



AGRICULTURAL AND ENVIRONMENTAL ENGINEERING RESEARCH



Research Network on Recycling of Agricultural,
Municipal and Industrial Residues in Agriculture.

RAMIRAN

NEWSLETTER

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WELCOME TO THE FIRST RAMIRAN NEWSLETTER

We have been fortunate enough to obtain some “seed” funding from FAO to publish this first Newsletter. The aim is to produce further issues between the Workshops and Conferences to provide a means of keeping in touch and exchanging information outside these meetings. The editor would be pleased to receive short articles, reports etc and your suggestions for future issues.

INTRODUCTION TO RAMIRAN

The scientific activities of RAMIRAN will already be familiar to many who have taken part in the consultations, workshops or working groups or who have read the reports and proceedings of these meetings. This introduction aims to place RAMIRAN in context within the FAO and to outline briefly the history and previous activities of the network.

SCORENA

RAMIRAN is part of the SCORENA network – the European System of Cooperative Research Networks in Agriculture. SCORENA was established by the FAO Regional Office for Europe (REU) in 1974. It is a form of voluntary research cooperation among interested national institutions involved in research in food or agriculture in European countries. Over the years, SCORENA has expanded its field of activities to include topics and themes of interest to other countries, particularly those from the Near East and Mediterranean area.

The current objectives of ESCORENA are to :

- Promote the voluntary exchange of information and experimental data on selected topics.
- Support joint applied research on selected subjects of common interest according to an accepted methodology and an agreed division of tasks and timetable.
- Facilitate voluntary exchange of experts, germplasm and technologies.
- Establish close links between European researchers and institutions working on the same subject to stimulate interaction.
- Accelerate the transfer of European technology advances to, and in cooperation with, developing countries.

ESCORENA comprises 13 cooperative research networks of which RAMIRAN is one. Today, with its 13 networks, it links over 2500 researchers across Europe and, in some cases, across the globe. The networks have a simple and flexible organisation and their activities are basically self-regulating. Most of the networks include sub-networks or working groups covering specific topics. In collaboration with FAO, the networks or working groups convene workshops, technical meetings and network consultations. The ESCORENA networks are grouped into 4 categories : Crops, Livestock, Food and Nutrition and Agri-Environment.

Agri-Environment comprises The Sustainable Rural Environment and Energy Network (SREN), that deals with issues including pollinator diversity, renewable energy production and use and organic farming, and RAMIRAN.

History of RAMIRAN

Researchers from a number of European countries established a network on animal waste utilisation in 1976. It was restructured in 1990 when the number of working groups was reduced to two and *ad hoc* expert groups created to address specific issues. The last workshop on animal waste utilisation was held in Gödöllő in Hungary in October 1996. It was decided at this workshop to expand the

network to include municipal and industrial wastes. The network was renamed RAMIRAN (Research Network on Recycling of Agricultural and Industrial Residues in Agriculture) to reflect this change.



Gödöllő (Hungary, 1996). Photo J.Martinez

RAMIRAN conferences and workshops

The first meeting of RAMIRAN was held in Rennes, France in May 1998 and was attended by 136 delegates from 26 countries. The theme was “Management Strategies for Organic Waste Use in Agriculture” under the chairmanship of the network coordinator Mr J.E.Hall of the UK. The conference was divided into five parts :

- Management strategies for organic waste use in agriculture.
- Agronomic value of organic wastes.
- Measurement, modelling and control of gaseous emissions.
- Processing and handling of wastes.
- Environmental impacts.



Rennes (France, 1998). Photo J.Martinez

The proceedings (RAMIRAN 1998 8th International Conference on Management

Strategies for Organic Wastes Use in Agriculture) were edited by Dr José Martinez and Marie-Noëlle Maudet of Cemagref Rennes and published by FAO and Cemagref.

Dr José Martinez was elected the new Network Coordinator at this conference.

Following the conference in Rennes, a workshop was held in Gargnano, Italy in September 2000 with the theme "Technology Transfer". This Workshop addressed five topics :

- Legislation and codes of good practice
- Control of air and water pollution
- Compost, manure, slurry and sludge management
- Spreading of compost, manure, slurry and sludge
- Transfer of technologies

The report was edited by José Martinez and Franco Sangiori (University of Milan) and published by FAO and Cemagref.



Gargnano (Italy, 2000). Photo M.N.Maudet

Next RAMIRAN conference.

The next RAMIRAN conference will be held from 14 – 18 May 2002 in High Tatras in the Slovak Republic and organised by Dr Ján Venglovsky of the Research Institute of Veterinary Medicine. The main theme of the conference will be "Hygienic safety in organic waste management". Visit the web site at <http://www.ramiran.sk>

Working Groups

Much of the detailed work of the network is undertaken by the Working Groups. There are currently 7 Working Groups within RAMIRAN including 2 new groups that were established at the last Workshop in Gargnano.

The titles, chairmen and contact details for these groups are listed below.

RAMIRAN Working Groups and coordinators
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WORKING GROUP ON GASEOUS EMISSIONS

Tom Misselbrook

The Gaseous Emissions Working Group evolved from the expert group on Ammonia Emissions (of which J Hartung, and prior to that J Voorburg, had been chair). That group, particularly latterly, was concerned with ammonia emissions from livestock housing and there was some discussion on the development and standardisation of measurement methods. At the 8th International RAMIRAN meeting in Rennes, France in May 1998, it was decided that the group remit be expanded to include all the major gaseous emissions (ammonia, nitrous oxide, methane, odours) from management of manure and other organic residues, and so the Gaseous Emissions working group was formed.

One important function of the working group is to provide a forum for discussion and interactions between researchers across Europe, leading to possibilities for the development of collaborative projects and proposals for European funding. The group also acts as a focus for the collation and dissemination of information on specific topics within the general theme of gaseous emissions research.

The main issues discussed at the 1998 meeting of the working group in Rennes were additives, measurement techniques and decision support systems.

Additives

A recent review of research relating to the use of additives in livestock wastes (McCrorry and Hobbs, *Journal of Environmental Quality*, 30 : 345-355. 2001) concluded that many of the additives currently available were either ineffective or required very large doses (> 1% manure volume) to be effective. Also, effects were often short lived. Further fundamental research is required to establish the modes of action of additives and, particularly, to increase understanding of microbial transformations within stored manures which

may have a key role in determining the effectiveness of particular additives. It was suggested that standard, independent testing techniques should be developed in order to assess the effectiveness of additives claiming to reduce gaseous emissions from livestock manures.

Measurement techniques

Techniques for measuring gaseous emissions from agricultural and municipal wastes continue to improve, but there is still scope for improvements in both sensitivity and reliability in many areas. Improved instrumentation has led to an increase in the number of real-time measurements being made using *e.g.* FTIR or TDL. Accurate and robust measurement of gaseous emissions from naturally ventilated animal housing still poses a challenge, although some developments have been made by SRI (UK) through the use of modified passive flux samplers (Ferm tubes).

Decision Support Systems

The development of decision support systems (DSS) is an important objective of much of the research being conducted on gaseous emissions from agriculture. Sharing of data between research groups enlarges the database from which such DSS can be developed and increases the value of individual datasets; this was one of the objectives of an EU Concerted Action project, ALFAM (Ammonia Losses from Field applied Animal Manures, www.alfam.dk), but could be developed in other areas. A list of key parameters which should always be measured within a particular type of project would enable research groups to increase the value of their data for modelling purposes to the wider community.

New issues

Important, currently emerging issues include interactions between emission/loss pathways and the verification of abatement strategies/policies. Increasingly, interactions between different emissions or loss pathways need to be studied to ensure that abating one loss pathway does not result in an increased loss elsewhere, or that abatement at one stage

of a process does not lead to increased emissions at a later stage. A more global approach to research in this area is required to assess the overall environmental benefits of any abatement strategies. It is also important that particular abatement strategies developed in isolation under experimental conditions are verified when incorporated into a commercial production system.

The Group is currently addressing the following specific tasks :

- Development of a Gaseous Emissions Research Project database.

The aim is to create a searchable, web-based database of research projects currently in progress in Europe concerned with gaseous emissions from manure and organic residues (although this could be expanded to become a RAMIRAN project database). The database would be widely advertised and RAMIRAN participants encouraged to submit details.

- Production a database of measurement-based emission factors as used in national gaseous emission inventories.

The EU Concerted Action on Biogenic Greenhouse Gas Emissions from Agriculture in Europe compiled such a database for ammonia, methane and nitrous oxide, which could be used as a starting point for this task. Ideally, the database would be web-based and updated on a regular basis.

- Initiate a survey of manure management practices in European countries to improve information available for calculation of national gaseous emission inventories.

Membership of the Working Group

Core members of the working group are :

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WORKING GROUP ON COMPOSTING AND TRANSFORMATION OF WASTES

M^a Pilar Bernal

The working group "Composting and Transformation of Wastes" was created at the 9th RAMIRAN meeting in Italy (2000), due to the great interest shown by the scientific community, and also demonstrated by the high number of publications per year in this field.

Transformation of wastes is increasing year by year due to the increasing regulations concerning the application of organic wastes to soil. Therefore, it is necessary to encourage the exchange of scientific information for developing and improving environmentally friendly technologies for transforming organic wastes, as an alternative to land application. Composting or transformation of wastes is a way of reducing the environmental impact caused by the accumulation of huge amounts of organic wastes, and also for adding value to the materials.

The activity of the working group will be focussed on the following aspects:

- Definition of compost: standardise methods and parameters to define maturity and quality of compost from different origins, and to establish the characteristics of compost according to future use.
- Update technologies for composting and for anaerobic transformation of wastes to maximize the compost or biogas production with minimum environmental impact, and to adapt them for use of organic wastes from different origins.
- Transfer such technologies to industries in order to encourage producers to recycle their own wastes.

Members of the Working Group

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WORKING GROUP ON OTHER WASTES GENERATED ON FARMS

Paolo Balsari

Usually the term “wastes produced on farms” is taken to refer to a series of by products such as solid and liquid manures, slurries etc. However, the farms produce other types of wastes related to their productive activity. For livestock farms, these wastes include empty containers for veterinary products, disinfectant and cleaning products or materials for forage management. On arable farms, empty fertiliser, seed and pesticide packaging are the most common. These by-products may or not

be pollutants and may be reused by the farm or disposed off the farm.

The amount and the type of these wastes and the disposal methods used by different countries are not known. Legislation also varies from country to country.

This Working Group aims to provide information on the amount, disposal methods and regulations in force concerning waste materials arising on European farms.

During the RAMIRAN meeting in 1998, it was decided to divide the Working Group “Other Farm Wastes” into two different parts. The first, chaired by J.M. Merillot (Ademe - France), will investigate the amount and the types of the wastes **coming to** the farm. The second co-ordinated by Paolo Balsari will take in consideration only the wastes **generated on** the farm. This second Working Group is concerned with the following main topics :

- knowledge about the regulations existing in E.U. concerning this type of wastes, in order to find common strategies,
- survey on the type and the amount of wastes generated by different farms (including that coming from the first processing of agricultural products).

To do this, during Gargnano Meeting, the coordinator presented and distributed to the participants a questionnaire concerning these aspects. The co-ordinator has also asked all the participants to help him get at least, twenty surveys from each country (10 from livestock and 10 from arable farms of different sizes). A copy of the questionnaire has been sent afterwards by e-mail to all the participants of the Gargnano meeting. The questionnaire provides options for wastes from fertilisation, crop protection, seeding, machinery maintenance and cleaning, animal medical treatments and plastic silage wrap/sheet/net wrap and plastic crop cover. The disposal method of all these kinds of wastes is also requested together with information on the existing legislation on this topic in the different Countries.

At the beginning of 2001, 20 questionnaires from Belgium have been sent back to the chairman. In order to get some more

information also from other European Countries a new request to complete the questionnaire was sent to the RAMIRAN Meeting participants during the summer of 2001. An answer from the other Countries is awaited by the end of the year, in order to present the first results during the next FAO RAMIRAN meeting in the Slovak Republic. The present Working Group aims to achieve the following objectives :

- to draw up FAO RAMIRAN reports concerning the European situation in terms of amount and type of these wastes (grouped according to their dimensions, materials and other specific characteristics) and laws in force regarding this topic in the different Countries;
- to find, by previous or new experiences, the best solutions for the management of these wastes;
- to provide FAO RAMIRAN guidelines for the correct use of these wastes.

For the realisation of the second objective, the Working Group will try to make a research proposal to E.U. Other colleagues interested to take part to this research program are invited to contact the Working Group coordinator to the following address : balsari@agraria.unito.it.

Membership of the Working Group

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WORKING GROUP ON HEAVY METALS

Roger Unwin and Fiona Nicholson

There are four main issues that could have implications for manure and waste management which are being addressed by the Group :

- Revision of the Sewage Sludge Directive
- Proposed Composting Directive
- Cadmium (Cd) and Lead (Pb) in Cereals
- AROMIS Concerted Action

Revision of the Sewage Sludge Directive

- Discussions are continuing to take place within the EU with a view to revise the sewage sludge Directive (86/278/EEC).
- It is proposed that it will include 'industrial' sludge as well as sewage sludge
- Proposals have been made to revise downwards the heavy metal limit values for sludge, soils and annual quantities of metals applied.

Proposed limit values for heavy metals in soils (mg/kg dm)

	Current	pH 5-6	pH 6-7	pH > 7
Cd	1-3	0.5	1	1.5
Cr	-	30	60	100
Cu	50-140	20	50	100
Hg	1-1.5	0.1	0.5	1
Ni	30-75	15	50	70
Pb	50-300	70	70	100
Zn	150-300	60	150	200

Proposed limit values for sludge heavy metal concentrations used on land (mg/kg dry matter)

	Current	Proposed	By 2015	By 2025
Cd	20 – 40	10	5	2
Cr	-	1000	800	600
Cu	1000-1750	1000	800	600
Hg	16-25	10	5	2
Ni	300-400	300	200	100
Pb	750-1200	750	500	200
Zn	2500-4000	2500	2000	1500

At the request of the Commission via CEN, guidance is being drawn up by a Working Group of ISO/TC 190, the international body responsible for agreeing soil standards.

Composting Directive

- Composting is not currently included as a treatment process in the revised Sludge Directive although there are differing views on this from various Member States. Discussions are in progress for a new Directive to deal specifically with composting

Cadmium and lead in cereals

- The EU has proposed limits on Cd and Pb concentrations in a range of foodstuffs including cereal grain (As part of the Contaminants in Foodstuffs Regulations which were subsequently agreed in Brussels December 2000).

Proposed limits on heavy metal concentrations in cereals (mg/kg fresh weight)

	Cd	Pb
Wheat	0.2	0.2
Barley	0.1	0.2

The limits will apply from April 2002. A Directive laying down associated methods for sampling and analysis requires Member States to bring into force means of complying with the Directive no later than 5 April 2003. This has implications for recycling sewage sludge and other metal-containing wastes to land used for growing cereals.

AROMIS Concerted Action

A new concerted action programme has been funded by the EU: AROMIS (Assessment and reduction of heavy metal inputs into agro-

ecosystems). It is expected that the concerted action will deal with many of the issues currently covered by this working group during its 3-years of activity.

Members of the Working Group

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WORKING GROUP ON SOLID MANURE

Harald Menzi and Brian Pain

Purpose and aims of the group

At the 7th meeting of the European cooperative research network on animal waste management (now RAMIRAN) in 1994, it was realised that most contributions focused on liquid manure and slurry, while newer research results and even up to date information on present practice were scarce for solid manure. The meeting therefore established a working group on solid manure with the following main aims:

- To assemble an overview on current solid manure management across Europe.
- To facilitate the exchange of experience and information on present research on solid manure and to encourage relevant collaborative activities.
- To make the RAMIRAN network better aware of solid manure research and management practice and to establish coordinative contacts with other programs looking at solid manure.

Survey on solid manure management across Europe

Using an extensive questionnaire that was circulated to all RAMIRAN members, the working group performed a survey about current manure management across Europe (Menzi et al. 1998). The questionnaire covered the following topics: importance of solid manure, solid manure composition, solid

manure use, nutrient losses, regulations, laws and recommendations, research and literature concerning solid manure. The survey covered 16 countries and thus enabled a quite representative overview. The most important results of the survey were :

- Solid manure constitutes more than one third of the total manure production in Finland, England and Wales, Sweden, Switzerland, Italy and parts of Belgium.
- The data about solid manure production per animal and solid manure content varies considerably between countries, mainly because of differences in housing systems and farm management. An actual comparison between countries is difficult because of the lack of common definitions and terms.
- In most countries the most important solid manure category is that produced together with slurry in tied cattle stalls.
- Where possible, solid manure is mainly used on arable land, primarily potatoes, beet, maize and in northern countries cereals. Use on grassland is common primarily in mountain regions.
- Even though the scientific understanding of solid manure systems is considerable, especially in central and northern European countries, serious gaps remain, e.g. factors controlling solid manure composition, nutrient availability of solid manure (especially for N), long term efficiency of the nutrient cycle in solid manure farming systems. These gaps are greater than for slurry systems.

Glossary of terms

A major problem arising during the survey was a lack of clear definitions on many important terms and therefore frequent misunderstandings. At the RAMIRAN meeting in 1998, it was therefore recognised that a glossary of important terms would be a tool welcomed by all RAMIRAN members. During the first phase of activities to assemble such a glossary it became clear that it would not be reasonable to prepare a glossary on solid manure only, but that this should rather include all the relevant terminology on manure and related topics (animal houses etc.). The preparation of a first draft of this glossary is the major activity of

the working group up to the RAMIRAN meeting 2002.

Participation in concerted activities ROSA, ALFAM and AROMIS

Several members of the working group participated in the concerted action ROSA (Recycling Organic Solids in Agriculture; terminated 2000), ALFAM (Ammonia Losses from Field-applied Animal Manure; terminated 2001) and AROMIS (Assessment of the reduction of heavy metals into agro-ecosystems; started 2001) as well as in the activities of MATRESA (Processing strategies for farm livestock manures to enable maximize nutrient use with minimum environmental problems - water/air/soil pollution, disease risks and odour nuisance; started 2001). Through this participation it was well guaranteed that information gathered in the working group (e.g. from survey) could be fed into the other activities and that the working group could be provided with detailed information from the other programs.

Other activities

- Following a suggestion from the group members, the possibilities of establishing databases on ongoing research activities and on analytical methods used were studied. It became clear that it would not be reasonable to establish such databases on solid manure only, but that it would be interesting to establish an overview for all manures and organic residues. Furthermore, it was recognised that such databases would only be reasonable if they are easily accessible and regularly updated. An evaluation of the possibilities of putting such information on the ESCORENA web site and to update yearly is currently under way.
- A questionnaire on possible future activities was distributed to all the members of the working group, to ask who would be prepared to participate in which of the activities previously proposed.

Future activities

After the joint activities on the solid manure survey, activities of the working group slowed down somewhat. It is therefore a

major aim to reactivate the enthusiasm and the activities of the members until the RAMIRAN 2002 meeting. Suggestions for activities that the group should perform in the future will be worked out and discussed. The future form of the working group will follow the general rule that the working group is not a necessity *per-se*, but that its` existence, its` structure and its` activities should be based on the necessities of joint activities on solid manure recognised by RAMIRAN members. If the needs and interests of RAMIRAN change, the working group on solid manure can always be discontinued, reorganised or merged with another working group.

Menzi H., Pain B. and Smith K., 1998 : Solid manure in Europe: Results of a survey by the Working Group on Solid Manure of RAMIRAN. In Martinez J. and Maudet M.N. (eds): Proc. 8th International Conference on the FAO ESCORENA Network on Recycling of Agricultural, Municipal and Industrial Residues in Agriculture (RAMIRAN 98), Rennes (F) May 26-29 1998, vol. 2, 383-399.

WORKING GROUP ON MANAGEMENT OF ORGANIC WASTES

Giorgio Provolò

The Working Group on "Management of Organic Wastes" was created during the last Ramiran Workshop held in Gargnano, Italy (September 2000) because of the increasing interest on the problems related to this topic. This interest was reflected not only in the theme of the 8th Conference "Management Strategies for organic wastes in agriculture" that took place in Rennes (France) but also in the number of papers presented at the Workshop and published in journals.

To date the Group has formalised just the chairman. Few people showed interest during the meeting in Gargnano last year so the Group has not been very active as yet. This is a first attempt to define a framework for the activities of the Group including the main objectives and the working plan. It is hoped that this proposal will also stimulate some reaction from interested people so that agreement can be reached on future plans.

Outline of the Working Group

The utilisation of organic wastes in agriculture involves different aspects related to waste characteristics, handling and treatment techniques, spreading systems; etc. Most of these topics are dealt by specific Working Groups and a number of results and perspectives have been reported on several occasions.

The opportunity to focus on "management" derives from the increasing requirements to address the effect of the combination of the different techniques adopted in the farm system in relation to the environmental impact.

It is possible to classify the possible problems and research activities in two sections :

- management of organic wastes inside the farm (at farm level);
- management of organic wastes outside the farm (at territorial level).

The first section deals with the systems and methods for the correct management from the arrival or production on the farm till the end use (utilisation on the land or selling). The different management strategies have to consider the constraints imposed by legislation constraint and the availability of techniques together with their sustainability.

In this section are included problems related to:

- the agronomic use of organic wastes and the definition of tools for supporting the nutrient management planning as well as the modelling of nutrient behaviour in the soil;
- the evaluation of the environmental impact of the techniques used on the farm and the application of the principles of the Environmental Management System (EMAS, ISO 14001);
- the definition of the Best Available Techniques for reduction of emissions to air, water and soil (IPPC directive, 96/61/EEC).

The second section addresses the problems at the territorial level. The main aim is to evaluate the strategies for the reduction of environmental pollution related to the utilisation of organic wastes. It includes the assessments that take into account the aspects that are external to the livestock unit but that use the information that comes from the

farms. There is a strong link between these aspects and guidelines, regulation and legislation (EU, national, regional). Simulation models and GIS are tools often used in this context.

The important considerations related to the management of organic waste outlined above highlight the link between this Group and the others in the Network.

Aims of the Group

The main objective of the Group should be to share knowledge and experiences on organic waste management, defining common procedure for the definition and evaluation of different management system, where useful. In fact, although conferences and published papers are a good way to share the achievements, there is still a lack of interaction among people operating in this field.

For this reason, the Group would like to become a reference point for all participants. It could offer the possibility of keeping in contact people that involved in projects on similar aspects and providing a forum for discussing experiences and common questions.

A further aim might be to define a common method for the evaluation of management systems of organic wastes from the technical, economic and sustainability point of view.

The first step to be accomplished by the Group might be the constitution of a database of ongoing activities and research projects relevant to Organic Waste Management.

The database could include, for example :

- type of activity (research project, demonstration project, monitoring activity, control, etc.)
- topic of the activity (inside the farm, outside the farm, etc.)
- details of the activity
- title of the project
- description of the state and of achievements
- contact person

Of course, a better definition of the content will be obtained by the discussion among interested people.

The data base might be shared on the web and become the start of a web page of the group. The information might be gathered by collecting information through a simple and "quickly completed" form, distributed by email. The web site could include also relevant documents/links and eventually provide a discussion forum for the participants of the RAMIRAN Network.

Further activities will arise from the discussion among participants.

All people interested in making a contribution to the activity of the Group may contact the Chairman.

WORKING GROUP ON HYGIENE

Reinhard Böhm

Increasing concerns over links between human health and food safety and organic wastes have stimulated the activities of this Group.

The interests of the Working Group include the hygienic aspects associated with solid manure utilisation, liquid manure storage, treatment, spreading and utilisation.

the treatment, spreading and utilisation of sewage sludge, the collection, processing, spreading and utilisation of solid municipal wastes (bio-wastes) and the utilisation of industrial organic wastes.

Activities of the Group

The activities of the Group include discussion and information exchange on :

- Occurrence of pathogens in raw materials and substrates.
- Epidemiology of bacterial, viral and parasitic pathogens with respect to transmission to humans and animals.
- Survival and inactivation of pathogens during storage and treatment.
- Spreading of pathogens in the environment by utilisation (protection of soil, water and air)
- Effect of treatment on survival of pathogens (inactivation)
- Safe handling of the material from the point of view of occupational health

Future plans

The following topics are considered to be important for the future :

- Behaviour of TSE-agents during treatment and in the environment
- Transmission of antibiotic resistant bacteria and strategies for prevention
- risks connected with bio-aerosols generated in treatment and utilisation.
- Transmission of plant pathogens

Membership of the Group

The Working Group “Hygiene” comprises a core of basically involved scientists experts contributing to special questions.

These include Colin Burton, Silsoe Research Institute, Silsoe, MK45 4HS, UK.

Email : colin.burton@bbsrc.ac.uk

Prof. Irina Arkhipchenko, Research Institute for Agricultural Microbiology, St. Petersburg, Russia.

Email : bamil@riam.spb.su

Dr. Helvi Heinonen-Tanski, University of Kuopio, Kuopio, Finland.

Prof., Pavel Novak, University of Veterinary and Pharmaceutical Sciences, BRNO, Czech Republic.

Email : novak@dior.ics.muni.cz

Dr. Jan Venglovsky, Institute of Veterinary Medicine, Kocice, Slovakia

Email : venglov@tuke.sk

Concerning the associate experts, there is a strong link between RAMIRAN and MATRESA in the person of Colin Burton who is the co-ordinator for the latter programme. The following experts can be named in this connection. Dr. Claire Turner, (UK), Dr. Wolfram Martens,(D) and Dr. Ivo Svoboda,(UK)

LINKS WITH EU PROJECTS

RAMIRAN has strong links with a number of ongoing and recently completed EU projects. These include :

ROSA : Recycling Organic Solids in Agriculture

Coordinator : Dr Trevor Cumby, Silsoe Research Institute, Silsoe, MK45 4HS, UK

Email : trevor.cumby@bbsrc.ac.uk

Solid manures and many other solid organic residues contain useful amounts of nitrogen (N), potassium (K) and phosphorus (P) that can be recycled in grass and arable production. At present, much of this valuable resource is seriously under-utilised in favour of inorganic fertilisers. This is not only a waste, but the disposal of the residues by other means also leads to environmental burdens. Clearly, there are reasons why recycling is limited, for example :

- Crop and soil contamination with harmful substances and/or pathogens
- Variable quality of organic residues
- Handling, transport and spreading difficulties
- Seasonality and storage factors
- Odours and other emissions

This is an international problem shared by most countries in the EU. Therefore, to help find the way forward, we are collaborating with research organisations and universities in 11 other European countries.

- To achieve an international review of the current approaches to utilisation of organic solids throughout the EU
- To exchange experience on the technical, environmental and economic aspects of the topic and to learn from each other
- To jointly identify the main constraints which prevent more effective utilisation of organic solids, and to specify the technological developments needed to ease some of these constraints
- To define an international research strategy for the future which will facilitate better utilisation of organic solids.

MATRESA : Manure Treatment Strategies for Sustainable Agriculture

Coordinator : Colin Burton, Silsoe Research Institute, Silsoe, MK45 4HS, UK.

Email : colin.burton@bbsrc.ac.uk

MATRESA is an EU project classified as an Accompanying Measure and is a collaboration of 30 partners across Europe. The project started in February 2001 and will be concluded in July 2002 and is addressing three main themes : management of wastes in Europe, treatment techniques and measures for reducing related disease risks. It seeks to promote good technology transfer of existing and new techniques to end users throughout the EU including farmers, advisors and local authorities. This will facilitate better management of livestock wastes and so minimise environmental and health hazards whilst gaining maximum benefit from these materials.

A key objective of MATRESA is to produce a comprehensive reference book on current management techniques for livestock farm wastes (manures, wastewaters and solid organic residues). The main objectives are to:

- Review the subject area of waste management in agriculture for the purpose of defining the content of the proposed reference book.
- Produce a reference book for use throughout the EU and Europe to promote good waste management.
- Further disseminate information and issues arising from the project. This will be achieved through setting up and running a website and arranging an open one day seminar to launch the book and to promote the key findings.

AROMIS : Assessment and Reduction of Heavy Metal Input into Agro-ecosystems.

Coodinators : Henning Eckel, Helmut Döhler and Ursula Roth, Kuratorium für Technik und Bauwesen der Landwirtschaft e.V. (KBTL), Bartningstrasse 49, D-64289 Darmstadt, Germany.

Email : h.eckel@kbt.de; h.doehler@kbt.de; u.roth@kbt.de

AROMIS is an EU Concerted Action project that involves 20 research institutions from all over Europe. It recognises that the input of heavy metals (from livestock manures, sewage sludge or compost, inorganic fertilisers, industrial activities and

atmospheric deposition) is a serious environmental hazard. It can endanger soil fertility, the quality of agricultural products and water quality.

The main objectives of AROMIS are to :

- Identify the contribution of agriculture to soil pollution with heavy metals.
- Calculate national and model farm heavy metal balances.
- Establish a heavy metal database including balances and national/EU legislation
- Identify the need for further research and initialise and coordinate research projects.
- Identify the need for regulations and work out recommendations for legislative initiatives.
- Develop abatement strategies and assess their ecological and economic consequences.

ALFAM : Ammonia Losses from Field Applied Manure.

Coordinators : Sven G Sommer and Nick.J. Hutchings, Danish Institute of Agricultural Sciences (DIAS), Research Centre Bygholm, PO Box 536, 8700 Horsens, Denmark.

Email : sveng.sommer@agrisi.dk

ALFAM is an EU Concerted Action with collaboration from 10 EU countries. The environmental effects of ammonia deposition on sensitive ecosystems are well documented. It is also established that agriculture is the largest source of ammonia emission over much of Europe and that losses from field-applied livestock manures accounts for a large proportion (about 40%) of this. Loss of nitrogen from manures as ammonia also represents a significant financial cost to European farmers.

The European expertise on ammonia emissions from field-applied manures is confined to a relatively small number of researchers from the different Member States. The resources and expertise required to undertake measurement of ammonia emissions are high so ALFAM was conceived to improved cooperation between researchers and to ensure that the potential of their results could be fully exploited.

The project run for three years from December 1998.

The main objectives of ALFAM were to :

- Collate and analyse European data on ammonia emission from field-applied manure and to describe the relationship between agricultural practice, weather and ammonia losses.
- Promote the comparison of data collected in different European countries by describing standard techniques for measuring ammonia emissions and agreeing measurement protocols.
- Evaluate both the efficiency of the techniques available to reduce ammonia emissions and their economic implications.
- Identify the requirements for future research and development.
- Disseminate the findings to policymakers and advisors.

The final meeting of ALFAM was held in Brussels in September 2001. In addition to the participants in the Concerted Action, the meeting was attended by representatives from the Commission together with national policymakers and advisors from the Member States involved. A final report was published by DIAS in December 2001. (Ammonia Losses from Field Applied Manures. S G Sommer, N J Hutchings & O T Carton. DIAS Report No.60. Plant Production. 112pp.).

NUMALEC : Nutrient Management Legislation in European Countries.

Coordinators : Prof. Dr. Ir G Hofman and Patricia De Clercq, Coupure Links 653, 9000 Ghent, Belgium.

(see website at <http://www.soilman.rug.ac.be/numalec/index.html>)

The Concerted Action NUMALEC was funded through the EU FAIR programme and involved collaboration between representatives of all EU Member States, Norway, Switzerland and one of Europe's largest fertiliser producing companies. The aims were :

- To review existing and proposed national legislation on nutrient management in EU countries.

- To propose, where possible and where likely to be effective, harmonisation in nutrient management legislation on a scientific basis.

The findings of the project were published in a book in November 2001 : Nutrient Management Legislation in European Countries. P De Clercq, A C Gertsis, G Hofman, S C Jarvis, J J Neeteson and F Sinabell (editors). Department of Soil Management and Soil Care, Faculty of Agriculture and Applied Biological Sciences, Wageningen, the Netherlands. 347pp.

TOWARDS REDUCING AMMONIA EMISSIONS FROM LIVESTOCK MANURES

Brian Pain

During the past few years there has been considerable international activity that has implications for the reduction of ammonia emissions from agriculture. Since the important role of livestock manures in ammonia emissions is well established, this issue is particularly relevant to many of the participants in RAMIRAN. In addition to lessening the adverse effects of ammonia deposition to sensitive ecosystems, reducing ammonia emissions also helps to conserve nitrogen in manures and to exploit their value as fertilisers for crop production.

A new protocol to the UN/ECE Convention on Long-Range Transboundary Air Pollution was signed in December 1999 at a meeting of environmental ministers in Gothenburg. This, the Gothenburg Protocol aims to reduce acidification, eutrophication and ground level ozone through reducing emissions of four pollutants, namely sulphur, nitrogen oxides, volatile organic compounds and ammonia. For each country, agreed reductions in emissions of the four pollutants must be attained by 2010. This is the first time that any international treaty has targeted ammonia emissions that it aims to reduce by almost 20% by 2010 compared with 1990 levels. It recognises that by 2010, ammonia is likely to be the largest contributor to acidifying and gaseous nitrogen emissions.

The Gothenburg Protocol requires that, within one year of it coming into force (likely to be 2003), countries publish and disseminate a national advisory code of good agricultural practice to control ammonia emissions. To aid this process, an UN/ECE expert group on ammonia abatement led by the UK has drafted a “framework” code based on the best available techniques for reducing ammonia emissions. Individual countries may then adapt and modify this code to suit their specific circumstances and conditions e.g. in terms of climate, soil types, manure production and farm structure. The framework code includes guidance on reducing ammonia emissions from all the major agricultural sources for which practical and widely applicable techniques are available. It comprises six sections covering these techniques :

- Nitrogen management that takes into account the whole N cycle.
- Livestock feeding strategies.
- Low emission manure spreading techniques.
- Low emission manure storage techniques.
- Low emission animal housing systems.
- Limiting ammonia emissions from the use of mineral N fertilisers.

The code emphasises the need to be aware that reducing ammonia emissions may lead to losses of nitrogen in other forms (e.g. through nitrate leaching). Also that reducing ammonia emission at one stage of management may lead to higher losses at a downstream stage. For example, where an abatement techniques is employed for livestock housing, it is important to use a suitable low emission techniques for applying the manure to land.

In addition to the publication and dissemination of a code, the Protocol contains other mandatory measures that apply to certain sectors of the agricultural industry, particularly to large pig and poultry farms, similar to those addressed by the EU Integrated Pollution and Control Directive. More recently, in September 2001, the European Parliament and the Council of Ministers approved the EU National Emissions Ceilings Directive. Similar to the

Gothenburg Protocol, tight national ceilings have been set for four key atmospheric pollutants including ammonia (see table). The year 2010 is the interim target date for achieving the binding limits set for each Member State and 2020 the benchmark for achieving the long-term goal of keeping within critical limits for each pollutant. Meeting these objectives is expected reduced by about 30% (compared with 1990) the Community area with nitrogen depositions in excess of the critical loads.

Country	Ammonia emission target (kilotonnes/year)
Austria	66
Belgium	74
Denmark	69
Finland	31
France	780
Germany	550
Greece	73
Ireland	116
Italy	419
Luxembourg	7
Netherlands	128
Portugal	90
Spain	353
Sweden	57
UK	297
EU15	3110

NOTES FROM THE 11TH NITROGEN WORKSHOP, REIMS, SEPTEMBER 2001

Vesselin Koutev

N. Poushkarov Institute of Soil Science, Sofia, Bulgaria

I took part in the 11th Nitrogen Workshop in Reims, France from 9 to 12 September 2001. The following notes cover some of the aspects that may be of interest to participants in RAMIRAN.

The Workshop was divided into 3 main themes :

- Decomposition of added organic matter: concepts, methods and models related to C and N cycling.

- Long –term evolution of C and N in agro-ecosystems as affected by organic matter management, N fertilization and soil tillage.
- Management of nitrogen at field, catchment and regional scales.

Poster sessions under the topics “Decomposition of plant materials” and “Decomposition of organic wastes” were of interest. Work on the availability of nitrogen from plant residues incorporated into soil and different methods for assessment of plant residue quality was most interesting. Other research illustrated how carbon and nitrogen transformations and N availability from composts and other organic wastes depended on the quality of organic matter.

During the Workshop sessions, thematic working groups were organised. Organic wastes problems were discussed in Thematic Working Group 2: “Evaluating N availability in organic wastes” in which 45 participants took part. Although organic wastes have been used in agriculture for many years, it is evident that many research programmes are still continuing on the evaluation of N availability in these materials. The aim of the Working Group was to understand why there is still a need for research, to analyse the factors influencing N availability in organic wastes and to summarise the different methods used to evaluate N availability of organic wastes. Another very important point presented in the discussions was the origin of the organic wastes used in agriculture: should the use of any type of organic wastes be allowed in agriculture? The objective was to inform participants on the criteria used in the different countries to authorise the use of organic wastes.

Problems previewed in discussion included :

1. Factors influencing N availability :
 - New breeding methods e.g. outdoor pig production
 - Example of a developing treatment of organic wastes, composting
 - Influence of agro-pedoclimatic conditions
2. New tools to evaluate N availability : N fractionation, usefulness of simulation models

3. Quality criteria used in the different countries to authorise the use of organic waste in agriculture.

The main topics of discussion were :

1. Synthesis of posters
 - new wastes and waste treatments being introduced
 - lack of analytical information to understand N availability
2. Discussion of tools
 - need for good conceptual models for treated wastes based on other than C/N ratio
 - need for practical methods
3. Discussion on long-term effect of organic matter application
 - characterisation of organic matter
 - long term experiments with new wastes
4. Discussion on regulation of wastes application
 - France – density of animals and quantity of applied N
 - Canada – P problem
 - USA – P problem but voluntary
 - Sweden – animal density.

ANNOUNCEMENTS SCIENTIFIC MEETING

EAAP meeting in Cairo (EGYPT), 1-4 Sept.2002. European Association for Animal Production.

Organizing committee, registration :

cise@main-scc.cairo.eun.eg

Website : esap.org.eg

Programme

1. Livestock farming systems in harsh environment.
2. Animal handling and transportation : welfare issues.
3. Animal factors in pollution control
4. Free communications
5. Animal health maintenance in harsh environment
6. Drug use, drug resistance and alternatives to drugs.