

**RAMIRAN 2015 – 16th International Conference
Rural-Urban Symbiosis**

Abstract book

8th – 10th September 2015

Hamburg University of Technology, Germany

Impressum

TuTech Verlag
TuTech Innovation GmbH
Harburger Schloßstr. 6-12
21079 Hamburg
Phone +49 40 76629-0
E-Mail verlag@tutech.de
www.tutechverlag.de

Edited by Ina Körner
Institute of Wastewater Management and Water Protection
Hamburg University of Technology (TUHH)
Hamburg, Germany

With the assistance of
Gerlinde Löbkens, TuTech Innovation GmbH, Hamburg, Germany
Steffen Walk, Institute of Wastewater Management and Water Protection, TUHH

This book was carefully produced. Nevertheless we do not warrant the information contained to be free of errors. The designations employed in this book imply the opinions of the respective authors.

Photos and drawings:
Christiane Lüdke (11, 41, 80, 155)
BioResourceInnovation, Ina Körner (1, 5, 64, 73, 106, 124, 146, 178)

All rights reserved.
© TuTech Innovation GmbH

ISBN: 978-3-941492-95-0

Organizing Committee

Conference Chairs

Körner, Ina
Otterpohl, Ralf

Hamburg University of Technology (TUHH), Germany

Local Organizer

Löbkens, Gerlinde

TuTech Innovation GmbH (TuTech)

Organizing Committee

Becker, Gisela, TUHH
Behrendt, Joachim, TUHH
Deipser, Anna, TUHH
Factura, Horacio, TUHH
Kilian, Jochen, TuTech
Kuscu, Binur, TUHH
Ogun, Moses, TUHH
Peters, Ilona, TuTech
Petersen, Eva, TUHH
Rusch-Fehrmann, Stephanie, TUHH
Soetijono, Ersalina, TUHH
Ramaswami, Sreenivasan, TUHH
Walk, Steffen, TUHH
Wiebusch, Andreas, TUHH
Zahedi, Ali, TUHH

Further support:

Badri, Amirezza (TUHH); Eggers, Susanne (TUHH); Funke, Axel (TUHH);
Deegener, Stefan (TUHH); Hasselder, Marcel (TUHH); Hertel, Saskia (TUHH);
Huhn, Lukas (TUHH); Gulyas, Holger (TUHH); Jungnickel, Thilo (TuTech);
Schaldach, Ruth (TUHH); Sommerfeld, Susanne (TuTech); Napp, Jonas (TUHH);
Ohlrogge, Christoph (TUHH); Puzies, Martin (TUHH); Westhof, Lena (TUHH);
Zhou, Meiyue (TUHH)

We would like to thank all organizers and supporters as well as the numerous helpers not mentioned by name.

Scientific Committee

Aguilera-Correales, INSTEC, Yuri, Cuba
Amon, Barbara, Leibniz Institute for Agricultural Engineering, Germany
Amon, Thomas, Leibniz Institut for Agricultural Engineering, Germany
Arensten, Maarten, University of Twente, The Netherlands
Balsari, Paolo, University of Turin, Italy
Behrendt, Joachim, Hamburg University of Technology, Germany
Bernal, Maria Pilar, Consejo Superior de Investigaciones Científicas, Spain
Candra Dewi, Ova, BORDA Indonesia Network/LPTP, Indonesia
Chadwick, David, Bangor University, United Kingdom
Cordovil, Claudia, University of Lisbon, Portugal
Dabert, Patrick, IRSTEA, France
Deipser, Anna, Hamburg University of Technology, Germany
Delin, Sofia, Swedish University of Agricultural Sciences, Sweden
Duta Capra, Anca, University of Transilvania, Romania
Ezebuoro, Christpeace, National Biotechnology Development Agency, Nigeria
Fabbricino, Massimiliano, Università degli Studi di Napoli, Italy
Houot, Sabine, French National Institute for Agricultural Research, INRA, France
Jönsson, Håkan, University of Agricultural Sciences, Sweden
Körner, Ina, Hamburg University of Technology, Germany
Koutev, Vesselin, Soil Science Institute, Bulgaria
Kranert, Martin, Universität Stuttgart, Germany
Kupper, Thomas, Berner Fachhochschule, HAFL, Switzerland
Martinez, José, IRSTEA, France
Menzi, Harald, Agroscope, Posieux, ALP, Switzerland
Misselbrook, Tom, Rothamsted Research, United Kingdom
Mutnuri, Srikanth, Birla Institute of Technology & Science, India
Nardoslawsky, Michael, University of Graz, Austria
Otterpohl, Ralf, Hamburg University of Technology, Germany
Pacholski, Andreas, Leuphana Universität Lüneburg, Germany
Provolo, Giorgio, University of Milan, Italy
Sanz-Cobena, Alberto, University Polytechnic Madrid, Spain
Scholwin, Frank, Institut für Biogas, Kreislaufwirtschaft und Energie, Germany
Siebert, Stefanie, European Compost Network ECN e.V., Germany
Sommer, Sven, University of Southern Denmark, Denmark
Stegmann, Rainer, IWWG, Germany
Thorman, Rachel, ADAS, Cambridge, United Kingdom
Tremier, Anne, IRSTEA, France
Venglovsky, Jan, University of Veterinary Medicine and Pharmacy, Slovakia
Vinneras, Björn, University of Agricultural Sciences, Sweden
Visvanathan, Chettiyappan, Asian Institute of Technology, AIT, Thailand
Wendland, Claudia, WECF, Germany
Ward, Shane, University College Dublin, Ireland
Wulf, Sebastian, KTBL, Germany

Preface

Residues originate in rural and in urban systems. Many contain biogenic ingredients, e.g. food and green waste, livestock manure, feces, sewage and other sludge's, harvest residues, digestates, agro-industry residues, and more. Commonly residues are known to pollute environments, cause hygienic problems or they are cost-intensive to collect and treat. Since fossil raw materials are becoming scarce, biogenic residues are more and more a topic of utilization. Application options are manifold. They range from energetic utilization, e.g. to provide electricity and heat for households, industries and agricultural facilities, up to substantial applications ranging from bulk products such as composts and specific products like mineral fertilizers or biochemicals. A special challenge is the interface between rural and urban systems. In this context the mutual understanding is often limited, usually due to a lack of knowledge or contradicting interests.

The conference aims at providing information on the state-of-the-art and on innovations, strengthening cooperation and interconnections among different stakeholders and working out deficits as well as finding solutions for a better understanding and for improved material flows.

The abstract book contains conference contributions to following areas:

- Keynotes on interdisciplinary issues (K: 3 oral presentations)
- Quality fertilizers from residues (TA: 29 oral presentations and 22 posters)
- Sustainable soils (TB: 8 oral presentations and 6 posters)
- Advances in emission prevention (TC: 25 oral presentations and 17 posters)
- The bioresource challenge (TD: 21 oral presentations and 8 posters)
- Sustainable regions (TE: 22 oral presentations and 12 posters)
- General thematic lectures (G: 5 oral presentations)

To deepen networking and to strengthen interdisciplinary not only among researches, but also with practitioners, politicians and public, some further initiatives were included in the conference:

- Podium discussion on rural-urban symbiosis
- Science and art presentations
- Manure management post-conference workshop
- Urban gardening post-conference workshop

The conference was attended by more than 200 delegates from more than 30 countries. Additional to the abstracts, reviewed 4-page-papers are available from the RAMIRAN webpage (www.ramiran.net). Selected contributions were additionally invited for a more detailed publication in a special issue of the open-access online Journal „Energy, Environment & Sustainability“.

Ina Körner
Conference Chair

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 are used on land as organic manures and soil amendments. It is in principal a European network, but it is also open to interested experts from other parts of the world.

The network provides an 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 manure and other organic residues. This overview of *who is who* and *who does what* is an important prerequisite to the networking activities that RAMIRAN wants to foster.

With its participants, RAMIRAN holds a tremendous resource of knowledge and expertise in a wide range of topics across the whole of Europe and some countries in Northern America, Asia and even Oceania. The network represents a unique opportunity to mobilise this resource through network 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. Past examples include residual Nitrogen effects from organic residues, anaerobic digestion and utilization of digestates. In 2003 and 2011 a group produced 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. At the 2013 conference in Versailles, it was suggested that the Glossary should be translated into different languages (a Russian version is now available) and that RAMIRAN should support its members to produce "Country Manure Profiles" providing an overview of the current practices and knowledge concerning organic residue management in the different countries.

With the special topic "Rural-Urban Symbiosis" the 16th RAMIRAN conference is focusing on closing the loop linking rural production and urban consumption systems and on the development of more sustainable solutions for the handling of residues. Once again this reflects the changing perception from waste and emissions towards benefits and resource use efficiency that has occurred throughout the lifetime of RAMIRAN. As Co-chairmen of the Network we thank the organizers for arranging this exciting and successful conference!

Tom Misselbrook and Harald Menzi
Network Coordinators

Thematic areas of RAMIRAN 2015

TA: Quality fertilizers from residues

Agricultural production depends on the supply of plants with nutrients. Efficiency in agricultural production considers not only yields, but also product qualities and fertilizer footprints. Fertilizers provide nitrogen (N), phosphorous (P), potassium (K), calcium (Ca), magnesium (Mg), and sulphur (S) as macronutrients in varying proportions and forms. Furthermore micronutrients are needed in trace amounts, which are valuable not only for plant production, but also in follow up chains such as food consumption or anaerobic digestion. Trace nutrients in many foods have declined over the last half century and rock phosphate as the main source of P fertilizers will deplete in 50-100 years. In some locations, over-fertilization leads to water contamination, while in others high fertilizer prices leads to nutrient deficiencies in soils. The main source for N fertilizers is ammonia generated via the energy intensive Haber-Bosch process from atmospheric N. It is estimated that this process alone demands around 1.4% of the world's total energy consumption. Agricultural, municipal and industrial residues contain varying quantities of N, P and other nutrients and trace elements. They are often disposed of with environmentally damaging effects or through costly treatment processes e.g. by waste water treatment or incineration.

TB: Sustainable soils

Soil is a living body. It is a complex medium comprising mineral particles, organic matter, water, air and living organisms. Soil is an essential, very slowly-renewable resource, which provides many vital ecosystem services such as food and the production of other bioresources as well as filtration and retention of toxic substances and nutrients. Demands on soil are increasing as the world population and the per capita food demand continue to grow. In addition, the pressure to reduce consumption of fossil resources has led to a growing demand to provide bioresources as alternative sources for energy and raw materials. Soil overuse is increasingly leading to soil degradation, both in the EU and at a global level up to desertification. In line with sprawling urbanization, arable land is decreasing in quantity as well as in quality. Lacking direct legislation, soil degradation is now having trans-boundary impacts along with high economic costs. One means of improving soil quality is the use of organic residues generated by human activities as soil amendments for enhancing soil carbon levels and soil structure. However this practice is not without risks, namely the introduction of harmful substances such as antibiotics and other pollutants or unwanted nutrient losses.

TC: Advances in emission prevention

Farming is a source of emission of pollutants to the atmosphere and to water. A well-known problem is nutrient leaching and surface run-off, which may cause eutrophication of surface and groundwater bodies and is detrimental to drinking water quality and human health. The most-studied climate relevant gases are methane, carbon dioxide and nitrous oxide. Their atmospheric concentrations have increased in the last centuries due to human activities, including agriculture. Another important rural emission pathway is ammonia volatilization, arising largely from livestock manures and urea-based fertilizers. Together with other reactive nitrogen compounds, e.g. NO_x from processes in transport and industry, it leads to N deposition that damages susceptible ecosystems and leads to soil acidification. Particulate matter originates from a range of agricultural sources, in particular the formation of secondary particulates from ammonia emissions, and may lead to a variety of health problems and associated social costs. In the future emissions may also be caused by new anthropogenic substances/compounds such as nanoparticles from nanomaterials. Urban emissions are numerous and may lead to the introduction of polluting substances (antibiotics, pharmaceuticals, heavy metals etc.) into agricultural chains with a feedback on urban systems.

TD: The bioresource challenge

The sustainable use and the protection of natural resources are essential for enduring food production and quality of life. In this context, bioresources will play a key role. Bioresources are non-fossil biogenic resources which can be used for multiple purposes: to produce food, substantial products such as paper, biobased plastics, biochemicals and composite materials or energy carriers such as bioethanol, biogas and heat. Bioresources are renewable, but they are not available in unlimited quantities and have limits to their utilization. Biobased economy encapsulates the vision of a future society no longer wholly dependent on fossil resources. The basics are bioresources originating from plants, animals, microorganisms or residues. In biorefineries they are converted into a multitude of products such as chemicals, materials, feed, fuels, and other energy carriers. Biorefineries are complex and integrated systems consisting of many process units. They take advantage of the various components contained in bioresources such as cellulose, hemicelluloses, starch, lignin, proteins, fats, oils, extractives and their intermediates. To date, the biorefinery industry is still in a nascent state, mostly using ligno-cellulosic feedstocks on larger scale. However, many concepts and approaches exist. Frequently discussed biorefinery systems with a connection to agriculture include sugar, starch, vegetable oil, lignocellulose, green, synthesis gas and biogas biorefinery.

TE: Sustainable regions

A sustainable agricultural system aims to deliver sufficient productivity, through the use of minimal and non-hazardous inputs, while maintaining soil quality and contributing to the reduction of environmental problems. The recycling of residues for fertilizing and soil quality improvement is still limited in practice. But urban and rural residues are increasingly not only a topic of disposal but of utilization. This provides an opportunity to bring rural and urban systems closer together again. However, practices involving recycling of residues might also cause environmental problems and lead to the evolution of unwanted compounds and pests.

Zero Waste is a visionary goal connected with changing people's lifestyle and behaviour and traditional waste management practices. A holistic and integrative approach for their improved utilization is the "Civilization biorefinery" - a system aiming for complete and efficient utilization of secondary, tertiary and quaternary regional bioresources in a rural-urban symbiosis. It consists of three major parts - collection of the local bioresources, their conversion in a local network of centralized and decentralized technical units into material and energy products and the utilization of these products.

Towards Nitrogen neutrality at RAMIRAN 2015

Nitrogen (N) is an essential element for food provision - plants need to be fertilized and animals as well as humans need N as a nutrient too. But N can also cause manifold problems. There are *problems of too much N* - losses into environment contribute to eutrophication, acidification, global warming, and more. But there are also *problems of too little N* - soil resources depleting and endangering the livelihood of farmers, and threatening food security. A lot of effort is needed to better balance N-management.

The concept of N-neutrality recognizes that there are institutional and individual responsibilities. A large event like RAMIRAN 2015 causes a considerable N-footprint that needs to be offset. By participating in the N-neutrality program we want to raise awareness of the topic and show possibilities for progression towards N-neutrality. To become N-neutral, the approach suggested by the European Commission's Joint Research Centre (JRC, Institute for Environment and Sustainability Monitoring of Agricultural Resources) was considered.

At RAMIRAN 2015 the following activities were taken into consideration to lower the footprint or reactive nitrogen (Nr):

1. Provision of tasty food with reduced Nr impact at RAMIRAN 2015

Our first aim regarding food was to provide tasty food in sufficient amounts. But we also selected the menus regarding their N-footprint. For the lunch break we evaluated 28 meals and selected 10. In the coffee breaks we provided various selections of fresh fruits, which have generally a low N-footprint. Additionally the unconsumed fruit mixes will be given to needy people. For the gala dinner a table served menu was chosen instead of buffet to reduce food waste. Furthermore we asked for special diets of the participants (mixed cost, vegetarian, vegan, allergies and intolerances) in the registration procedure and considered the results in food provision.

2. Calculating of the Nr-impact of RAMIRAN 2015

The N-impact of food provided at RAMIRAN 2015 was calculated on the basis of the N-footprint approach by Leip et al. (JRC). For that purpose we collected data regarding type and amount of all menu ingredients. For instance the average N-footprint of the meals prepared for lunch had a 9 % smaller Nr-footprint compared to an earlier conference in the same canteen and same working days. Additionally we studied the waste generation and the waste whereabouts in order to find out about used, recovered or lost Nr amounts.

3. Compensating the Nr-impact of RAMIRAN 2015

All participants of RAMIRAN 2015 were asked to contribute a voluntary compensation fee (30 €) to equalize the remaining N-impact of consumed food as much as possible. The money will be donated to a sustainable food project in Indonesia (BEST, Institute for Integrated Social Economic Development, NGO) which focuses on demonstration of vertical gardening as a special urban farming solution e.g. for onions, lettuce and celery. The installations have the potential to be widely used in urban areas contributing to the provision of high quality food, helping 'reconnect' people with their food systems, and save land.

More information to the N neutrality approach and the calculations for the lunch meals are to be found in this abstract book (Leip et al., 2015, page 10).

Art at RAMIRAN2015

“Art is the queen of all sciences communicating knowledge to all the generations of the world.”
Leonardo da Vinci

The conference is not only an interface between rural and urban regions as well as between scientists, practitioners and politicians. It also shall connect the practical world with culture and art. Following artistically activities were carried during the conference to give it an communicative, but also enjoyable and relaxing atmosphere:

Acting for sustainability: A group of young researchers and practitioners with interdisciplinary experience in environmental governance uses theatre to promote intercultural dialogue on sustainability in the context of academic and public conferences. By combining scientific knowledge with artistic expression they appeal to the emotions, thus engaging their audience at a deeper level than can be achieved through mere intellectual argumentation and create a level of communication that engages participants with the heart as well as the mind.
(<http://scientific-theatre.org/>; Freiburg Science Theatre, t.floerkemeier@scientific-theatre.org)

Art from tetrapak: Christiane Lüdtkke is a Hamburg artist. Sculpturing is one line of her activities. At RAMIRAN 2015 she presents a further line: etchings from tetrapak materials. Etching is traditionally method of printmaking where a metal surface is used to create a relief, which delivers the printing matrix. Mrs. Luedke is using Tetrapak as printing matrix which gives the pictures a very lively structure. She presents funny etching from various human situations as well as book marks.
(<http://christianeluedtke.de/>; kunst@christianeluedtke.de)

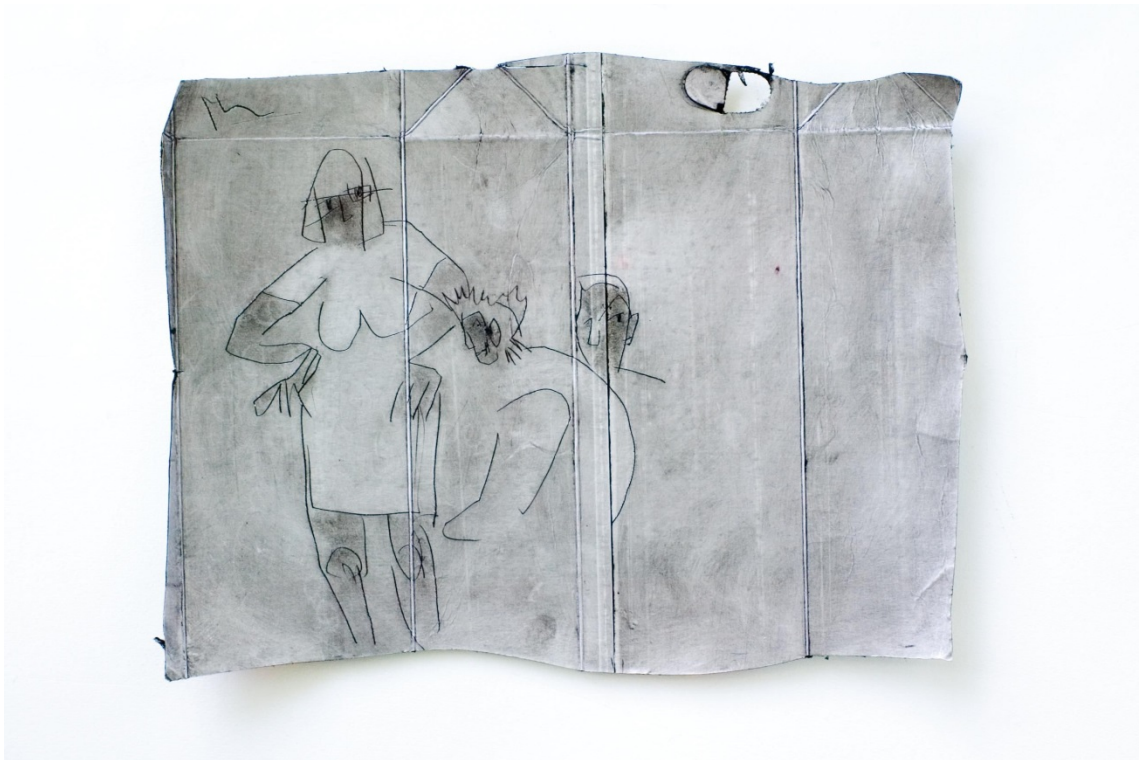
Rural-urban colors: Photographic images – original and artistically edited – were arranged to relaxing films for the conference breaks and upgraded with some statistical data to the conference for information. The focus of the images is on structures and colors from urban and rural environments taken from various distances. It ranges from extreme close-ups, where very small subjects appear in the photograph greater than life size up to photos taken with wide perspective.
(<http://www.bioresource.eu/>; BioResourceInnovation, BRI, i.koerner@bioresource.eu)

Art at the Hamburg University of Technology: TUHH hosts various artworks ranging from photographs, over paintings up to sculptures, partly from internationally known artists (e.g. Hanne Darboven, Berto Lardera, Chui Wang, Alfred Mahlau). They are distributed within the buildings and the campus park. Some of the most impressive artworks were explained via a tour through the university. Information includes the manifold ways they came to the university, the techniques used and the partly difficult standing of art in a technical environment.
(<http://kunst-tuhh.de/>; stieglitz@tuhh.de)

The cell factory: Biorefineries are the foundation of the biobased economy. The major actors in biorefinery systems are microorganisms. The complexity of the processes within a microbial cell was visualized via a 3-D-model with an almost 1-meter-diameter. The model represented a fungal cell including their organelles. Also various enzymes were visualized in 3-D-form. The exhibition unit is accompanied by biorefinery feedstockes and products.
(<http://www.tuhh.de/ibb/home.html>; aze@tuhh.de).

Examples are shown on pages (1, 5, 11, 41, 64, 73, 80, 106, 124, 146, 155, 178)

Contents



Christiane Lüdtkke: Art from Tetrapak

Keynote Lectures	1
K_01 Biobased economy in Germany – Sustainable supply of bioresources	2
Schütte, A.; Becker, S.	
K_02 Synergistic interaction of sanitation, biowaste utilization and energy systems towards water and food security	3
Otterpohl, R.	
K_03 Energy recovery and added value molecules extracted from agricultural bio resources and organic waste – A review of research needs, perspectives and prospects	4
Martinez, J.; Dabert, P.	
General Thematic Lectures	5
G-O_01 Dealing with future European manure management challenges	6
Jensen, L.S.; Oelofse, M.	
G-O_02 Marketing of biogas fermentation residues – The providers’ perspective	7
Dahlin, J.; Herbes, C.; Nelles, M.	
G-O_03 Implementing anaerobic digestion into the German agricultural emission inventory	8
Wulf, S.; Haenel, H.D.; Haeussermann, U.; Rösemann, C.	
G-O_04 Macroalgae as a resource for biobased industry	9
Schäfers, C.; Burkhardt, C.; Meyer, N.; Wiebusch, S.; Schirmmayer, G.; Reisinger, C.; Antranikian, G.	
G-O_05 Towards nitrogen neutrality – Assessment of the tool on the example of conferences	10
Leip, A.; Cordovil, C.M.d.S.; Candra-Dewi, O.; Körner, I.	
Thematic area TA – Quality fertilizers from residues (Oral presentations)	11
TA-K_01 Example of a country manure management profile – Switzerland	12
Menzi, H.; Kupper, T.; Spiess, E.	
TA-K_02 Organic residue management options in a Chinese peri-urban region with intensive animal husbandry and high nutrient loads	13
Roelcke, M.; Heimann, L.; Hou, Y.; Ma, W.Q.; Luo, Y.M.; Li, G.X.; Liu, X.J.; Schuchardt, F.; Nieder, R.; Zhang, F.S.	
TA-O_01 Development of a mobile app for manure management – ‘The Farm Crap App’	14
Wilson, B.; Hodgson, C.J.; Reigate, C.; Roderick, S.	
TA-O_02 Farmers’ reasons to accept bio-based fertilizers – A choice experiment in Flanders	15
Tur Cardona, J.; Speelman, S.; Verpecht, A.; Buysse, J.	
TA-O_03 Agricultural reuse of the digestate from microalgae anaerobic digestion and co-digestion with sewage sludge	16
Solé, M.; Cucina, M.; Folch, M.; Tàpies, J.; Matamoros, V.; Garfí, M.; Ferrer, I.	
TA-O_04 Strategies in sustainable utilization of manure in China – A review	17
Chen, Q.; Yan, Z.; Shan, N.; Chadwick, D.	

TA-O_05	Effects of pig slurry acidification, separation techniques and pyrolysis on nitrogen and carbon mineralization and nitrous oxid emissions after application to soil	18
	Gómez-Muñoz, B.; Magid, J.; Case, S.D.C.; Jensen, L.S.	
TA-O_06	Band application of acidified slurry as an alternative to slurry injection – An integrated evaluation	19
	Fangueiro, D.; Surgy, S.; Abreu, F.; Cameira, R.; Fraga, I.; Vasconcelos, E.; Coutinho, J.	
TA-O_07	The recycling potential of phosphorus in Norwegian waste products in a system's context	20
	Brod, E.; Hamilton, H.; Hanserud, O.; Haraldsen, T.K.; Müller, D.	
TA-O_08	Nitrogen recovery from digested slurry with simplified ammonia stripping technique	21
	Provolo, G.; Finzi, A.; Perazzolo, F.; Mattachini, G.; Naldi, E.; Riva, E.	
TA-O_09	Struvite recovery from methanogenic landfill leachate by chemical precipitation	22
	Ramaswami, S.; Selabi, S.D.; Behrendt, J.; Otterpohl, R.	
TA-O_10	Combination of biochar and clinoptilolite for nutrient recovery from liquid fraction of digestate	23
	Kocaturk, N.P.; Bruun, S.; Zwart, K.; Brussaard, L.; Jensen, L.S.	
TA-O_11	Wood ashes – A new fertilizer for agriculture.....	24
	Sinaj, S.; Maltas, A.; Kebli, H.; Turpault, M.P.	
TA-O_12	The influence of raw materials and storage time in composts maturity	25
	Henriques, R.; Brás, I.; Silva, M.E.	
TA-O_13	Reduction of ammonia emissions by acidification and injection of cattle slurry applied to perennial grassland.....	26
	Seidel, A.; Pacholski, A.; Nyord, T.; Kage, H.	
TA-O_14	Drying of separated manure digestate solids – Effects of acidification, temperature and ventilation on nitrogen loss	27
	Pantelopoulos, A.; Magid, J.; Jensen, L.S.	
TA-O_15	Thermal drying does not increase nitrogen release from an anaerobically-digested biosolid.....	28
	Case, S.D.C.; Gómez-Muñoz, B.; Magid, J.; Jensen, L.S.	
TA-O_16	Improving product quality and limiting nutrient losses of solid fraction of cattle slurry by composting and ensiling	29
	Viaene, J.; Nelissen, V.; Vandecasteele, B.; Willekens, K.; De Neve, S.; Reubens, B.	
TA-O_17	Scaling up pig slurry composting from laboratory to farm	30
	Bernal, M.P.; Santos, A.; Saéz, J.A.; Clemente, R.	
TA-O_18	The influence of feeding on excreta characteristics of dairy cows	31
	Bracher, A.; Menzi, H.	
TA-O_19	Innovative technique to improve phosphorous recycling yield from wastewater treatment plant (WWTP) sludge by producing high quality fertilizer (struvite).....	32
	Braak, E.; Auby, S.; Daumer, M.-L.	
TA-O_20	Phosphorus fertilizer from sewage sludge ashes by thermochemical treatment – Benefits and challenges.....	33
	Herzel, H.; Krüger, O.; Adam, C.	

TA-O_21	Innovative bioresource management technologies for recovery of ammonia and phosphorus from livestock and municipal wastes	34
	Vanotti, M.B.; Szogi, A.A.; García, M.C.; Millner, P.D.; Dube, P.J.; Hunt, P.G.	
TA-O_22	Soil changes and nutrient uptake induced by organic residues	35
	Ruíz-Bello, A.; Trejo-Téllez, L.; Rodríguez-Mendoza, M.N.	
TA-O_23	Multi-criteria indexes to evaluate the effects of repeated organic amendment applications on soil quality	36
	Obriot, F.; Stauffer, M.; Goubard, Y.; Revallier, A.; Vieublé, G.L.; Houot, S.	
TA-O_24	Effect of manure-based phosphorus fertilizer and biochar on biomass yield of spring barley and faba bean in comparison to conventional fertilizer	37
	Ehmann, A.; Lewandowski, I.	
TA-O_25	Improving nitrogen fertilization effect from residues in spring and winter cereals	38
	Delin, S.; Engström, L.	
TA-O_26	Recycled phosphorus fertilizers from urban residues tested in agricultural crop production	39
	Wollmann, I.; Möller, K.	
TA-O_27	Sulphur availability from organic materials applied to winter wheat crops	40
	Sagoo, E.; Smith, K.E.; McGrath, S.P.	
Thematic area TA – Quality fertilizers from residues (Poster presentations).....		41
TA-P_01	Apparent nitrogen recovery in Italian ryegrass (<i>Lolium perenne</i> , L.) from the solid fraction of two digestates	42
	Cavalli, D.; Geromel, G.; Bechini, L.; Corti, M.; Marino, P.	
TA-P_02	Optimal placement of pelleted organic fertilizer in spring oat	43
	Delin, S.; Engström, L.; Lundkvist, A.	
TA-P_03	Reuse potential of urine as a source of plant micronutrients	44
	Factura, H.; Bettendorf, T.; Buzie, C.; Otterpohl, R.	
TA-P_04	Effect of fertilizer source on honey bees number in black cumin plant	45
	Fallah, S.; Rostaei, M.	
TA-P_05	Agronomic assessment of the fertilizing capacity of agroindustrial waste composts in Chimborazo province (Ecuador)	46
	Gavilanes-Terán, I.; Jara-Samaniego, J.; Bustamante, M.A.; Pérez-Murcia, M.D.; Pérez-Espinosa, A.; Moral, R.; Paredes, C.	
TA-P_06	The influence of anaerobic digestion on the concentration of antibiotics, heavy metals and on phosphorous-solubility of digestates.....	47
	Lehmann, L.; Bloem, E.; Schick, J.; Haneklaus, S.; Schnug, E.	
TA-P_07	WAVALUE – A new process to produce commercial fertilizers from digestate generated at biogas plants	48
	Lekuona, A.; Hart, O.; Cenoz, S.; Brekelmans, J.; Pinto, M.	
TA-P_08	Effects of thermal drying on phosphorus availability from sewage sludge.....	49
	Lemming, C.; Bruun, S.; Jensen, L.S.; Magid, J.	
TA-P_09	Recycling vegetable waste, sewage sludge, wood ash and sawdust by composting	50
	Manciulea, I.; Dumitrescu, L.; Bogatu, C.; Duță, A.	

TA-P_10	Evaluation of distillery organic waste compost efficiency on vineyard soil properties and grape quality.....	51
	Marín-Martínez, A.; Moral, R.; Bustamante, M.A.; Pérez-Murcia, M.D.; Pérez-Espinosa, A.; Agulló, E.; Paredes, C.	
TA-P_11	Procedure for defining new Swiss standard values for the nutrient excretions of dairy cows.....	52
	Menzi, H.; Schlegel, P.; Huguenin, O.	
TA-P_12	Changes to the nutrient contents of pig and poultry manures in England and Wales.....	53
	Nicholson, F.; Misselbrook, T.; Hunt, J.; Williams, J.R.	
TA-P_13	Phosphorus availability in the tropical soils of Reunion – Comparison of various methods	54
	Nobile, C.; Bravin, M.N.; Ravelet, M.; Tillard, E.; Becquer, T.; Paillat, J.-M.	
TA-P_14	Utilization of precipitated phosphorous in plant production.....	55
	Riihimäki, M.-A.; Pölönen, I.; Wiirilä, S.; Salminen, T.	
TA-P_15	Acidification of cattle slurry – Effect on ammonia emissions and dry matter yield after spreading non-digested and digested slurry on grassland.....	56
	Rodhe, L.; Delin, S.; Oostra, H.; Gustafsson, K.	
TA-P_16	Solubility of Copper and Zinc and particle size fractionation in compost made from the solid fraction of pig slurry	57
	Saéz, J.A.; Clemente, R.; Bernal, M.P.	
TA-P_17	Risk arising from disposal of animal wastes to soil	58
	Sasáková, N.; Venglovský, J.; Papajová, I.; Gregová, G.; Čornejová, T.; Kachnič, J.; Ondrašovič, M.; Vargová, M.	
TA-P_18	Phosphorus recovery prior to land application of biosolids using the “Quick wash” process developed by USDA.....	59
	Szogi, A.A.; Vanotti, M.B.	
TA-P_19	Improvement of soil nitrogen’s mineralization modeling with a better consideration of organic restitutions.....	60
	Trochard, R.; Bouthier, A.; Cohan, J.P.	
TA-P_20	Impact of pollutants from animal farms on quality of potable water	61
	Venglovský, J.; Sasáková, N.; Papajová, I.; Gregová, G.; Hromada, R.; Chvojka, D.; Koščo, J.; Kormošová, L.	
TA-P_21	Vegetable crop residues as feedstock for composting and silage – Production cost and product quality	62
	Willekens, K.; Viaene, J.; Nelissen, V.; Reubens, B.; De Neve, S.; Vandecasteele, B.	
TA-P_22	Bioavailability of phosphorous in thermally treated sewage sludges and pig manure	63
	Ylivainio, K.; Jermakka, J.; Rasa, K.; Turtola, E.	
Thematic area TB – Sustainable soils (Oral presentations)		65
TB-K	From soil application of sewage sludge to nutrient recycling – A soil science outlook	66
	Kirchmann, H.; Börjesson, G.; Kätterer, T.; Cohen, Y.	
TB-O_01	Sustaining soil quality by farm compost application and non-inversion tillage, and resulting nitrogen dynamics.....	67
	Willekens, K.; Vandecasteele, B.; De Neve, S.	

TB-O_02	Preplant compost application improves landscape plant establishment and sequesters carbon in compacted soil	68
	Sullivan, D.M.; Bell, N.	
TB-O_03	Organic matter stability and accessibility characterization – Towards a tool for organic residue diagnostic before land spreading	69
	Jimenez, J.; Lei, H.; Steyer, J.-P.; Houot, S.; Patureau, D.	
TB-O_04	Effect of food waste biochar usage in farmland on carbon sequestration and vegetable growth	70
	Yoshizaw, S.; Tanaka, S.	
TB-O_05	Simulation of carbon and nitrogen mineralization after application of ammonium sulphate, pig slurry and maize stalks to agricultural soil	71
	Cavalli, D.; Bechini, L.; Marino, P.	
TB-O_06	Determining the mechanisms of nitrous oxide emission under contrasting soil disturbance levels and organic amendments	72
	Grave, R.A.; Mezzari, M.P.; da Silva, M.L.B.; Cassol, P.C.; Nicoloso, R.S.	
TB-O_07	Evolution of zinc concentration in soil in <i>Pinus radiata</i> D. – Don silvopastoral systems limed and fertilized with sewage sludge.....	73
	Mosquera-Losada, M.R.; Rigueiro-Rodríguez, A.; Ferreiro-Domínguez, N.	
Thematic Area TB – Sustainable Soils (Poster presentations)		75
TB-P_01	Fast estimation of the labile carbon fraction of organic waste products by FTIR photoacoustic spectroscopy	76
	Bekiaris, G.; Bruun, S.; Peltre, C.; Houot, S.; Jensen, L.S.	
TB-P_02	Soil amendment using fresh and stabilised organic materials – Effects during a wheat-maize cropping sequence.....	77
	Bustamante, M.A.; Pérez-Murcia, M.D.; Sanz-Cobeña, A.; Pérez-Espinosa, A.; Paredes, C.; Moral, R.	
TB-P_03	Effect of repeated soil application of organic waste amendments on draught force and fuel consumption for soil tillage	78
	Peltre, C.; Nyord, T.; Bruun, S.; Jensen, L.S.; Magid, J.	
TB-P_04	Use of <i>Phoenix dactylifera</i> pruning biomass for the development of more fibrous and recalcitrant composts.....	79
	Pérez-Murcia, M.D.; Moral, R.; Camiletti, J.; Agulló, E.; Bustamante, M.A.; López, M.; Pérez-Espinosa, A.; Paredes, C.	
TB-P_05	Manure-derived biochars behave also as fertilizer.....	80
	Subedi, R.; Taupe, N.; Ikoyi, I.; Bertova, L.; Zavattaro, L.; Schmalenberger, A.; Leahy, J.J.; Grignani, C.	
TB-P_06	The impact of rock mineral wool on water retention in a conventional growth medium, and development of zonal pelargoniums.....	81
	Šušek, A.; Majkovič, D.; Muršec, M.	
Thematic Area TC – Advances in emission prevention (Oral presentations).....		83
TC-K	Predicting ammonia loss from field-applied manure –The ALFAM2 project.....	84
	Hafner, S.D.; Pedersen, S.V.; Sommer, S.G.; Pacholski, A.	
TC-O_01	Ammonia emission after slurry application to grassland	85
	Häni, C.; Sintermann, J.; Kupper, T.; Neftel, A.	

TC-O_02	The importance of pH for ammonia emission from animal manure	86
	Sommer, S.G. ; Hafner, S.D.	
TC-O_03	Impact of field acidification and application methods on ammonia emissions, yield and nitrogen efficiency of organic liquid manures.....	87
	Wagner, C.; Hafner, S.D.; Nyord, T.; Pacholski, A.S.	
TC-O_04	Emission situation of anaerobic digestion of agricultural residues and bio-waste	88
	Daniel-Gromke, J.; Reinelt, T.; Liebetrau, J.	
TC-O_05	Abatement of ammonia emissions from digested manure using gas-permeable membranes	89
	García, M.C.; Vanotti, M.B.; Szogi, A.A.	
TC-O_06	Reduction of ammonia emissions and related greenhouse gas fluxes from separated anaerobic digestates	90
	Pacholski, A.	
TC-O_07	Model-based quantification of indirect nitrous oxid emissions in a crop rotation with biogas digestate-fertilized OSR	91
	Räbiger, T.; Böttcher, U.; Kage, H.	
TC-O_08	Controlled drum composting with limited climate impact – Emissions and heat recovery	92
	Rodhe, L.; Niklasson, F.; Oostra, H.; Gervind, P.; Ascue, J.; Tersmeden, M.; Ringmar, A.	
TC-O_09	Emission patterns of separated digestate obtained from field pilot-scale stores	93
	Perazzolo, F.; Mattachini, G.; Finzi, A.; Riva, E.; Tambone, F.; Provolo, G.	
TC-O_10	Reduction of gaseous emission from slurry storage tanks by different covering materials	94
	Dinuccio, E.; Balsari, P.; Gioelli, F.	
TC-O_11	Influence of surface processes on gaseous emissions from manure slurry – Surface oxidation and pH gradient.....	95
	Feilberg, A.; Bildsoe, P.; Adamsen, A.P.S.	
TC-O_12	Bio-acidification of manure – By supplying manure with 2-3% sugar or cellulose.....	96
	Hjorth, M.; Fernandez, M.S.; Jayaram, S.; Sørensen, J.A.; Adamsen, A.P.S.	
TC-O_13	Proposal of a composting model to predict and manage gaseous emissions and quality of compost.....	97
	Denes, J.; Menasseri, S.; Gasco, S.; Tremier, A.	
TC-O_14	Gaseous emissions from slurry storage – Influence of temperature and potential mitigation methods.....	98
	Misselbrook, T.; Perazzolo, F.; Hunt, J.	
TC-O_15	Ammonia emissions factor modelling of naturally ventilated dairy housings using on-farm measurements, climate data and nitrogen levels.....	99
	Schrade, S.; Zeyer, K.; Emmenegger, L.; Keck, M.	
TC-O_16	Assessment of the through-flow patterns in naturally ventilated dairy barns – Three methods, one complex approach.....	100
	Hempel, S.; Wiedemann, L.; Ammon, C.; Fiedler, M.; Saha, C.; Löbsin, C.; Fischer, J.; Berg, W.; Brunsch, R.; Amon, T.	

TC-O_17	Influence of deep litter on gaseous emissions and microbial composition in a dairy farm.....	101
	Prenafeta-Boldú, F.X.; Viñas, M.; Noguerol, J.; Guivernau, M.; Tey, L. ¹ ; Bonmatí, A.	
TC-O_18	Reduction of ammonia emission from broiler houses by use of a heat exchange system.....	102
	Hansen, M.N.; Rasmussen, S.G.	
TC-O_19	Greenhouse gas and ammonia emissions from different dairy production systems in Germany.....	103
	Häußermann, U.; Vandré, R.; Grebe, S.; Zehetmeier, M.; Döhler, H.; Wulf, S.	
TC-O_20	Excretion of volatile solids by livestock to calculate methane production from manure	104
	Zom, R.L.G.; Groenestein, C.M.	
TC-O_21	Animal delivery of a nitrification inhibitor via feeds to urine patches.....	105
	Minet, E.P.; Richards, K.G.; Lanigan, G.; Murphy, J.B.; Luo, J.; Ledgard, S.F.	
TC-O_22	Development of system to reduce ammonia emission and leaching of nitrate from slurry application	106
	Toft, M.	
TC-O_23	Greenhouse gas emissions from temperate paddy fields under different straw and water managements.....	107
	Bertora, C.; Peyron, M.; Pelissetti, S.; Grignani, C.; Vidotto, F.; Ferrero, A.; Celi, L.; Said-Pullicino, D.; Miniotti, E.; Romani, M.; Sacco, D.	
TC-O_24	Life cycle assessment of a combined manure system optimized for phosphorous utilization.....	108
	Wesnæs, M.; Lorie, H.; Henrik, W.	
Thematic Area TC – Advances in emission prevention (Poster presentations).....		109
TC-P_01	In-house distribution of ammonia and greenhouse gas concentrations in a laying hen facility	110
	Alberdi, O.; Arriaga, H.; Estellés, F.; Calvet, S.; Merino, P.	
TC-P_02	The effect of slurry composition on methane and ammonia emissions from fattening pig slurry – A review of three nutrition assays.....	111
	Antezana, W.; Estellés, F.; Cerisuelo, A.; Ferrer, P.; Beccaccia, A.; García-Rebollar, P.; De Blas, C.; Calvet, S.	
TC-P_03	Potential for biogas production from anaerobic fermentation of vinasse in Iran ...	112
	Arezou, M.	
TC-P_04	Flux chamber measurements of ammonia emission from organic beddings in bedded pack dairy barns	113
	van Dooren, H.J.C.; Galama, P.J.; Blanken, K.; Szántó, G. K.	
TC-P_05	Impact of cattle-slurry treatment by separation and acidification on gaseous emissions after soil application.....	114
	Fangueiro, D.; Pereira, J.; Bichana, A.; Surgy, S.; Cabral, F.; Coutinho, J.	
TC-P_06	Greenhouse gas emissions and crop yields under different organic fertilizers and irrigation treatments in a Mediterranean maize field	115
	Guardia, G.; Sanz-Cobeña, A.; Cangani, M.T.; Andreu, G.; Vallejo, A.	

TC-P_07	OptiBarn – Optimized animal specific barn climatisation facing temperature rise and increased climate variability.....	116
	Hempel, S.; Amon, B.; Ammon, C.; Hoffmann, G.; Berg, W.; Menz, C.; Zhang, G.; Halachmi, I.; del Prado, A.; Estelles, F.; Brunsch, R.; Amon, T.	
TC-P_08	Solid manure and its liquid fraction – Quantities and nutrient contents derived from balancing models	117
	Horlacher, D.; Rutzmoser, K.; Schultheiß, U.	
TC-P_09	Use of a feed additive based on biochar for mitigation of ammonia emissions from weaned piglets and broilers	118
	Kupper, T.; Fischlin, I.; Häni, C.; Spring, P.	
TC-P_10	Identification of odorous compounds in air following land spreading of animal slurry	119
	Liu, D.; Nyord, T.	
TC-P_11	A French inventory of solid manure (cattle, pig, poultry) stored in temporary field heaps	120
	Loyon, L.	
TC-P_12	Environmental benefits of amending cow slurry with the nitrification inhibitor dicyandiamide.....	121
	Minet, E.P.; Jahangir, M.M.R.; Krol, D.J.; Rochford, N.; Forrestal, P.J.; Fenton, O.; Rooney, D.; Lanigan, G.; Richards, K.G.	
TC-P_13	Can earthworms reduce greenhouse gas emissions from composting of urban waste?	122
	Nigatu, A.; Bruun, S.; Kuyper, T.; Brussaard, L.; de Neergaard, A.	
TC-P_14	Evaluation of reduction effect by different kind of soil injection in bare soil	123
	Nyord, T.; Vestergaard, A.V.; Birkmose, T.S.	
TC-P_15	Animal feeding strategies to abate nitrous oxid and ammonia emission from surface applied slurry to a grassland soil	124
	Sanz-Cobeña, A.; Beccaccia, A.; Sánchez-Martín, L.; de Blas, C.; García Rebollar, P.; Estellés, F.; Andreu, G.; Marsden, A.; Chadwick, D.R.; Vallejo, A.	
TC-P_16	Ammonia emissions following crop-based and manure-based digestate applied to maize, with or without a nitrification inhibitor	125
	Smith, K.E.; Rollet, A.J.; Taylor, M.J.; Bowden, A.; Bennett, G.; Williams, J.R.	
TC-P_17	Limiting nutrient losses and improving product quality during storage of cattle manure by composting and ensiling.....	126
	Viaene, J.; Nelissen, V.; Vandecasteele, B.; Willekens, K.; De Neve, S.; Reubens, B.	
Thematic Area TD – The bioresource challenge (Oral presentations).....		127
TD-K	Bioresource utilization in context with regional development.....	128
	Narodoslawsky, M.; Maier, S.; Eder, M.	
TD-O_01	Co-digestion of manure and organic residues in the Netherlands	129
	Velthof, G.L.; Rietra, R.P.J.J.; Ehlert, P.A.I.; Oenema, O.	
TD-O_02	Perspective and conversion routes for bioproduction of bulk chemicals and fuels from organic wastes and green electricity	130
	Zeng, A.-P.; Kaltschmitt, M.	
TD-O_03	Bioconversion of renewable feedstocks and agri-food residues into lactic acid ...	131
	Venus, J.; Pleissner, D.	

TD-O_04	Bioresource utilization as a challenge of coordination Arentsen, M.J.	132
TD-O_05	Residual grass an overlooked bioresource – Environmental consequences of various conversion pathways Hamelin, L.; Muica, V.-T.	133
TD-O_06	Influence of food waste characteristics on treatability through anaerobic digestion Fisgativa, H.; Tremier, A.	134
TD-O_07	Design of microalgae process for nutrient extraction from digestate through laboratory tests and modelling Marcilhac, C.; Sialve, B.; Pourcher, A.M.; Ziebal, C.; Bernet, N.; Béline, F.	135
TD-O_08	Ecological evaluation of biogas from catch crops with Sustainable Process Index (SPI)..... Maier, S.; Shahzad, K.; Szerencsits, M.	136
TD-O_09	Needs for production of grain protein crops in Europe and possibilities for more bio-based green economy including nitrogen use Bavec, F.; Bavec, S.; Grobelnik, S.; Jakop, M.; Robacer, M.; Rozman, Č.; Bavec, M.	137
TD-O_10	Effect of source segregation and conventional separation of pig excreta on biogas yield of solids Vu, P.T.; Melse, R.W.; Zeeman, G.; Groot Koerkamp, P.W.G.	138
TD-O_11	Biogas production from large-scale retail trade wastes – Preliminary assessments related to Piedmont reality..... Balsari, P.; Cuk, D.; Menardo, S.; Dinuccio, E.; Gioelli, F.	139
TD-O_12	New tool for improving management of biogas digesters – A heat transfer- and biogas production model for anaerobic digestion..... Pedersen, S.V.; Martí-Herrero, J.; Sommer, S.G.; Hafner, S.D.	140
TD-O_13	A Flemish case study of possible synergies between high quality green compost and green energy..... Boogaerts, C.; Vandecasteele, B.; Vandebroek, K.	141
TD-O_14	Environmental infrastructural investments in peri-urban areas – How to overcome nimbyism in case of waste to energy biogas plants Oniszk-Popławska, A.; Rolewicz-Kalińska, A.; Wesołowska, J.; Ryńska, E.D.	142
TD-O_15	Ensiling as pretreatment to improve the anaerobic biodegradability of catch crops Riau, V.; Burgos, L.; Camps, F.; Anton, A.; Bonmatí, A.	143
TD-O_16	Anaerobic co-digestion of pig manure and organic waste materials as affected by different hydraulic retention time Vazifekhoran, A.H.; Triolo, J.M.	144
TD-O_17	Promoting pig slurry low-cost methanization by understanding the microbiology of anaerobic digestion at low-temperature..... Dabert, P.; Morizur, J.; Jaziri, K.; Lendormi, T.; Buffet, J.; Le Roux, S.; Barrington, S.; Béline, F.	145
TD-O_18	Interstage treatment for increasing methane production from recalcitrant biomass Rennuit, C.; Hafner, S.D.	146

TD-O_19	Quality fertilizer for apple and vine-growing from dry anaerobic digestion of biowaste	147
	Bona, D.; Grandi, L.; Cristoforetti, A.; Zorzi, M.; Silvestri, S.	
TD-O_20	Biogas for the future – Trade-offs between economy and climate.....	148
	Houge-Hansen, J.; Hansen, P.M.S.; Hamelin, L.; Wenzel, H.	
Thematic Area TD – The bioresource challenge (Poster presentations)		149
TD-P_01	Environmental assessment of the agronomical recovery of post-treatment digestates	150
	Déchaux, C.; Tremier, A.; Aissani, L.	
TD-P_02	High-tech water-and nutrient-recycling – The blackwater-loop.....	151
	Deegener, S.; Otterpohl, R.; Behrendt, J.; Braun, U.	
TD-P_03	Process simulation of biological degradation processes in waste management.....	152
	Deipser, A.; Körner, I.	
TD-P_04	Biogas and fertilizer from lawn silage and lawn silage juice	153
	Hertel, S.; Nadal, J.; Körner, I.	
TD-P_05	Multi-composting as a tool to produce compost from olive mill waste as a substitute for growing strawberries in the United Kingdom.....	154
	Mortimer, N.; Fletcher, L.; Velis, C.	
TD-P_06	Wastewater treatment plant of the future – Energy storage in interaction with technical infrastructure between the poles of energy generation and consumption (“ESiTI”).....	155
	Schaum, C.; Lutze, R.; Rühl, J.; Cornel, P.; Seier, M.; Schebek, L.	
TD-P_07	Nutrients removal capacity of the green microalgae isolated from wastewater treatment plant in Hamburg.....	156
	Soroosh, H.; Duan, S.; Hügel, S.	
TD-P_08	LIFE + MANEV – Evaluation of manure management systems and treatment technologies in Europe	157
	Teresa, M.; Herrero, E.; Bescos, B.; López, M.	
Thematic Area TE – Sustainable Regions (Oral presentations)		159
TE-K	New paradigms on how to achieve zero food waste in future cities – Optimising food use by waste reduction and valorisation	160
	Redlingshöfer, B.; Guilbert, S.; Fuentes, C.; Gracieux, M.	
TE-O_01	Appropriateness and potential of large-scale composting initiatives in developing and transitional municipalities.....	161
	Szántó, G.K.; Veeken, A.H.M.; Li, W.	
TE-O_02	Farmers attitudes and potential barriers to the use of new organic fertilizers.....	162
	Case, S.D.C.; Oelofse, M.; Oenema, O.; Hou, Y.; Jensen, L.S.	
TE-O_03	Management of wetland areas – Tradition & innovation for sustainable land use and network between rural and urban areas.....	163
	Mayer, R.; Plank, C.; Hohegger, K.	
TE-O_04	Practical experiences in Flanders towards a rural-urban sustainable biomass policy	164
	Braekevelt, A.	

TE-O_05	Integration of sanitation infrastructure with agriculture in peri-urban communities of South Africa.....	165
	Musazura, W.; Pietruschka, B.; Odindo, A.O.; Buckley, C.	
TE-O_06	Planning the sustainable use of agricultural bioresources as fuel for city busses – Example case Turku, Finland	166
	Rasi, S.; Lehtonen, E.; Kässi, P.; Seppälä, A.	
TE-O_07	SMART-3S and CST system for zero waste low-rise and high-rise urban settlement – A concept.....	167
	Candra-Dewi, O.; Al-Rasyid, H.H.	
TE-O_08	Scenarios for a low carbon society – Agricultural waste	168
	Erangu Purath Mohankumar Sajeev, A.; Winiwarter, W.	
TE-O_09	Urban farming to grow a greener future	169
	Cordovil, C.M.d.S.; Rodrigo, I.; Gonçalves, R.	
TE-O_10	Waste recycling through integrated farming system – An Assam agriculture experience	170
	Baishya, A.; Borah, M.; Gogoi, B.; Hazarika, J.; Bora, A.; Rajbonshi, A; Deori, P.	
TE-O_11	Analyzing consumer-related nitrogen flows – A case study on food and material use in Austria	171
	Pierer, M.; Schröck, A.; Winiwarter, W.	
TE-O_12	Food and phosphorus security – Bridging the global-local and the rural-urban gaps	172
	Drangert, J.-O.	
TE-O_13	Encouraging local organic cycles in urban Europe with a collaborative tool.....	173
	Meyer-Kohlstock, D.	
TE-O_14	Software tool for a global evaluation of different manure management systems focused on specifics scenarios – MANEV tool.....	174
	Herrero, E.; Teresa, M.; Bescos, B.; López, M.	
TE-O_15	Availability and use of urban areas green cuttings for methane production through anaerobic digestion	175
	Balsari, P.; Cuk, D.; Menardo, S.; Dinuccio, E., Gioelli, F.	
TE-O_16	Addressing the nexus of sanitation and energy towards increased living conditions in rural areas in Kyrgyzstan.....	176
	Wendland, C.; Jorritsma, F.; Choitonbaeva, A.	
TE-O_17	Resources recovery and economic aspects in the application of terra preta sanitation system in Arba Minch, Ethiopia	177
	Yemaneh, A.; Bulbo, M.; Otterpohl, R.	
TE-O_18	Treatment of deinking sludge from wastepaper recycling by anaerobic digestion	178
	Ogun, M.K.; Amare, D.E.; Badri, A.; Körner, I.	
TE-O_19	Energy production and resource recovery on sewage plants in Austria	179
	Kollmann, R.; Kretschmer, F.; Neugebauer, G.; Truger, B.	
TE-O_20	Estimation of design values for greywater treatment units.....	180
	Sievers, J.C.; Londong, J.	

TE-O_21	Interfacing urban water management and agriculture – Transformation steps towards new alternative sanitation systems.....	181
	Maier, K.; Londong, J.	
Thematic Area TE – Sustainable regions (Poster presentations)		183
TE-P_01	Agriculture as a mean of sustainable resettlements – A proposal of symbiotic agricultural and micro-economic projects for internal displaced persons (IDPs) in Darfur, Sudan	184
	Adam, W.; Alneel, M.	
TE-P_02	Sustainable urban-rural proposal in Malinalco, Mexico – Case study	185
	Arias, E. ; Mier y Terán, A.; Flores, I.P.	
TE-P_03	Systemic approach applied to a Mexican rural area, in order to improve the quality of life and economic well-being of people	186
	Barbero, S.; Bicocca, M.	
TE-P_04	Unemployed young people and periurban agriculture – Case of Madrid.....	187
	Cruz, J.L.; Castellanos, E.; Castellanos, M.; Soriano, I.; García, M.; Benito, A.	
TE-P_05	Ecological restoration approaches for degraded forrests in landscape scale – Functional roles of corridors	188
	Kahazaei, N.; Zahedi, A.; Otterpohl, R.	
TE-P_06	Biosolid recycling in agriculture – A case study, Cairo sludge disposal study.....	189
	Abd El Lateef, E.; Hall, J.; Smith, S.	
TE-P_07	Methodology for geo-based bioresource inventory shown on a case study of the town of Beočin, Serbia	190
	Lazić, D.; Körner, I.	
TE-P_08	The effect of long term storage of dogs’ excrements with “Enviro” lime on the survival of helminth eggs.....	191
	Papajová, I.; Pipiková, J.; Juriš, P.; Venglovský, J.; Sasáková, N.	
TE-P_09	Integrated management of water resources with an innovative aquaponic system under greenhouse conditions in Spain	192
	Pardo, E.; Martínez-Gaitán, C.; Martín, G.; Valle, A.; López, G.	
TE-P_10	Changes in farming production strategies with wastewater in Sacaba Valley, Bolivia	193
	Pérez-Mercado, L.; Delgadillo, O.	
TE-P_11	The water-energy-food-nexus and international trade – Australia’s water trade offs through energy and virtual water exports.....	194
	Schaldach, R.	
TE-P_12	Volunteers to translate waste prevention policy to citizens.....	195
	Van Stichelen, K.; Anthonissen, E.; Vandebroek, K.	
List of authors		197

TE-P_03 **Systemic approach applied to a Mexican rural area, in order to improve the quality of life and economic well-being of people**

Barbero, S.¹; **Bicocca, M.**¹

¹Department of Architecture and Design, Politecnico di Torino, Viale Pier Andrea Mattioli, 39, 10125 Torino, Italia

miriam.bicocca@polito.it

Objectives

Promote economic diversification combining traditional agricultural skills and new technical know-how.

Support and develop agro-food systems, thus contributing to sustainable, inclusive and economic growth in rural regions.

Case-study description

The project is located in Ahuacuotzingo, a Mexican rural area, State of Guerrero chosen because of its particular features related to food, both production and consumption. Take action on these aspects has environmental, social, economic and health consequences.

The area is characterized by low population and enterprise density, high unemployment and emigration, especially to the United States. This situation generates a radical change in food consumption and lifestyles, and a loss of material culture and know-how, because some people try to imitate other cultures losing totally its own know-how.

Observation

The population of this rural area, rather isolated, reveals to be intimately and intensely linked to the territory and to have a strong sense of belonging and aggregation. In addition, the farmers of the cooperative Ahuehuetla, with which we are working, they are very motivated for a substantial change towards sustainable rural development.

The Systemic project started from the analysis of the activities of six farmers in order to identify the materials and energy flows, and the main critical aspects.

The second step is the flows design according to the intention of tending to zero waste. The objective is to reach the satisfaction of the agro-food demand of the people of Ahuacuotzingo by intervening on production but also changing dietary habits. The project aims to produce healthy, local and clean food, linked to the rural Mexican tradition. Also educational and social aspects are important: the Ahuehuetla cooperative owns a community space (Cavideco), where it is possible to make and sell food, as well as being a meeting point for seminars and workshops. Cavideco could be the link between the cooperative and the population, so that both can benefit from the systemic project.

Methodology

The methodology applied in this project is the Systemic Design Approach, because it plans open systems with a strong reduction in the waste production and with benefits for the whole community: from a better environmental quality to the creation of new job placements. The first guide-line of this approach is that the waste (output) of a system must become resources (input) of another system. In this way the system generates for itself resources, content and meaning, by updating and developing independently.

References

- [1] Bistagnino, L. (2011): Design Sistemico. Progettare la sostenibilità produttiva e ambientale, Bra, Slow Food Editore
- [2] Pauli, G. (2010): Blue Economy. Nuovo rapporto al Club di Roma. 10 anni, 100 innovazioni, 100 milioni di posti di lavoro, Milano, Edizioni Ambiente