. Everingham:</i> Insurance as a tool to help farmers mitigate nitrogen pollution from intensive cropping (Abstract #091)	10:45-11:00 <i>G. Velthof:</i> Introduction
11:00-11:15 <i>G.K. Bedford, E. Graham, R. Storey:</i> Regional-scale stream health responses to riparian management (Abstract #036)	11:00-11:15 <i>G. Quaglia, I. Joris, S. Broekx, N. Desmet, W. Boënne, K. Koopmans, P. Seuntjens:</i> Mitigating pesticide levels in surface waters: Long-term surface water monitoring in an agricultural catchment (Abstract #104)	11:00-11:15 <i>M. Strauch, A.F. Cord, A. Jungandreas, A. Kaim, M. Volk:</i> Land use optimization based on scenario analysis: An approach to foster multifunctionality in agricultural landscapes (Abstract #220)	11:00-11:15 <i>N. Surdyk, S. Klages, C. Christophoridis, D. Doody, B. Hansen, C. Heidecke, A. Henriot, H. Kim, S. Schimmelpfennig:</i> Agri-drinking water indicators (ADWIs): Linkage between agricultural practice and good drinking water quality (Abstract #078)
11:15-11:30 <i>A. van der Wal, P. van Beelen:</i> Long-term field observations may indicate phosphate leaching in sandy agricultural soils (Abstract #067)	11:15-11:30 <i>D. Zak, M.V. Carstensen, J. Audet, C.C. Hoffmann, S. Hille, M. Knudsen, B. Kronvang, M. Stutter, J. Stockan, H. Watson, H.S. Jensen, S. Egemose, J.A. Strand, P. Feuerbach, B. Christen, G. Heckrath:</i> The multi-functionality of integrated buffer zones in Northwest Europe (Abstract #120)	11:15-11:30 <i>T.C. van Leeuwen, M.W. Hoogeveen, C.H.G. Daatselaar:</i> Best performing dairy farms in the Netherlands: Their results, strategy and management (Abstract #256)	11:15-11:30 <i>R.K. Laursen, J. Williams, F.A. Nicholson, L. Tandler, R. Cassidy, P. Schipper, K. Verloop, J. van Vliet:</i> Decision support tools for reduction of nitrate and pesticide pollution from agriculture (Abstract #118)

11:30-11:45 <i>C. McClain</i> , L. Wilson, B. Mayer, P. Humez, M. Nightingale, M. Nasr: Nitrate occurrence in groundwater of Alberta, Canada (Abstract #106)	11:30-11:45 <i>C. Kjaergaard</i> , C.C. Hoffmann, B.V. Iversen: Constructed wetlands targeting nutrient removal in agricultural drainage discharge: A new cost- effective mitigation strategy in Denmark (Abstract #238)	11:30-11:45 <i>A.L. Collins</i> , Y. Zhang: The effectiveness of on-farm measures for delivering multiple benefits: Integrating farm surveys and modelling to co- design solutions at landscape scale (Abstract #013)	11:30-11:45 <i>M.C. Commelin</i> , P. Groenendijk, J. Baartman, S. Klages, I. Calciu, A. Ferreira. M. Graversgaard, I Wright, V. Geissen, O. Oenema: Effectiveness of agricultural management practices to reduce pesticide pollution to ground and surface waters – a meta-analysis (Abstract #180)
11:45-12:00 <i>A. Sofo</i> , A.N. Mininni, C. Crecchio, P. Ricciuti, C. Xiloyannis, B. Dichio: Water and soil quality in Mediterranean orchards managed with sustainable or conventional systems (Abstract #055)	11:45-12:00 <i>C. Tanner</i> , J.P.S. Sukias, S.T. Larned: How much wetland would be needed for 20% and 40% reduction in agricultural nitrogen loads into Te Waihora / Lake Ellesmere? (Abstract #149)	11:45-12:00 <i>M.J. Gutierrez Gines</i> , D. Clarke, V. Baker, I. Alderton, R. Simcock, G. Tupuhi, B.H. Robinson, M. Taylor, J. Efford, T. Nikau, T.R. Biddle, T. Moana, J. Horswell: Water quality, ecosystem restoration and traditional knowledge (Abstract #015)	11:45-12:00 <i>P. Groenendijk</i> , M. Commelin, S. Klages, I. Calciu, A. Ferreira. M. Graversgaard, I Wright, O. Oenema: Review of measures to decrease nitrate pollution of drinking water (Abstract #182)
12:00-12:15 <void slot, to be used by session chairs>	12:00-12:15 <i>J. Audet</i> , A. Kjeldgaard, S.E. Larsen, N.B. Ovesen, D. Zak, C.C. Hoffmann: Nutrient retention in restored riparian wetlands in Denmark (Abstract #117)	12:00-12:15 <void slot, to be used by session chairs>	12:00-12:15 <i>A.E. Boekhold</i> , B.I. Wright, J. Rowbottom, K. Dudman, F.M. Platjouw, S. Wuijts: Innovative governance approaches to protect drinking water resources against nitrate and pesticide pollution from agriculture (Abstract #167)
12:15 – 13:45 Lunch (no walk)			
<i>Lecture Hall: Eduard Biermann Auditoriet</i>	<i>Lecture Hall: Jeppe Vontilius Auditoriet</i>	<i>Lecture Hall: Merete Barker Auditoriet</i>	<i>Lecture Hall: William Scharff Auditoriet</i>
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Skarbøvik E., Kronvang B., Kyllmar K., Rankinen K.

Abstract number–53 Setting reference conditions for nutrients in Nordic surface waters: Methodologies, levels, uncertainty and management implications

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Reference condition (RC), defined as the natural or minimally disturbed state of water bodies, is an important part of the Water Framework Directive (WFD) for determination of water quality and ecological targets. Linked to this is the amount and impact of measures needed to reach the environmental targets, which means that realistically set RCs are important for both managerial and economic reasons. In this paper we explore how RCs of nutrient concentrations and loads are adopted in the Nordic countries of Denmark, Finland, Norway and Sweden, with comparison to other countries (rest of Europe, US, Canada). We investigate the methods applied to define RCs in the different countries, and assess if the choice of method have given disparate RC levels for similar water typologies. We also compare water typologies for which RCs have been particularly difficult to set, with particular focus on water bodies in marine clay areas, calcareous soils, and peatlands. Finally, we discuss some managerial and economic implications of the uncertainty in RCs.

Sofa A., Mininni A.N., Crecchio C., Ricciuti P., Xiloyannis C., Dichio B.

Abstract number–55 Water and soil quality in Mediterranean orchards managed with sustainable or conventional systems

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Climate change, in terms of increased temperature and extreme precipitation regimes, will have agricultural consequences due to the interrelations between climate, land and water use, soil degradation and landscape changes. At the same time, conservation agriculture offers new chances to adapting and mitigating climate change. In sustainable agro-forestry systems, management practices are able to increase carbon (C) inputs into the soil and possibly reduce GHGs emissions due to some revised field operations (e.g., irrigation techniques, use of recycled water, pest and disease management, fertilization, soil and plant farming systems). Carbon enrichment increases biological activities by improving soil structure, as well as the soil moisture and nutrient contents, that are beneficial to plant growth and production. This study reports results on the effects of changed soil management practices of Mediterranean orchards from conventional management (Cmng: soil tillage, mineral fertilizers, burning of pruning residues) to sustainable management (Smng: no-tillage, pruning residues, cover crop retention, and compost application) on water quality and management, plant microbiota and physiological status, soil

microbiota and organic carbon (SOC). Results show that an 18-year period of Smng (including C inputs at a mean rate of 8-9 t C ha⁻¹ year⁻¹) increased SOC concentration (from 1.0-1.3% w/w up to 1.7-2.0% in the topsoil) and soil water retention (up to 40% more) and permeability (from 13 to 160 mm H₂O day⁻¹), so allowing farmers to save irrigation water and improve soil structure. A correct irrigation management had a key role in the potential role of orchards in C sequestration (soils become from C sources to C sinks) and in the consequent greenhouse effect mitigation. Indeed, compared to dry areas, wetted soils generally had a higher microbial respiration and SOC mineralization, and a faster bacterial C and N turnover. Finally, the Smng brought beneficial effects on plant yield, that can be improved by 30-50%, compared to Cmng. The effects of endogenous C additions on the reserves of soil water and nutrients (N, P, K, Ca, Mg), and on CO₂ soil emission are also discussed. Promoting cost-effective sustainable land use strategies can avoid SOC decline, soil erosion and soil degradation, with consequent benefits in terms of reduced irrigation volumes and higher water quality. The results obtained could promote the development of new sustainable approaches for optimizing irrigation, soil C and N cycling and nutrient transport, and for sustaining and improving plant yield and quality.

Jensen D.M.R., Egemose S., Thomsen A.T.H., Larsen T.

Abstract number–57 Variations in the Danish permit practice and the resulting differences in urban discharge of stormwater to the recipients

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In Denmark, climate changes and increasing urbanisation have pushed for new stormwater management strategies. To accommodate this need, Danish government required all municipalities to make climate change adaptation plans before the end of 2013, and 350 M euro was reserved to be invested in climate adaptation measures. For some municipalities, this has been supplemented with a cloudburst management plan, qua recommendations made by the Danish Wastewater Committee in 2017. These plans all largely rely on separating rainwater from sewers and handling it in surface-near and nature-based solutions before discharging to the natural water system - an approach which blurs the line between technical structures and the natural water environment, and causes an increase in the load onto the recipients. Concurrently environmental targets have been set for the recipients, rooted in e.g. the EU Water Framework Directive.