

"Will we be eating meat in the future?"

Linda Farmer AFBI Food Research Branch





on red meat

Red Meat

Headlines Nutritional Impact

FOOD AND DRINK

Eating red meat and cheese can help heart health, scientists claim

The key to a healthy heart may differ from previous guidelines



High protein diets may increase risk of heart failure, finds study

HEALTH



HEALTH & FAMILIES

Women who eat 3 bacon rashers a week at higher risk of breast cancer



Vegetarians more likely to show signs of depression, finds study



Headlines Impact on people

'Fish are vanishing' - Senegal's devastated coastline

C 1 November 2018

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Wed 31 Oct







Mor Ndiaye is worried about how he will survive because of depleting fish stocks

Foreign trawlers and an expanding fishmeal industry are increasingly threatening the livelihood of Senegalese fishermen, forcing many to migrate to Europe, writes the BBC's Alfonso Daniels.





Westhoek, H., et al (2011), *The protein puzzle*, PBL (Netherlands Environmental Assessment Agency)

Consumers are responding NUMBER OF VEGANS IN UK SOARS TO 3.5 MILLION, SURVEY FINDS

Seven per cent of British people have gone plant-based

Independent 3 April 2018

Vegetarian and vegan: A quarter of UK dinners have no meat or fish



BBC

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How much protein do we need?

How much protein do we need?

Ref	Description	Country	Based on	Intake per day (adult)
1	Dietary Reference Intake	USA	-	56g/d (M), 46g/d (F)
2	Reference Nutrient Intake	UK	bodyweight (0.75 g/kg)	53g/d (70kg/11st) 106g/d (140kg/22st)
3	Protein Intake Calculator	India	bodyweight	56g/d (70kg/11st)

50g/d protein

~ 200g (8oz) meat or cheese, or 7 large eggs

- 1. Dietary Reference Intakes for Energy, Carbohydrate, Fiber, Fat, Fatty Acids, Cholesterol, Protein, and Amino Acids (2005). Institute of Medicine of the National Academies, USA. https://www.nap.edu/read/10490/chapter/1#xxv
- Committee on Medical Aspects of Food and Nutrition Policy (COMA), 1991. <u>https://www.nutrition.org.uk/attachments/article/234/Nutrition%20Requirements_Revised%20Oct%202016.pdf</u>



3. www.MedIndia.net

EU 27, 2007



Average intake of proteins

Recommended protein intake

= 50 g/d = 18.3 kg/y

40% protein comes from vegetable sources

EU27 - eating 70% more protein than we need!



Westhoek, H., et al (2011), *The protein puzzle*, PBL (Netherlands Environmental Assessment Agency)

Vegetal

Total proteins

Is that really true? Spot check using 7 day individual intake data. Where does the protein come from?



EU 27, 2007



Average intake of proteins

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EU27 - eating 70% more protein than we need!

World, 2013

Protein Supply per person per day (FAO)



Westhoek, H., et al (2011), *The protein puzzle*, PBL (Netherlands Environmental Assessment Agency)

Total proteins

Animal

Vegetal



Intake of proteins - changes over 50 years

Average intakes for example countries

FAO, United Nations, Food Balance Sheets 1963-2013 United Nations: List_of_countries_by_population



Nutritional benefits of animal protein

- "First class protein"
 - All 9 essential amino acids

Mixed plant proteins ✓ Avoiding malnutrition, esp. developing countries

		FOOD CHAP	Meat, Liver, Muk,
[P	PROTEINS.	Flesh forming.	1st Class Protein: Meat, Eggs, Fish. 2nd Class Protein: Germ and Bran of Cereals, Pulses, and other Vegetable Protein, particularly that of Oatmeal. Protein, particularly that of Oatmeal.
-	FATS. CARBOHYDRATI (Starches & Sugar MINERAL SALT	Heat and energy giving. ES. Heat and energy giving. TS. Blood purifying and bone for Vitalising or "life" parts	Fat of Meat, Dairy Processing Liver Oil. Nuts. Liver Oil. Nuts. Flour and its products, Cereals, Potatoes, Sugars, Jam, Treacle, Syrup. Potatoes, Sugars, Jam, Treacle, Syrup.
В	VITAMINS. ROUGHAGE. WATER.	Body regulator. Body regulator. Solve digestion.	Fibrous parts of Green Vegetables Fruit. Outer husks of Cereals. All foods.

Nutritional benefits of animal protein

- "First class protein"
 - All 9 essential amino acids
- "Minerals
 - Iron, magnesium, phosphorus, zinc
- Vitamins
 - <mark>A, D,</mark> E, K, <mark>B12</mark>
- Bioactive peptides
 - May benefit human physiology
- Fats and fatty acids
 - Essential n-3 and n-6 fatty acids, CLA

Mixed plant proteins ✓

Avoiding malnutrition, esp. developing countries

Fish and meat are key so

Important for women, infants, older peopleAlso present in plants ✓ (bioavailability lower)

Meat, fish, dairy are important sources

Meat & dairy +

No vegetable sources of B12

MacNeill and Van Elswyck (2012), Webb and O'Neill (2008),

Missing factors! Why do we really eat meat?

- Social
 - E.g., celebrations, events
- Cultural
 - **Regional traditions**
- Gustatory
 - Because we like it!
- Satisfying
 - Sustains for longer



What are the alternatives?



MIXED FLAVOURS (3 X 9G PACKS)

What are the alternatives?

- Insects
- Microbial proteins
- Plant based "meat"
- Cultured meat
 - Eat less meat ...

Thursday	1 November 2018				
ΞF.	ARM	IRELA	ND		

'Bleeding' vegan burger gets approval for human consumption in the US



The 'Impossible' burger has received FDA approval





2nd International Conference on

Alternatives to the "Western Diet"?



- UK, ES, DE, FR

Western

- Scandinavian
 - DK etc
- Atlantic
- Mediterranean
- Indian

EAT-

Lancet Commission on healthy diets from sustainable food systems, Jan 2019

- More calories and proteins from whole grains and plant sources
- Fewer from animal sources



Willett et al., 2019. Food in the Anthropocene: the EAT–Lancet Commission on healthy diets from sustainable food systems. Lancet; 393: 447–92.

The future?

The Future?

WOR



PBL Netherlands Environe. ment Agency

THE PROTEIN PUZZLE

The consumption and production of meat,

the European Union

dairy and fish in

WORLD RESOURCES INSTITUTE

Installment 11 of "Creating a Sustainable Food Future" SHIFTING DIETS FOR A AINABLE FOOD FUTURE

Many papers and reports, e.g....



What is the Safe Operating Space for EU livestock?

Findings do not disagree. Focus on protein ...

- Westhoek, H., et al (2011), *The protein puzzle*, PBL (Netherlands Environmental Assessment Agency)
- Ranganathan, J. et al. (2016). Shifting Diets for a Sustainable Food Future, World Resources Institute.
- Buckwell, A. and Nadeu, E. (2018). What is the Safe Operating Space for EU Livestock? RISE Foundation, Brussels.



The Protein Puzzle Report Findings

- 1. Meat, dairy, eggs and fish are important in European diet.
- 2. Environmental, ethical and exploitation issues.
- 3. European consumption of protein is 2x global average.
- 4. Conversion of plants into animal proteins is generally inefficient.
- 5. Demand for animal products expected to increase.
- 6. Pressure for policy changes.
- 7. Three strategies proposed ...

Westhoek, H., et al (2011), *The protein puzzle*, PBL (Netherlands Environmental Assessment Agency)



The Protein Puzzle Report Findings

3 strategies:

- Modelling of scenarios compared with "business as usual"
 - 1. Improve production efficiency
 - cheaper inputs and reduced emissions
 - 2. Reduce local impacts
 - improved welfare
 - 3. Reduce European consumption of livestock products
 - good for environment and health.
 - cultural changes may be slow.



Westhoek, H., et al (2011), The protein puzzle, PBL (Netherlands Environmental Assessment Agency)

EU RISE report 2018 Findings

"The sheer immensity of the livestock challenge, and the needed response, is such that public authorities must be prepared to take bold initial steps to overcome the inevitable inertia.

Without such a jolt or shock there will be insufficient action."



Buckwell, A. and Nadeu, E. 2018. *What is the Safe Operating Space for EU Livestock?* RISE Foundation, Brussels

EAT Report

- " "Transformation to healthy diets from sustainable food systems is necessary to achieve the UN Sustainable Development Goals and the Paris Agreement... "
- "An opportunity exists to integrate food systems into international, national, and business policy frameworks aiming for improved human health and environmental sustainability."

The Lancet Commissions

Food in the Anthropocene: the EAT-*Lancet* Commission on healthy diets from sustainable food systems





Protein protein

What Future Meat?

- Protein availability is out of balance animal protein intake is too high in Western countries.
 - Issues for climate change and human health.
 - Consumers are increasingly aware.
 - Individuals are making choices.
- Will the demand for meat decrease?
 - In developed world? In developing world?Will there be action by policy makers?
 - To adjust livestock production and consumption??



Implications How do we respond?

Meat Industry

- Do nothing??
- Focus on new markets in China to cover potential decreases at home?
- Ensure optimum quality as livestock products become a "treat"?
- Make food from all animal protein?
- Diversify into alternative proteins?
- Produce smaller portions to meet demand for reduced intake?

Scientists

Research on:

- Use of novel protein co-products from livestock production?
- Ensure optimum acceptability of all cuts and products?
- Better use of plant and meat foods?
- Alternative diets to improve satiation?
- Ways to improve portion control?
- Communication!