Solutions in the food system: how to get there

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Saltsjobaden 6
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UN Economic Commission for Europe
Gothenburg Protocol
Five Priorities for Ammonia

1. Low emission techniques for land spreading of cattle/pig/poultry manures and mineral fertilizers
2. Animal feeding strategies, inc phase feeding
3. Covers on new slurry stores
4. Farm N balance on demonstration farms
5. Low emission new pig & poultry housing
Slurry spreading: a wide range of low-emission techniques are available.

- Splash Plate Spreader - 1950s technology
- Trailing Shoe Slot Injector
- Trailing Hose
- Slot Injector

The car and the exhaust pipe...
Limus & Neem trials in wheat and maize for:

- NH$_3$ & N$_2$O emission;
- Crop performance

BASF & the Indian Agricultural Research Institute (IARI), New Delhi
Denitrification (as $\text{N}_2\text{O}$)

Denitrification was higher in continuous flooded rice as compared to the intermittent flooding.

Arti Bhatia, Niveta Jain, Renu Singh et al.
Policy cycle and barriers to change

Issue Concern
Nitrogen threatens the Planet

Science activity

Underpinning data
Processes, Trends, Number

Key messages

Press Interest
Policy interest
Policy Process (e.g. UN Conventions)

Public interest

Threats and Challenge for Action

• A basis to link between disciplines (air & biodiversity)
• As basis to engage with stakeholders
ENA Special Report

Launched
2014: Science Media Centre
2015: European Parliament
Eat Less Meat

A vital message is buried in a new report on climate change.

It is not alarmist to predict food shortages and price inflation within the next half century if we fail to change what we eat. The world’s population, now roughly seven billion, is expected to rise to ten billion by 2050. More than 200 million hectares of forest have been cleared for farming in the past ten years and forest clearance in the Amazon alone continues at a rate equivalent to 33 football pitches an hour. In the meantime, by far the most costly use of farmland is for grazing cows and sheep.

Rising crop yields and better science will undoubtedly help with food supply, but rising prosperity will also give more humans a taste for beef and lamb. One option is to herd the bulk of the world’s livestock indoors. The animals producing most of our red meat would never see the light of day or breathe fresh air. That might be economically but it would be neither compassionate nor healthy — for humans or the animals themselves. The right course is to raise livestock with due regard for animal welfare and retain meat as part of a balanced diet. That means eating less of it.

How much less? For Britons, 40 per cent less.

According to the Department of Energy and Climate Change, the figure comes from a report on changes that the department says will have to be made to our lives to do our “fair share” towards limiting global carbon emissions.

Meat production is a carbon-intensive business, and the political urgency behind the report is the need to appear serious about carbon emissions in the build-up to a UN climate conference in Paris in November. The environmental urgency is another matter. It will be hotly debated long after the conference, whether or not the heads of state attending reach any sort of accord and whether or not world temperatures actually rise in line with scientists’ projections.

What is not in doubt is the compelling case for cutting back on meat, regardless of its impact on global warming. A 30 per cent reduction in meat consumption would, according to the chief medical officer has said, prevent 18,000 premature deaths a year in Britain. Globally, meat farming is a big cause of acid rain because of the high ammonia content in animal waste. It is a principal cause of deforestation but also of desertification as a result of over-grazing. The former drives down biodiversity. The latter hurts farm yields, and both trends will only worsen as demand for more western diets grows among China’s rapidly expanding middle class.

That demand will be used as an argument for more intensive factory farming of cattle and sheep. The technology exists and is being used to house huge new Chinese herds that live almost entirely indoors. This is neither an ethical nor a sustainable food future. The lesson of battery-farmed poultry and pork is that it depends on the over-use of antibiotics and produces meat that is too high in fat and low in protein to be worth the cost in animal welfare.

There is no doubt that freely grazing cattle are inefficient converters of farmland to food. A field the size of a football pitch produces, by weight, 60 times more fruit and vegetables than beef. This is not an argument for more industrialised farming, but for changing our habits. The US Department of Agriculture will shortly urge Americans to eat less meat. It is good advice. If we all did, we would be healthier and might even enjoy it more.
## Nitrogen and a Demititarian Europe?
### Example scenario of 50% consumption reduction

<table>
<thead>
<tr>
<th>Aspect</th>
<th>Unit</th>
<th>Reference</th>
<th>-50% meat, dairy and eggs</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Protein</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Average daily intake</td>
<td>g cap(^{-1}) day(^{-1})</td>
<td>83</td>
<td>75</td>
</tr>
<tr>
<td>Proportion of animal origin</td>
<td>%</td>
<td>60%</td>
<td>36%</td>
</tr>
<tr>
<td><strong>Red meat</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Average daily intake</td>
<td>g cap(^{-1}) day(^{-1})</td>
<td>88</td>
<td>47</td>
</tr>
<tr>
<td>Compared with the RMDI</td>
<td>%</td>
<td>207%</td>
<td>107%</td>
</tr>
</tbody>
</table>

Westhoek and the TFRN-EPNF (2014)
DEM•I•TAR•IAN
(adjective): Of or relating to a diet limiting meat consumption to half the standard portion eaten at regular meals.

EATYMOLOGY
(EET-UH-MOL-UH-JEE, noun)
the dictionary of modern gastronomy
JAMES BEAUD AWARDS-WINNING CREATOR OF @RUTHBOURBAIN
JOSH FRIEDLAND

Raising Awareness

BARSAc DECLARATION
The term appeared in 2009 in the Barsac Declaration, developed in Barsac, France, at the combined workshop of Nitrogen in Europe and Biodiversity in European Grasslands: Impacts of Nitrogen: “We declare our commitment to: a. Encourage the availability of reduced portion sizes of meat and animal products, compared with current standards in developed countries, for the preparation of healthy meals, b. Implement this commitment through promotion of the ‘demitarian’ option, which we define as a meal containing half the amount of meat or fish compared with the normal local alternative, combined with a correspondingly larger amount of other food products…”

ENVIRONMENTAL IMPACT
A 2014 report by the UN Economic Commission for Europe, Nitrogen on the Table, found that if a demitarian diet was adopted throughout Europe and meat and dairy intake was cut by 50 percent, it would reduce greenhouse gas emissions by 25 to 40 percent and lower soybean imports (mostly used to feed livestock) by 75 percent.
Nitrogen is cheap today. What about the future?

- Farmers want fertilizer cheap
- Environment & circular economy need fertilizer expensive

How will future drivers affect prices, innovation & environment?
Building the case for change

- Hard times: period of little commitment
- How can countries benefit from a joined up nitrogen approach?
  - **WAGES**: Water, Air, Greenhouse, Ecosystems, Soils
  - **Win-wins**: environment, food & energy security
  - **Nitrogen Use Efficiency**: a positive approach
  - **Nitrogen Circular Economy**: innovation & jobs
  - **Addressing the Barriers**: gravity of common cause