COOPERL Forum: pig farmers and experts from six regions in Europe identify common future challenges.

The European Forum organised by COOPERL, Rennes 13th September, France's biggest pig production cooperative brought together farmers' organisations and experts from six regions with high livestock intensity: Brittany, Flanders, Netherlands, Lombardy, Catalonia and North-West Germany. Although production systems and environmental contexts may be very different between these regions, a number of regulatory and market trends were identified as shared.

Cécile Crespel, COOPERL, explained that the Brittany and North West France pig farmers cooperative brings together 2 300 farmers, employs 5 700 staff and produces nearly 6 million pigs per year (20% of France's production). The cooperative deals with the whole pork production chain, from the farm and manure management, through to slaughterhouses, meat processing and marketing.

**COOPERL research and innovation**
Prior to the Forum, speakers visited COOPERL's research farm at Ville Poissin, near Lamballe, Brittany, a full scale installation where 300 sows and 900 pigs/year pigs are raised, including fattening through to slaughter and piglet production and weaning, under fully controlled conditions. This enables testing of feeds, equipment, light cycles, genetic pig races and other factors, so that COOPERL can develop, test full scale and provide to farmers efficient production innovations. The farm also enables full-scale testing of manure treatment systems. Currently, a new stable building is under construction to enable full-scale and full production cycle testing of stable scraping systems (TRAC).

Cécile Crespel indicated that today around 10% of COOPERL pig farmers have manure solid / liquid separation and biological treatment installed, enabling production of some 50 000 tonnes/year of organic fertiliser products. COOPERL sells some 400 different formulations of organic fertiliser, with controlled and reliable nutrient balance adapted to different crop needs or regional products.

**Environmental progress and manure traceability**
COOPERL's TRAC stable floor scraper system results in solid / liquid separated manure production in the stable, so enabling separation of most of the phosphorus (in the solid fraction) in a region where P is becoming a limiting factor for manure spreading. The system also results in c.
50% lower ammonia emission (reduced air emissions, improved animal welfare). The urine fraction can be spread locally by farmers (90% of phosphorus and 55% of nitrogen are in the solids) and the solid fraction can be transported for centralised treatment. A new version of this scraper system now under testing (roll-out planned for 2018) includes thin lightweight, modular concrete slab elements and an autonomous robot scraper (rather than fixed mechanical scraper mechanism) which enable installation into existing stable buildings.

COOPERL are building a 150 000 t/y input biogas production plant to treat the collected manure solids, as well as meat production wastes, and process to organic fertiliser products (see ESPP News n°3, to be commissioned in 2018. Operation will allow traceability of organic fertiliser products, indicating from which farms input manure was used, considered important for user confidence.

Christine Roguet, IFIP (French pig industry institute), presented the geographical concentration of pig production in Europe. Six countries produce 70% of Europe’s pigs: Germany (esp. Lower Saxony, North Rhine Westphalia), Spain (esp. Catalonia, Aragon), France (Brittany), Denmark (Jutland), The Netherlands (North Brabant, Limburg), Poland. This spatial concentration is the result of interactions between market mechanisms and regulations, the consequence of political choices (competition on a global non-subsidised market). European policies are needed (e.g. CAP) to encourage environmental protection, animal welfare and actions need to be developed to convince consumers to pay for quality.

Kees Kroes, LTO (Netherlands national farmers organisation) explained that manure in the Netherlands contains some 77 000 tonnes of phosphorus (P) per year, with the biggest share coming from cattle, whereas land application is limited to 56 000 tP/y. Costs for pig manure disposal in the Netherlands are 15-25 ?/tonne, equivalent to c. 0.07? per kg pork.

**Regulatory complexity**
There are many complex regulations impacting manure use. Trends include low ammonia emissions field application, GPS and weighing control of manure transport, precision farming and manure processing to generate products adapted to farmers’ needs, circular economy initiative and biodiversity conservation objectives. Treatment technologies include mobile on-farm solid-liquid separation units, composting to ensure sanitisation (pasteurisation), co-digestion with other organic wastes to produce biogas with drying and palletisation of digestate, reverse osmosis separation and ammonia stripping (with problems that waste heat is needed to fuel this, and
generated nitrogen products are too dilute to transport).

New actors are entering manure processing and marketing of generated products, including cooperatives, contractors, co-digesters and lead farms taking several farms manures. There are currently around 100 manure processing installations in the Netherlands.

Emilie Snauwaert, VCM (Flanders centre for coordination of manure processing, Belgium) also underlined the difficulties posed to farmers and to manure processing by complex and overlapping regulations, including Nitrates Directive implementation, phosphorus spreading limitations and manure processing obligations. Average manure disposal costs in Flanders for different locations/arrangements range from around 4?/tonne for spreading on nearby farms to 17?/tonne for processing.

The most widespread manure treatment system in Flanders is biological treatment of liquid manure, often with shared installations between a few farms and recently with development of smaller single farm systems (< 10 000 t/y). Manure processing trends include:

- Post treatment (after biological treatment of liquid fraction) to address potassium, sodium, chlorine: e.g. wetlands, membrane treatment
- On-farm solid-liquid separation (screw press or centrifuge), with the liquid fraction used on-farm and the solids transported to central processing
- Nitrogen recovery stripping/scrubbing technology, the status of the end-product still needs to be clarified (Nitrates Directive (see SCOPE Newsletter n° 100)
- On-farm pasteurisation of solids, so enabling cross-border export into France
- Black soldier fly larvae used to convert manure solids to lipids for industrial applications (see SCOPE Newsletter n° 118

Christian Auinger, Schauer Agrotonic (Austria) summarised key issues facing pig producers in Germany and Austria as air emissions, animal welfare, Nitrates Directive implementation (including manure spreading limitation and reducing nutrient losses by changing soil management: e.g. low tillage, cover crops). Around 40% of ammonia emissions occur in stable buildings, 20% in storage and 40% in field spreading. Ammonia air stripping on stable buildings is expected to become a federal obligation in Germany (> 2 000 fattener pigs)

Market opportunities
Consumer studies suggest that organic production will increase from 2% of consumer meat
demand today to 5%, but that a further 30% of consumers are prepared to pay higher prices for animal welfare labelled meat. 65% of consumers will continue to buy the cheapest meat on sale. Straw on stable floors is expected to become obligatory, for animal welfare reasons, as well as implementation of floor scraper systems. Reducing air pollution offers synergy with animal welfare.

Francesca Malpei, Politecnico di Milano Dept. of Civil and Environmental Engineering (DICA), presented developments in Lombardy. The region has 4.5 million pigs, 1.4 million cattle as well as 10 million human population and industries. Today, around 400 anaerobic digestion plants treat a quarter of the region's pig manure. Other manure treatment systems are less common: around 250 screw press solid-liquid separation, 21 biological treatment of liquid fraction, 9 ammonia stripping, 2 ultrafiltration/membrane installations.

Livestock production accounts for around one third of Lombardy’s ammonia emissions, a quarter of methane emissions and 30% of PM10 fine particles in the atmosphere in Lombardy’s urban areas (ammonia and acidic gases generate secondary aerosols and so PM10 particles).

To date there is no government action on phosphorus spreading in manure, despite very strict limitations for sewage works.

**Environmental challenges in pig production in Catalonia**

Jaume Boixadera, Catalonia Region, indicated that the region has 6.4 million pigs (over one quarter of Spain’s pigs) and 24 million poultry. Catalonia has a Mediterranean climate and highly calcareous soils. Agricultural demand for raw manure is low because the driest lands and tree crops have limited needs of nutrients, only moister and irrigated lands (250 000 ha) need significant nutrient input. A difficulty is that over 60% of Catalonia pig production is “integrated”, with the farmer effectively producing as a contractor for food industry companies. This poses problems for manure management, because the companies leave this responsibility to the farmers, without costing into contracts.

Six manure processing plants in Catalonia closed when renewable energy subsidies were terminated but one large biogas manure treatment plant with reverse osmosis and ultrafiltration is still operating. Composting plants include three poultry manure composting plants.

Regulatory and policy priorities in Catalonia include: animal management on-farm (water, feed), improving manure field application (transport, manure treatment, developing nutrient products
instead of spreading up to nutrient load limits, so improving nutrient use efficiency) and reducing ammonia emissions. Phosphorus is not yet seen as an issue for manure management.

**Identifying common trends for manure management in different EU regions**

Bernard Rouxel, pig farmer and Vice-President of COOPERL, concluded that environmental performance is an obligation for European pig farmers, and that solutions need to be identified to enable this to be achieved whilst maintaining economic competitiveness. This will require moving from manure processing being a cost to making it an added value.

The following trends appeared as shared common concerns between the six European regions with high levels of pig production present at the Forum:

- Opportunity to develop markets towards consumers who are prepared to pay higher prices for pork produced respecting animal rights (e.g. straw in stables, scraper systems, non-castration, abattoir welfare concerns?) and environmental criteria. Quality label and marketing systems are needed to enable this added value.
- Phosphorus spreading limits (beyond the ?literal? implementation of the Nitrates Directive which limits only nitrogen)
- Processing manure to enable production of fertiliser products. Processing to solid organic fertilisers adapted to crop / user needs and compatible with transport can be economic and compatible with biogas production. Other manure treatment processes, such as osmosis or air stripping, have yet to demonstrate economic viability and a capacity to generate marketable products.
- Combinations of on-farm initial processing (or several grouped farms), such as solid-liquid separation or biological treatment, and centralised further processing to produce and market fertiliser products. Involvement of new actors (contractors, farmers? cooperatives, organic fertiliser companies) in manure processing and marketing.
- Value of traceability to ensure user (farmer, food industry) confidence in recycled fertiliser products
- Reducing ammonia emissions, because of both greenhouse gas impacts and local air quality (including PM10 particles) in stables (e.g. scraper systems, air stripping), storage (e.g. covering of manure storage) and field application (injection into soil, on-tractor acidification?)
Return to the **SCOPE In Press** section.