

**Agenda of Action in Support of Sustainable Livestock Development**  
**CONSULTATION ON FOCUS AREA NUMBER 3:**  
**TOWARDS FULL RECOVERY OF NUTRIENTS AND ENERGY FROM**  
**ANIMAL MANURE**  
**Seoul National University, 25-27 April 2012**

## **Introduction**

This consultation, jointly organized by the FAO Secretariat and Seoul National University, Republic of Korea, was made possible by the Governments of Switzerland and The Netherlands. The broad goal was to consider how to move ahead under the Focus Area of the proposed Global Agenda of Action in support of Sustainable Livestock Development (GAA) concerned with promoting better manure management, with the following specific objectives:

- To identify targets in terms of livestock production systems, commodities, regions and socio-economic contexts;
- To identify gaps in knowledge and capacities and ways of addressing these;
- To identify comparative advantage and added-value of the Agenda of Action
- To identify priorities and themes for targeted actions;
- To broaden the Agenda's basis of involvement and identify additional partners for this area;
- To review outputs from previous meetings and carry on the design of an action programme.

An issues paper, [Zero Discharge: Towards Full Recovery Of Nutrient And Energy From Animal Manure](#), was previously posted by the Secretariat.

About 30 participants attended from different regions including Africa, Asia East, South-East and South, Europe, and North and South America, representing governments, international organizations, the private sector and academia (see List of Participants).

## **Summary of Discussions**

The workshop commenced with briefings on the Green Growth Programme of the Republic of Korea and its relevance for dealing with environmental issues of intensive livestock production. As well as providing subsidies for adoption of appropriate manure treatment and recycling technologies by its beef, poultry, dairy and swine industries, the ROK also has strict regulations for prevention of manure discharge into the environment: strong public awareness and political commitment to a clean environment play an increasing role in ensuring that these regulations are consistently enforced.

Participants were briefed by FAO on earlier discussions among potential stakeholders leading towards establishment of a GAA in Support of Sustainable Livestock Development and on the rationale for selection of three areas of focus including the issue of animal manure management.

Pierre Gerber of FAO elaborated the manure management issue. Discharge of animal manure into the environment causes pollution of soils and water resources and the emission of noxious gases. This results in public health risks (e.g. waterborne diseases), biodiversity losses, economic losses (e.g. increased water treatment costs) and contributes to greenhouse gas (GHG) emissions. The pollution issue is particularly acute where large numbers of animals are physically concentrated and not connected to crop land where manure can be applied as organic fertilizer. Total amounts of nutrients (N, P and K) available in livestock excreta are even larger than the total amounts of N, P and K provided in synthetic fertilizers. Improved animal diets and feed conversion ratios can contribute to reducing the percentage of nutrient excreted as manure. The nature of the biological process by which animals convert feed into energy and body mass will, however, always result in the excretion of a significant share of the ingested nutrients. Between 50 to 90 percent of the nutrients contained in feed are not transformed into livestock products but are excreted. No more than 40 percent of N ingested by a dairy cow is retained in milk. Similarly, about 20 to 30 percent of dietary energy contained in feed is not digested by animals. Traditional pastoral and mixed systems have long used nutrient and organic matter in manure as an input to agriculture or fuel. Recycling manure is particularly difficult, however, when livestock production is physically concentrated, limiting the opportunities to apply manure to crop land. Such concentration occurs because costs can be reduced by locating close to consumption centers and supplies of feed, or within the operational area of support industries. Many countries are experiencing this clustering of livestock production units and struggle to manage the environmental consequences. Impacts related to manure discharge are only likely to get worse as confined livestock production expands rapidly and continues to concentrate in geographically limited areas. Poorly handled manure causes runoff of nutrients (mainly N and P) and leaching into surface and ground water systems. Manure also emits GHG, especially when stored in uncovered deep lagoons and applied to land. Pork and dairy production are the main concerns as they usually generate liquid manure or slurry which is difficult to manage. Slurry is often directly discharged into open streams causing surface water pollution, or spread on agricultural land in addition to chemical fertilizers causing nutrient overloads, or else stored in permeable deep lagoons causing methane emissions and leaching.

Participants heard and discussed expert presentations on different aspects - technical, economic and regulatory - of manure management with the emphasis on regions such as EU and N America where zero discharge policies have been enforced for some time (see Agenda). Speakers provided an overview of the state of current knowledge and best practice as well as indicating some of the major knowledge gaps. Discussion of the reasons for lack of progress in addressing manure management issues in other regions concluded with the following list of factors that would need to be addressed:

- Government regulation and enforcement capacity (and political commitment)
- Farmer knowledge and confidence to make investments in sustainable LS
- Misinformation and lack of public awareness
- Economics and lack of good business models
- Technical aspects

With this introduction the workshop considered targets and priorities for action under the Global Agenda with respect to production systems (commodities, intensity, scale of production, crop-livestock integration, spatial distribution) and regions (institutional capacities, baseline information available, potential for private-public partnerships, climate).

Participants agreed that production systems primarily involved would typically be medium to large scale intensive pig and dairy units, where most of the growth in production is expected to originate, but small scale confined units could also constitute a serious pollution issue when they were physically concentrated and disconnected from mixed farming systems with sufficient land for manure recycling. Thus *concentration of units*, rather than their size, would become the most critical factor in targeting.

The working group on regional prioritization found big differences both between and within regions in terms of their willingness and capacity to address manure management issues. One general conclusion was the importance of public awareness and government policy commitment. A second was the key factor of cost and who pays for treatment and other mitigation investments: a viable industry is better able to invest. It therefore stressed the need to look at the whole situation (i.e. all of the constraint factors earlier listed) before planning interventions under the Agenda platform – the institutional and policy situation was crucial. It concluded that East Asia is probably the highest priority region for initial actions, followed by some countries in LAC, S Asia and Eastern Europe/CIS, but scoping studies would be needed.

As a result of workshop discussions the overall focus area objective remains essentially as drafted at the December 2011 meeting held in Thailand but with a proviso about concentration, viz:

- To create sustainable conditions for the adoption of nutrient recycling and energy recovery from manure in confined animal feeding operations *in areas of high concentration*.

Desired outcomes of the focus area would be:

- Cost-effective practices are required and adopted to avoid manure discharge into the environment or storage in uncovered lagoons;
- GHG emissions and nutrient loads in the environment substantially reduced through recycling of nutrients and recovery of energy from farmyard manure.

Presentations highlighted the contrasting nature of issues and policy responses in two important livestock-producing and exporting countries with different economic and geographical settings: Thailand and Holland (though it might only be a matter of time before one catches up the other). In Thailand the need for government action arose primarily from a perception of intensive livestock production as a public nuisance (particularly odour) and as a threat to public health and food safety, with legislation for

these two matters followed by introduction of a Code of Practice (COP) for livestock producers (voluntary but with some ‘carrots’ attached). The COP is complemented by regulatory measures to encourage re-zoning away from main population centres and to penalize improper waste discharge, at least by larger units. Implementing these measures faces difficult challenges especially of coordination within the public administration at both central and local levels but a promising start had been made. One positive factor was that in Thailand there is a thriving market for manure products as input to various kinds of agricultural production, horticulture and fish farming, so that it is possible for some farmers to make a little money from good manure management provided they have adequate labour available.

In The Netherlands, on the other hand, the whole environment facing the livestock industry, even though one of the most highly productive in the world, was more complex. The livestock industry actually generates a greater volume of nutrients (especially P) than needed by the entire agriculture sector, necessitating very costly treatment and transport interventions that add very significantly to costs of production<sup>1</sup>. These are all subject to a burdensome array of EU directives and Dutch national requirements that must be satisfied by producers, which in turn generates a constant search for technical and other forms of innovation on which the future viability of the industry largely depends. However sharing this highly-developed capacity for research and innovation could be a major asset for the proposed Agenda. Presentations on approaches to manure management by Korea’s dairy farmers and Canadian pork producers in Manitoba provided confirmation of this opportunity.

In working groups, participants examined constraints and potential lines of action under the proposed Agenda from the perspective of different stakeholders. Constraints were summarized in the following matrix prepared by the private sector working group showing requirements to be satisfied for farmers to invest in better manure management.

<b>Economic</b>	<b>Regulatory</b>	<b>Institutional</b>
Capital cost within bounds Workable business model Investment climate	Consistency Science-based Subsidy for public goods (recognize value of environmental services)	Political commitment Predictability Enforcement capacity Cross-linkages (between institutions & actions)
<b>Knowledge</b>	<b>Social</b>	<b>Technical</b>
Innovation Open access and extension	Base food needs satisfied Acceptance by single- interest groups	Soils suitability Temperature Topography Dispersal vs concentration

<sup>1</sup> Up to 30,000 euro/year in manure management costs for an average pig farmer in The Netherlands.

Accordingly, useful lines of action for the Agenda were categorized as follows:

<b>Lines of Action:</b>	<b>Characteristics:</b>
General: need to find “best-fit” solutions for each situation	Practical, science-based, adapted to context, economically sustainable
Political commitment	This is essentially a home-grown product but perhaps COAG could give governments a nudge
Regulatory framework	Both ‘carrots and sticks’ need enough weight to be credible
Dialogue and communications	Multi-stakeholder approach: engagement, trust-building, negotiation, compromise; communications form and style adapted to audience concerned; farmers don’t always trust extension messages; can use PPP’s where available.
Analytical work	Research market prospects for output products, as part of LT scoping of sustainable business models and innovation opportunities
Capacity-building	Use selected public institutions for training both public and private sector actors
Piloting and demonstration	Need to have effective ‘show-cases’ of how it can be done
Advocacy	May need to shift discourse on MM from ‘nuisance’ to ‘resource use’

### **Conclusions and Next Steps**

Workshop participants overwhelmingly felt the time was right to move this platform of the Agenda ahead into an active phase and considered in detail what specific steps were needed. The conclusions of these discussions are summarized below; ideally, most of them could be accomplished by the time of the MSP public launch meeting planned for September. The key to unlocking the Gordian knot of moving from vision to action seems to lie in the domain of analytical work: specifically, undertaking the scoping, targeting and foresight (STF) study that all agreed was necessary. The main burden of getting this work done inevitably falls upon the Secretariat (FAO) but all agreed that maximum use could and should be made of recent or ongoing scoping work carried out under other auspices.

<b>FA3 Activities</b>	<b>Implementation arrangements</b>
<p><b><i>Output 1: Research and Analysis</i></b>            Build LWM Research Group for analysis and development: a task Force is created with a central hub and <i>multi-disciplinary</i> network of experts and partner institutions in the area of economics, political science, law, land planning, public health and livestock waste management engineering.</p>	<p>(Multi-stakeholder based, FAO Secretariat to coordinate)</p> <p>Prepare TOR for scoping, targeting and foresight (STF) exercise (Secretariat, by end-July)</p> <p>Consider options for LWM Research Group establishment, how related to work under other ongoing initiatives (GRA etc) and additional resources needed (FAO + stakeholders, by September MSP).</p>
<p><b><i>Output 2: Knowledge-sharing, Communications and Advocacy</i></b>            Share science-based knowledge on the above through development of media and networks formatted for various audiences.</p>	<p>Draft discussion document on Declaration of Principles to be prepared for MSP in September (IMS Canada);</p> <p>Look at resource needs for setting up a full-time communications hub for the GAA (FAO).</p>
<p><b><i>Output 3: Capacity-building</i></b>            Develop partnerships and identify regional centres of excellence to foster policy innovation and technology transfer through region-specific training and capacity-building activities.</p>	<p>Assessment of existing programmes in the three selected regions – TOR to be included in Output 1 preparation.</p>
<p><b><i>Output 4: Piloting innovation and facilitating investment</i></b>            Piloting and dissemination of improved manure management methods; policy support on LWM.</p>	<p>Wait until Outputs 1-3 are set up and under way but in the meantime look out for piloting opportunities under other LS projects (WB, ADB, IDB, IFAD, etc).</p>

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