



Royal Veterinary College
University of London

Food Safety for Poultry Meat and Eggs as a component of Food Security in Emerging Economies

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Outline

1. Food Security and food safety
2. Food Security: changing emphasis with economic development

Availability

Adequacy

Acceptability

The case of China

3. International food trade, food availability and food safety
4. Perspective from the UK

Food Security & Food Safety





WORLD FOOD SUMMIT

13-17 November 1996 Rome Italy

RVC

WORLD FOOD SUMMIT

13-17 November 1996 Rome Italy

- 180 nations
- Target of reducing the number of undernourished people by half by 2015
- Adoption of the [Rome Declaration on World Food Security](#) which sets forth [seven commitments](#) as the basis for achieving sustainable food security for all



Commitment One: we will ensure an [enabling political, social and economic environment](#) designed to create the best conditions for the eradication of poverty and for durable peace, based on full and equal participation of women and men, which is most conducive to achieving sustainable food security for all;

Commitment Two: we will [implement policies](#) aimed at eradicating poverty and inequality and improving physical and economic access by all, at all times to sufficient, nutritionally adequate and safe food and its effective utilization;

Commitment Three: we will pursue [participatory and sustainable](#) food, agriculture, fisheries, forestry and rural development [policies and practices](#) in high and low potential areas, which are essential to adequate and reliable food supplies at the household, national, regional and global levels, and combat pests, drought and desertification, considering the multifunctional character of agriculture;

Commitment Four: we will strive to ensure that food, agricultural trade and overall [trade policies](#) are conducive to fostering food security for all through a fair and market-oriented world trade system;

Commitment Five: we will endeavour to [prevent and be prepared for natural disasters](#) and man-made emergencies and to meet transitory and emergency food requirements in ways that encourage recovery, rehabilitation, development and a capacity to satisfy future needs;

Commitment Six: we will promote [optimal allocation and use of public and private investments](#) to foster human resources, sustainable food, agriculture, fisheries and forestry systems, and rural development, in high and low potential areas;

Commitment Seven: we will [implement, monitor, and follow-up this Plan of Action](#) at all levels in cooperation with the international community.



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Food Safety – the assurance that food will not cause harm to the consumer, is an inherent component of food security;



**Food
Security**

Availability

(sustainable production
of sufficient food)



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Accessibility
(physical and economic
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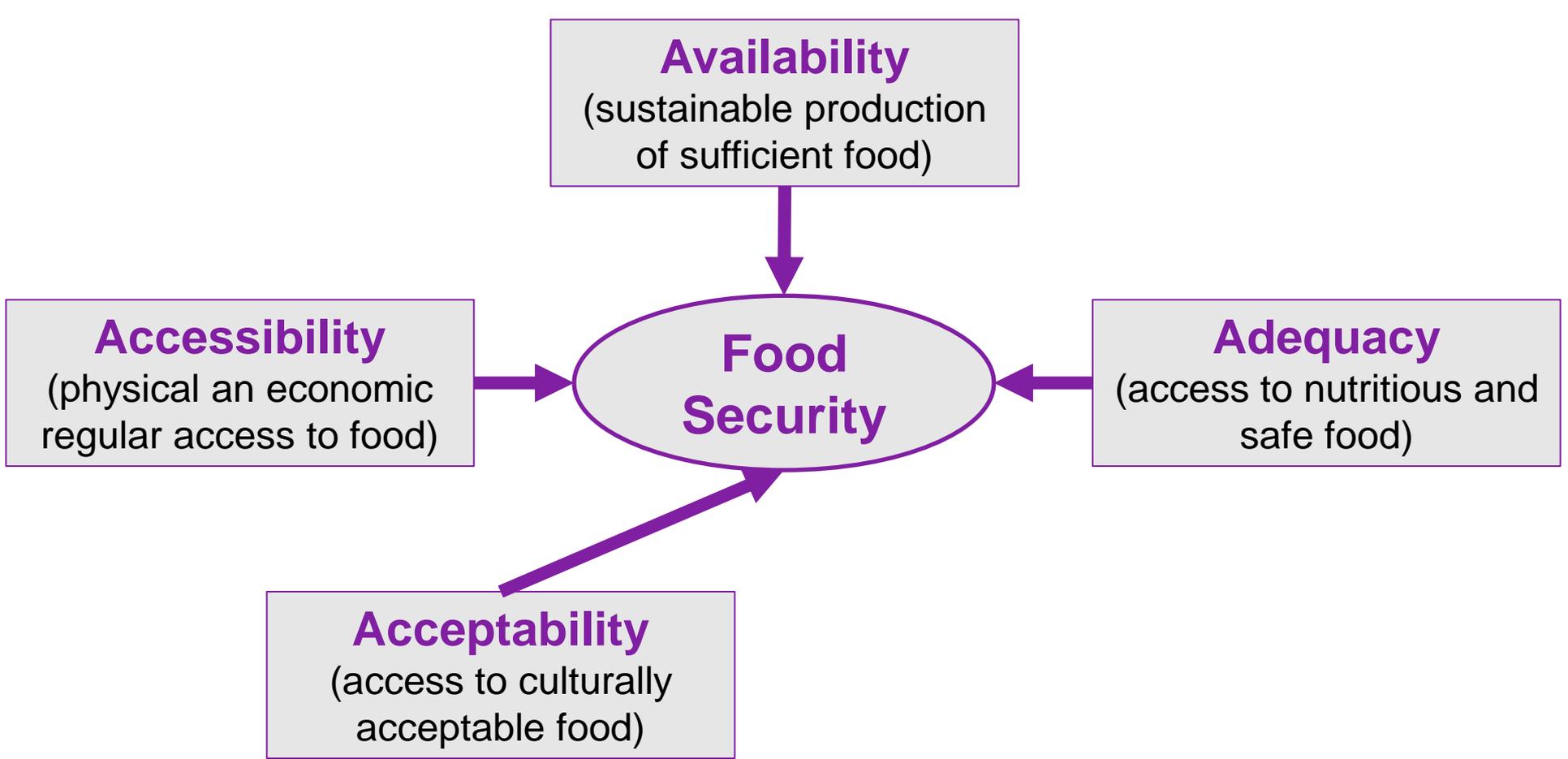
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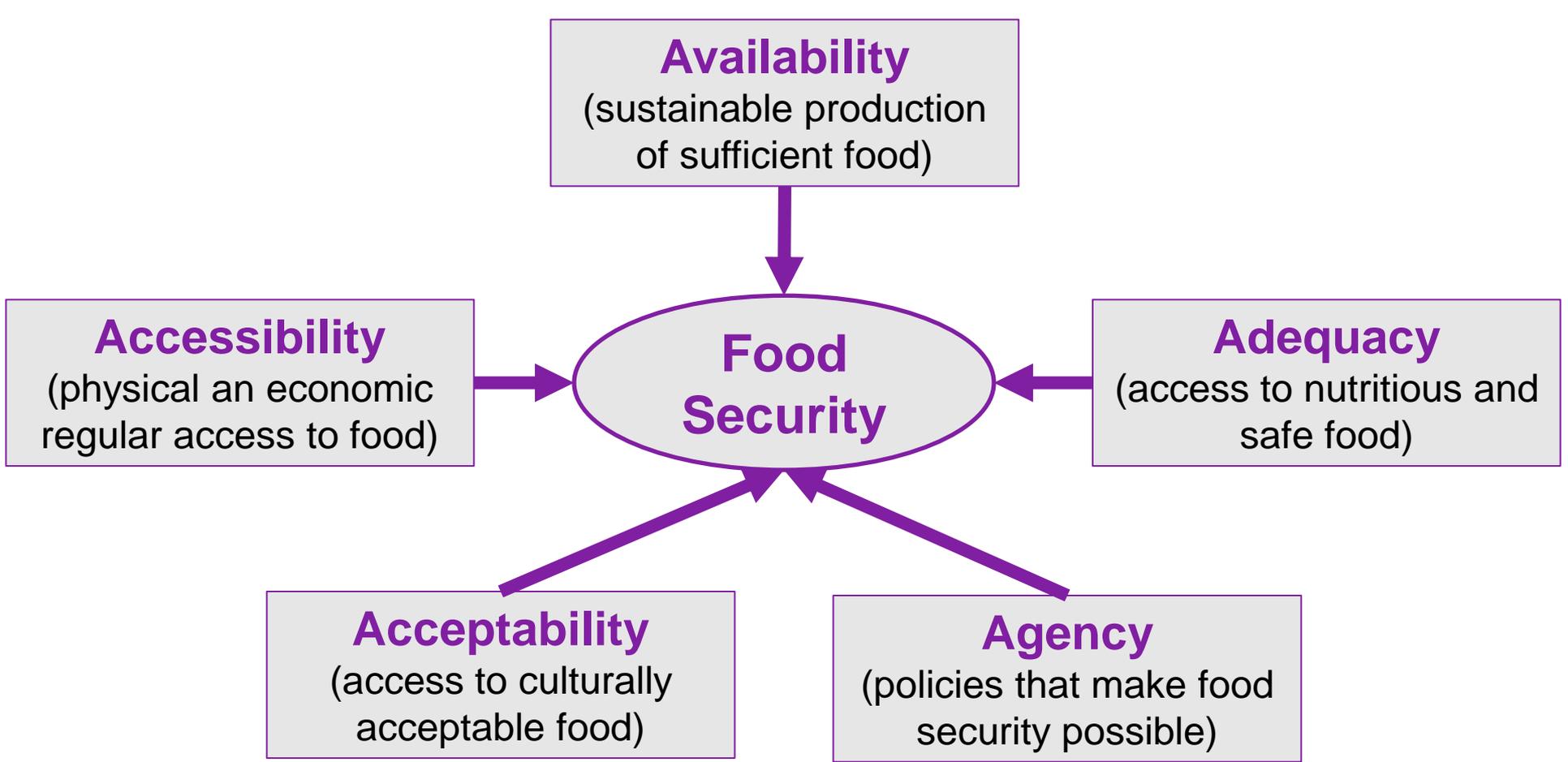


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Adequacy
(access to nutritious and
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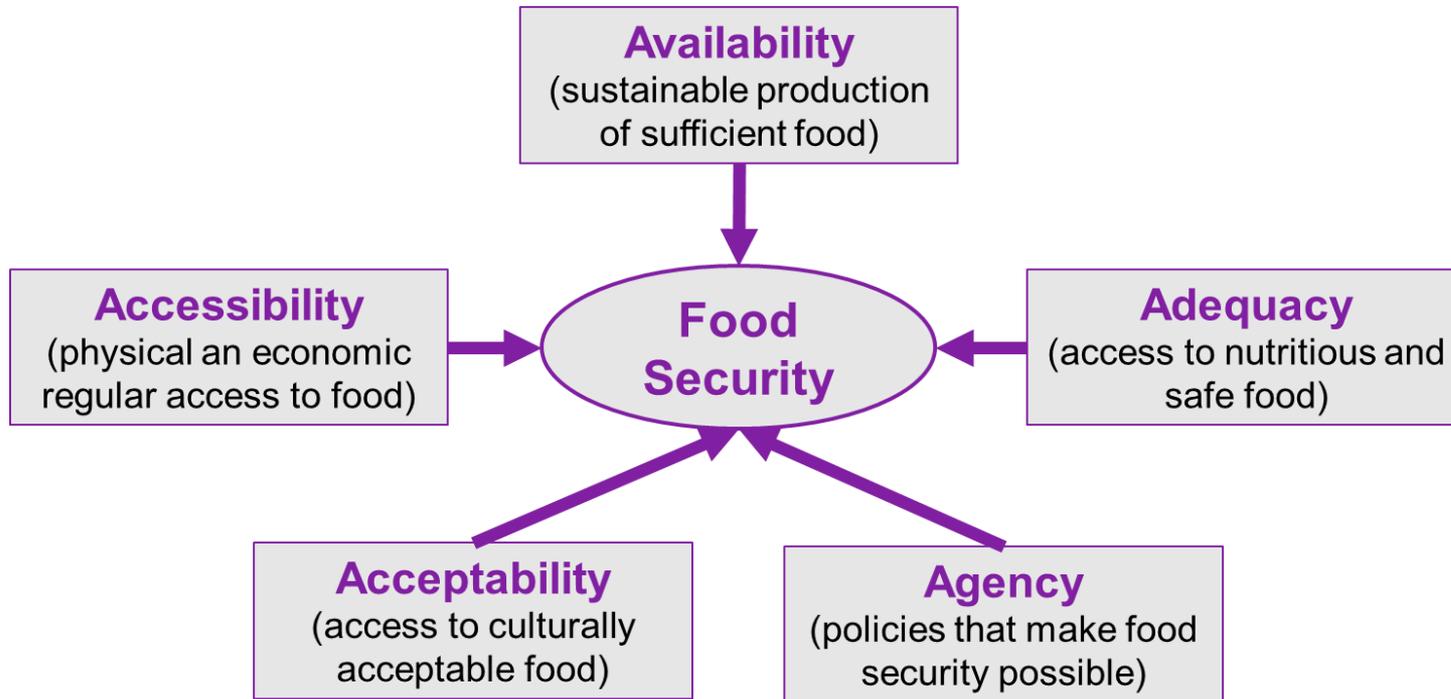


Agency
(policies that make food
security possible)

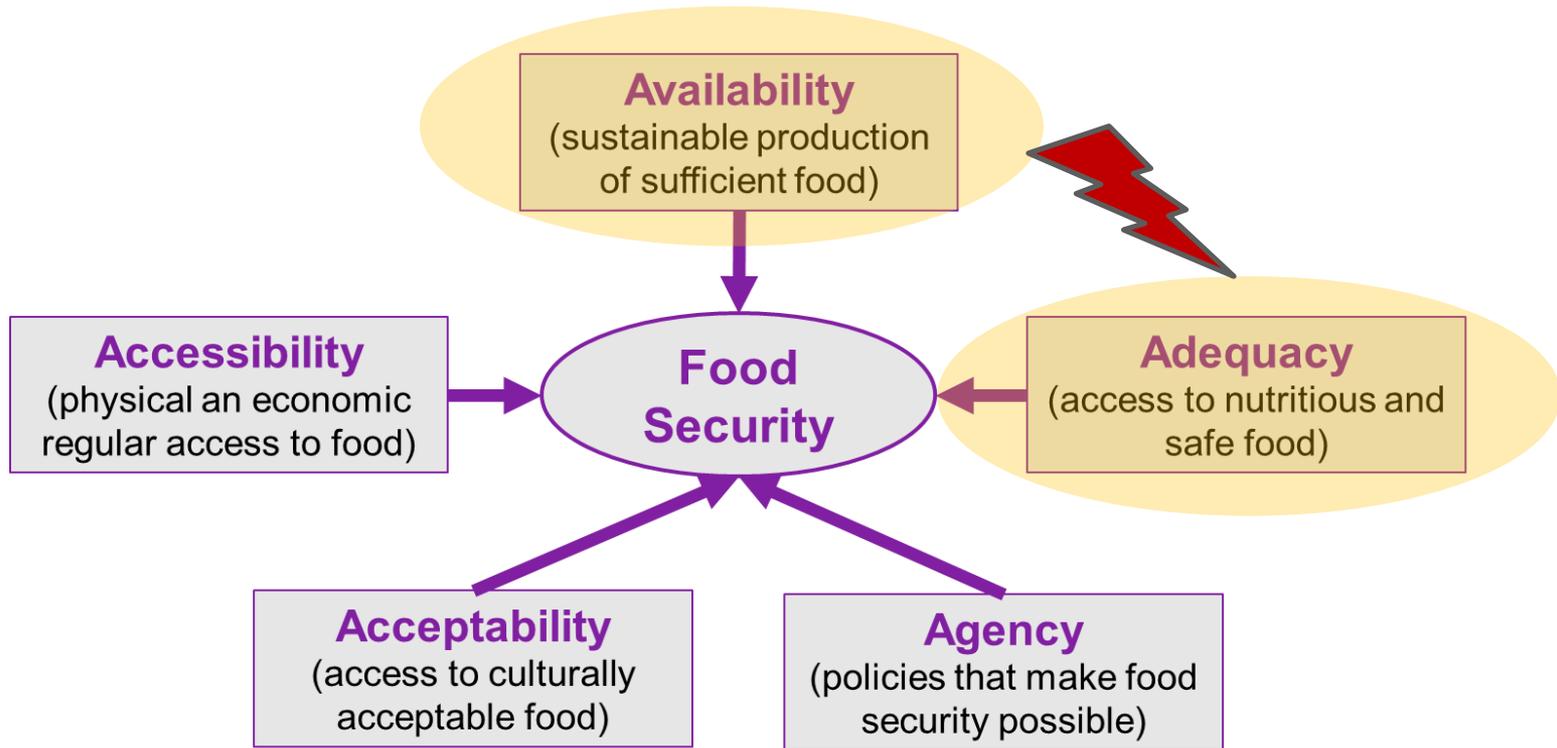


*Includes Food Safety
(but not only)*

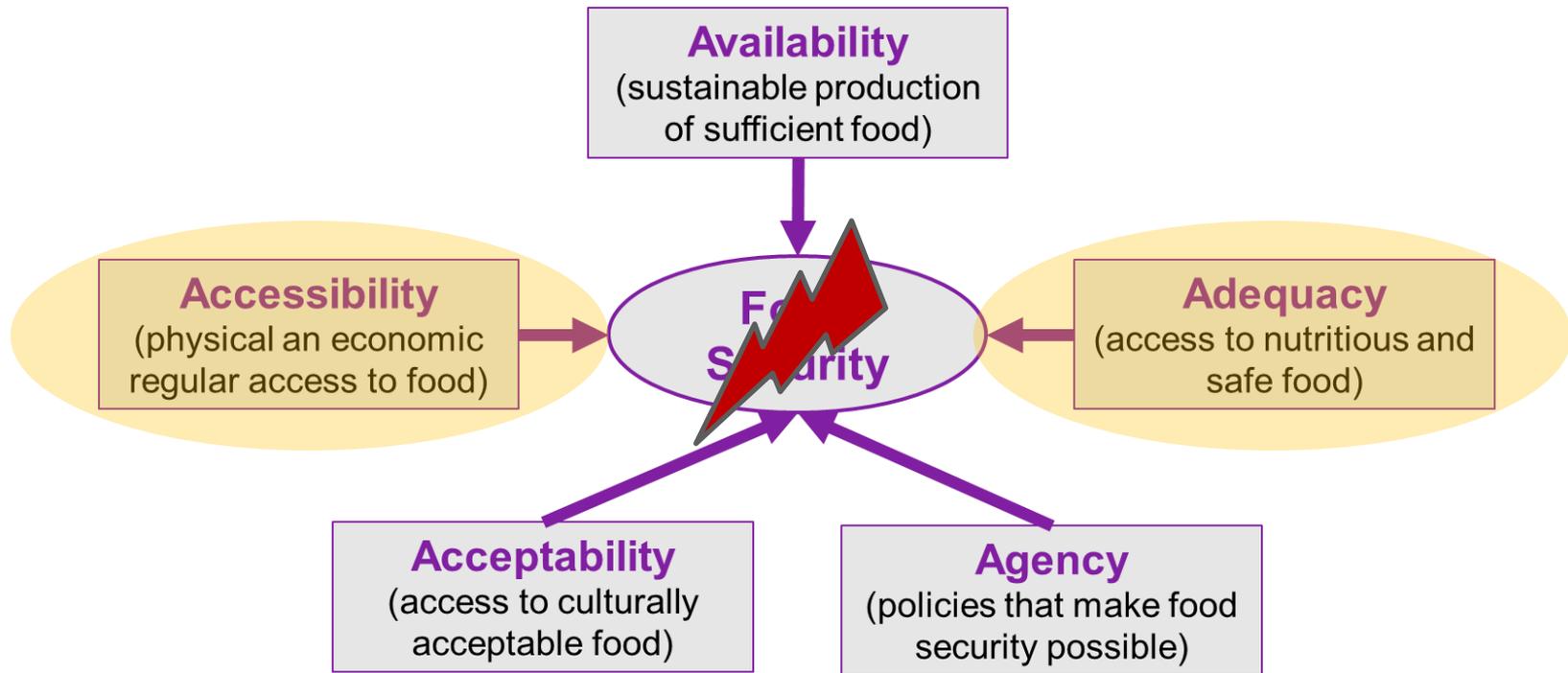
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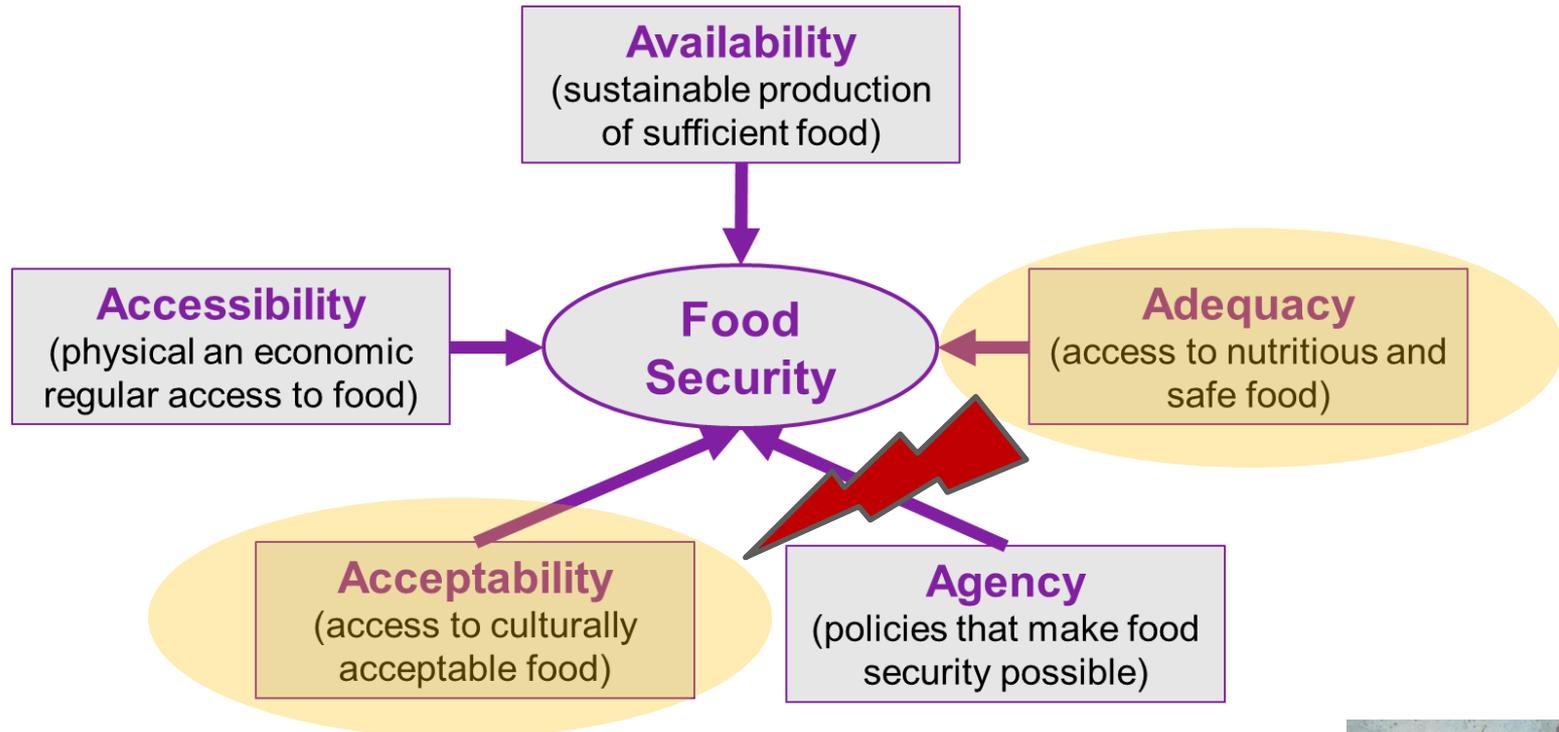
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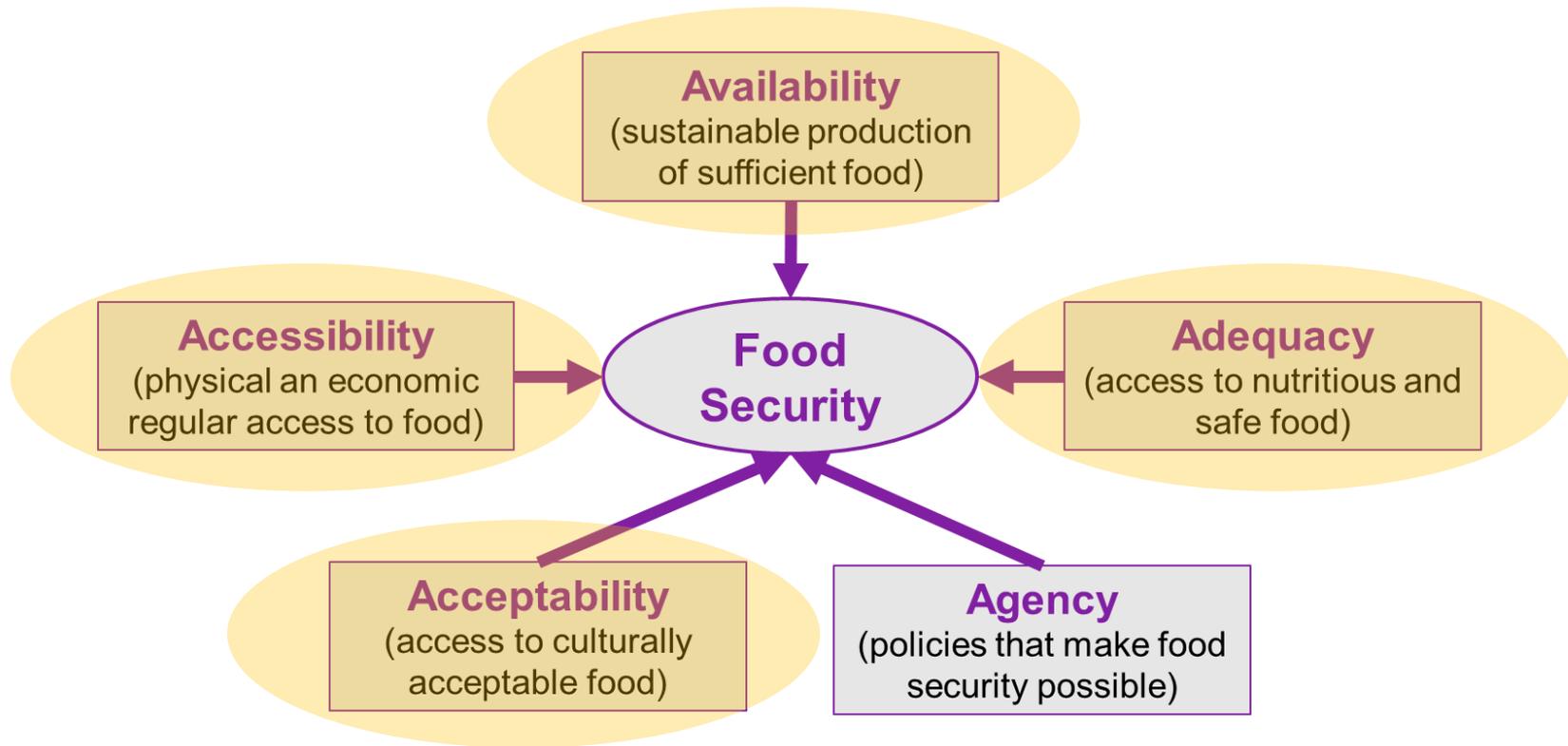
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Focus on tensions / trade-offs and how the emphasis on specific components evolves

Changing emphasis with economic development

availability > adequacy > acceptability

China: from availability to safety



Stage 1

Food availability is
not guaranteed

Ensure that animals
provide food & power
for crop production



After F. van Knappen – modified

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FOOD AVAILABILITY



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Stage 2

Food availability guaranteed, food safety legislation

Food inspection, control programs for food-borne diseases



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FOOD SAFETY



Stage 3

Highly organized production & quality assurance systems

Monitoring herds and production systems



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Monitoring health and welfare across production systems

FOOD ACCEPTABILITY



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Components of food security—change in emphasis: China

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In the 20th century China experienced periods of famine. Food availability and accessibility have been the key priorities.



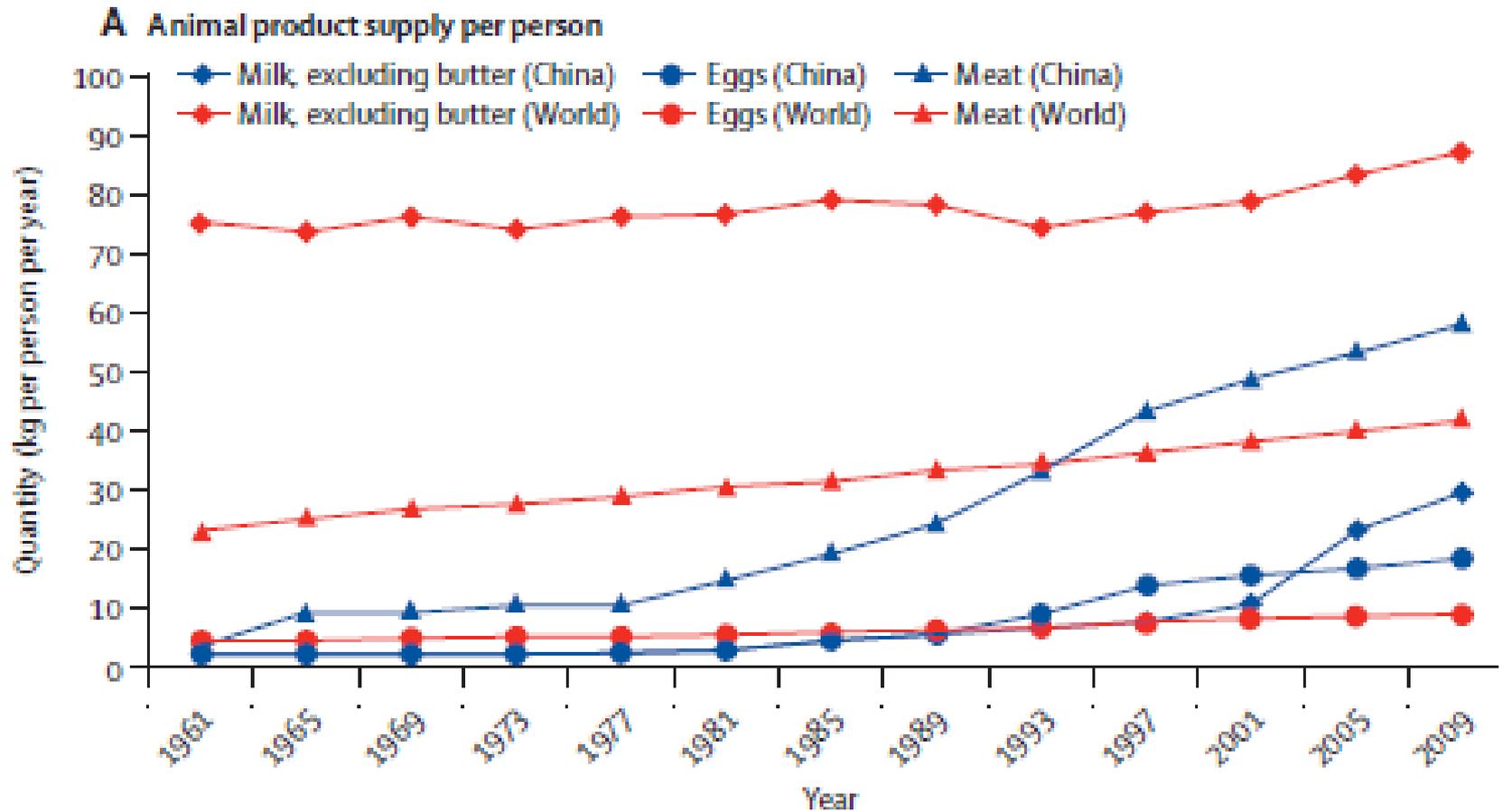
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Dietary shift during the last decades, with a large increase in the consumption of animal-derived products (meat, eggs, milk/dairy, fish).

The dietary shift in China



Source: H-M Lam et al. *Food supply and food safety issues in China*. Lancet 2013; 381: 2044-53



Food supply and food safety issues in China

Hon-Ming Lam, Justin Remais, Ming-Chiu Fung, Liqing Xu, Samuel Sai-Ming Sun

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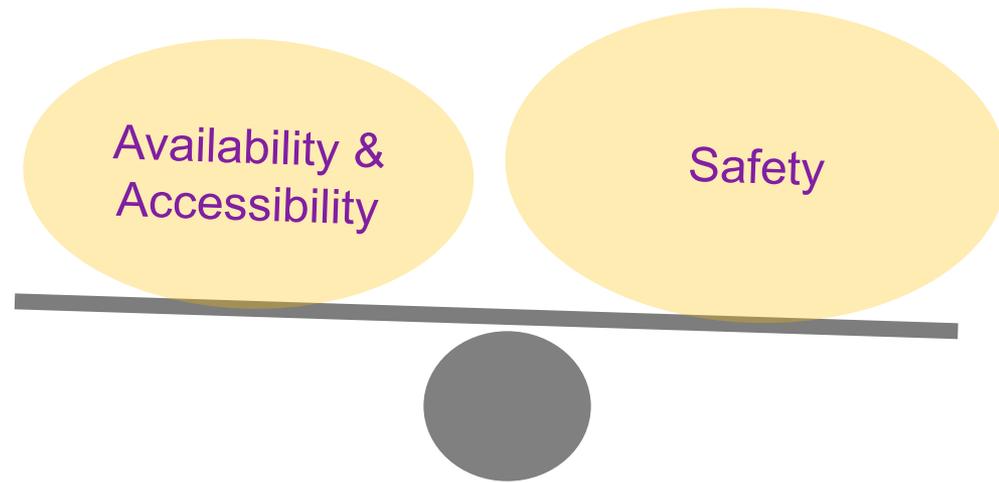
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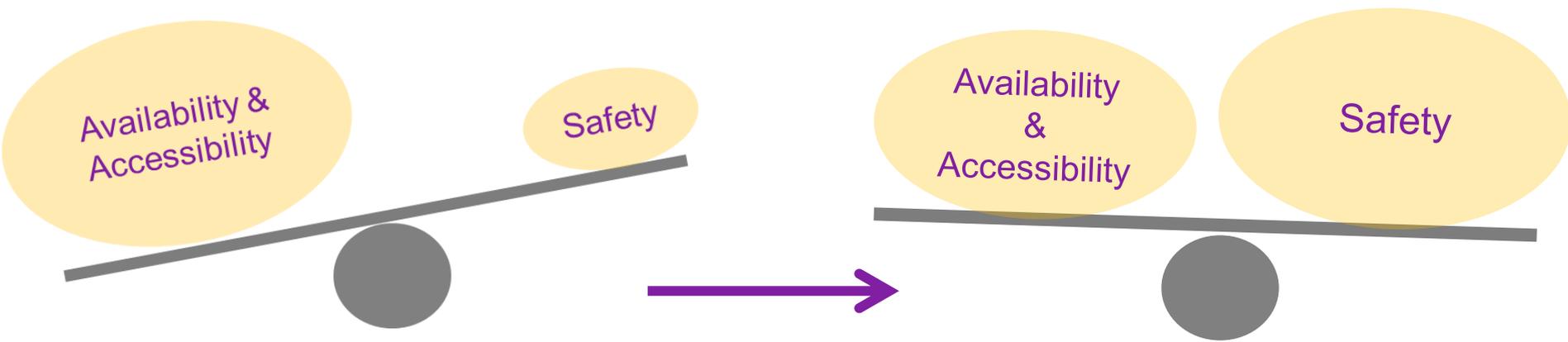
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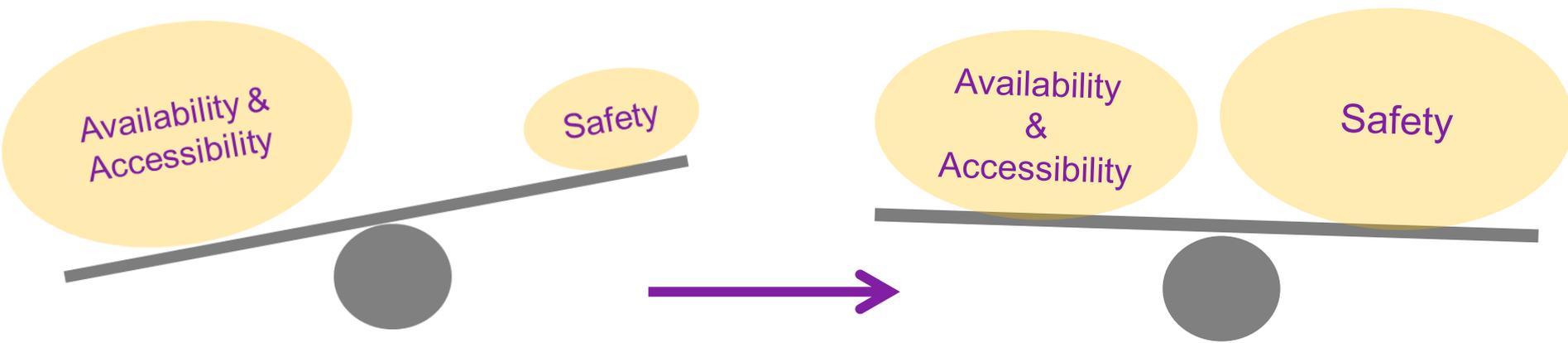


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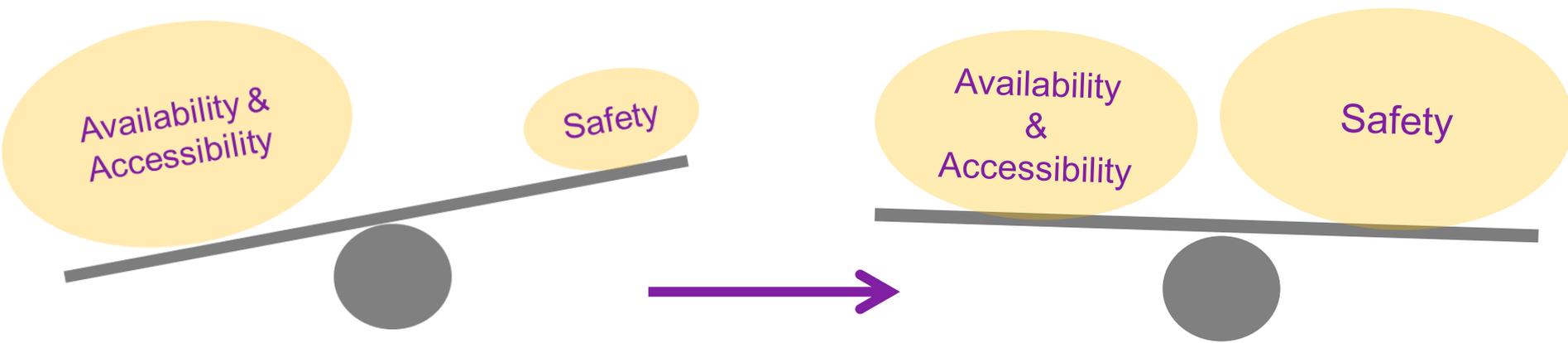




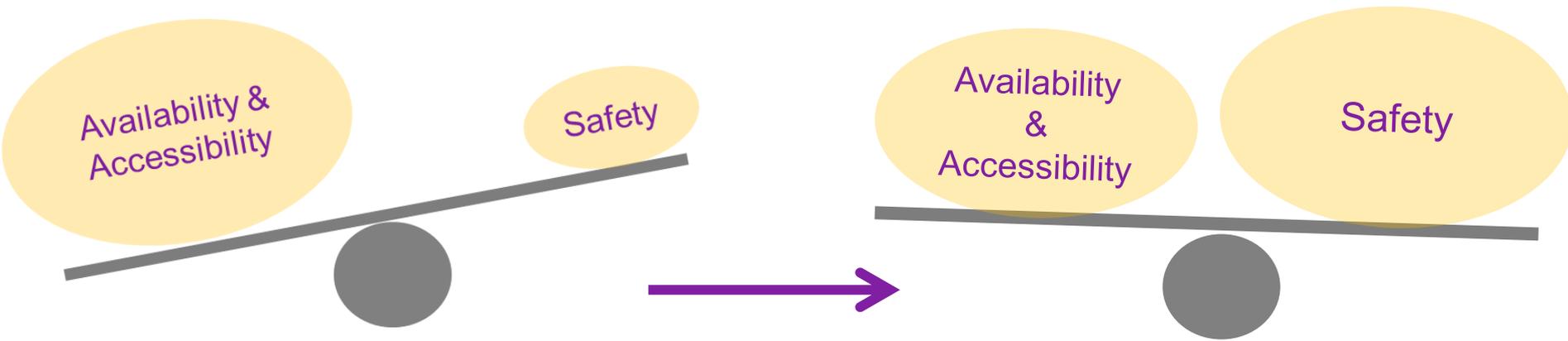
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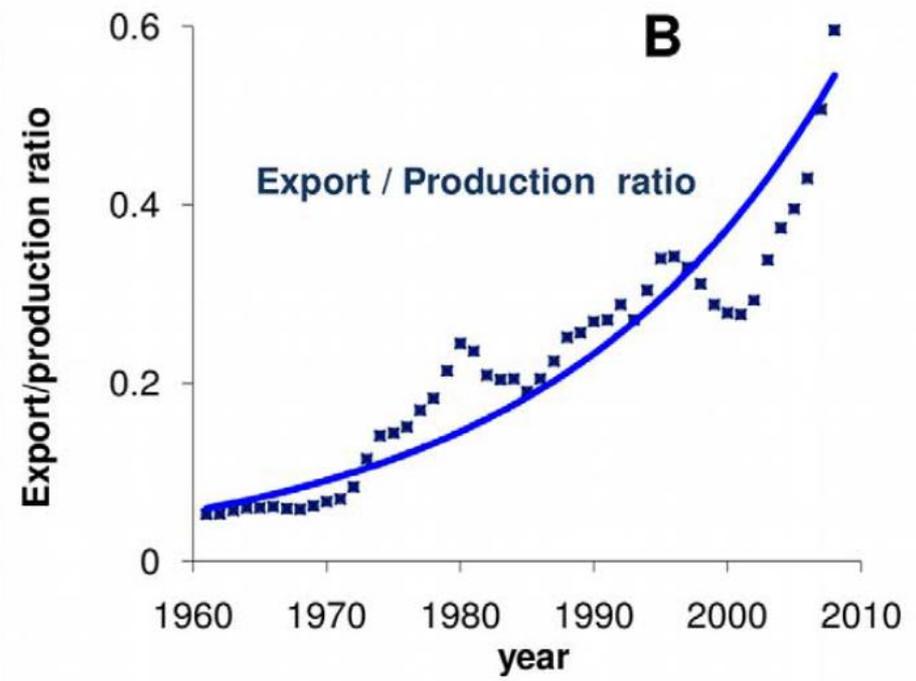
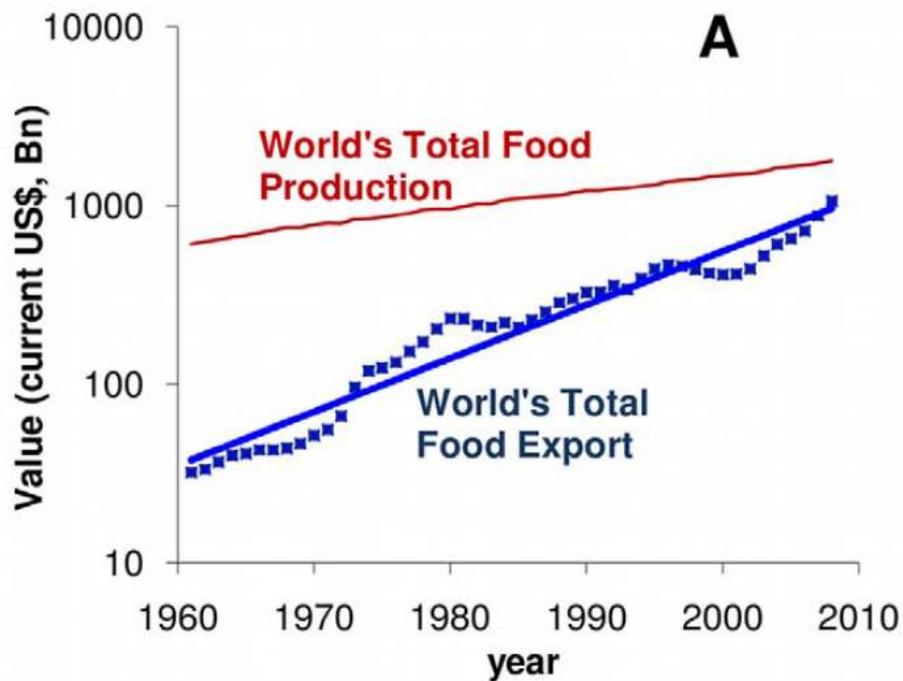
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The screenshot shows the BBC News website interface. At the top, there are navigation tabs for 'News', 'Sport', 'Weather', 'Capital', and 'TV'. Below this is a red banner with the word 'NEWS' and a 'Watch ONE-MINUTE WORLD NEWS' button. The main content area features a headline: 'China toxic egg scandal spreads'. Above the headline, it says 'Page last updated at 07:27 GMT, Thursday, 30 October 2008'. There are also links for 'E-mail this to a friend' and 'Printable version'. On the left side, there is a 'News Front Page' section with a world map and a small 'Africa' label.

Food safety is a **major concern for the Chinese population**: A survey in 2011 identified “food safety” as **the most worrying safety issue** (H-M Lam et al. *Food supply and food safety issues in China*. Lancet 2013; 381: 2044-53)

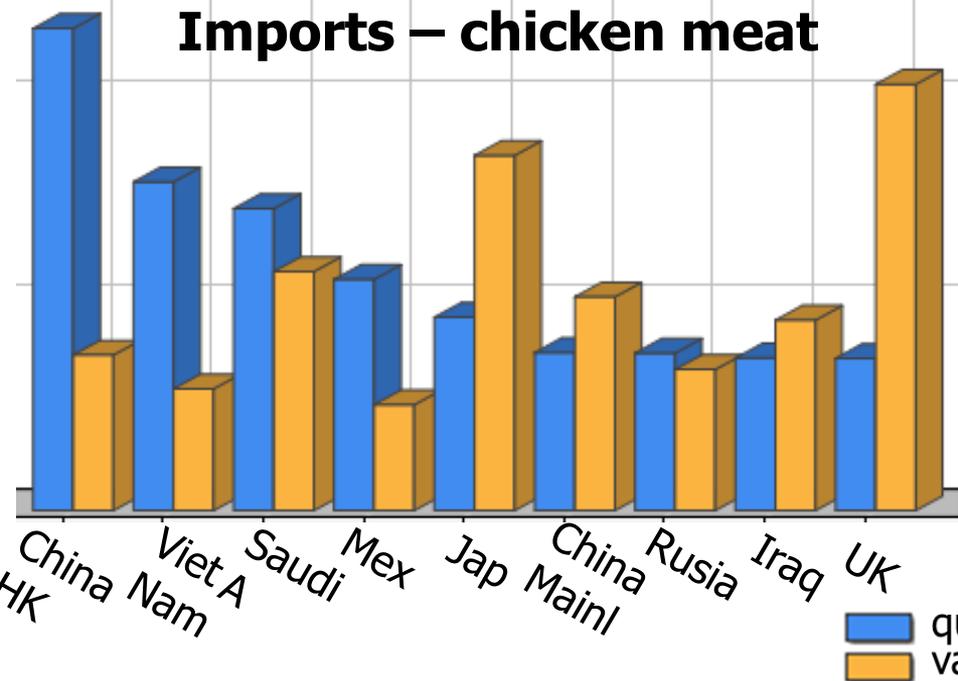
Impact of international trade on food availability, accessibility and safety



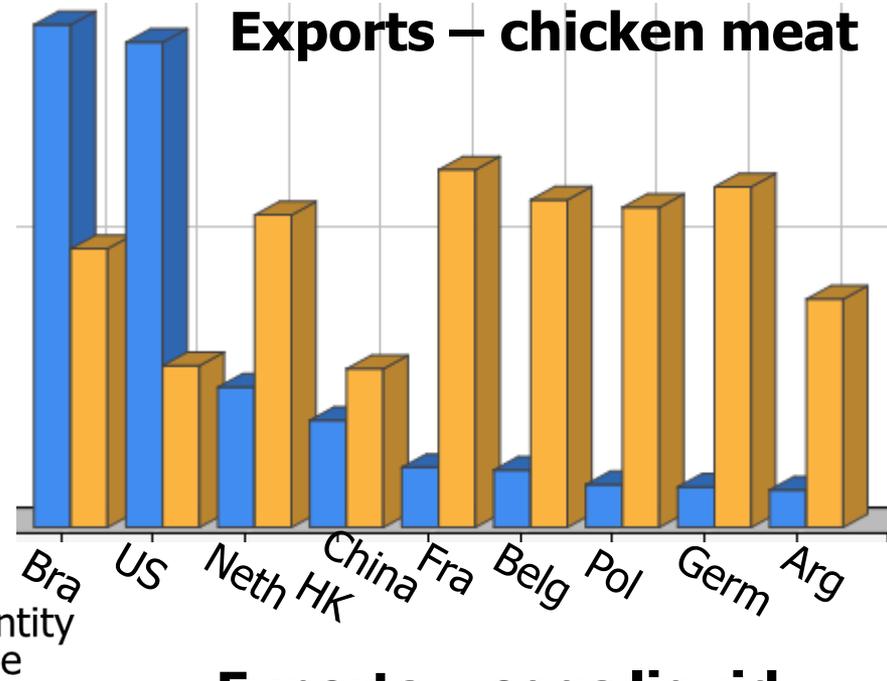


Recently published paper describing the global Agro-Food Trade Network – shows how **food trade is growing at a faster pace than production**

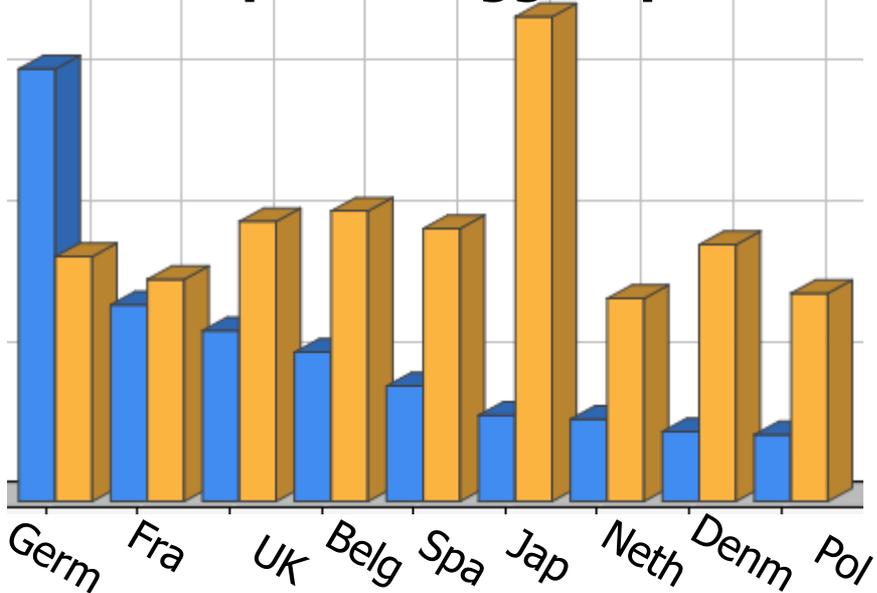
Imports – chicken meat



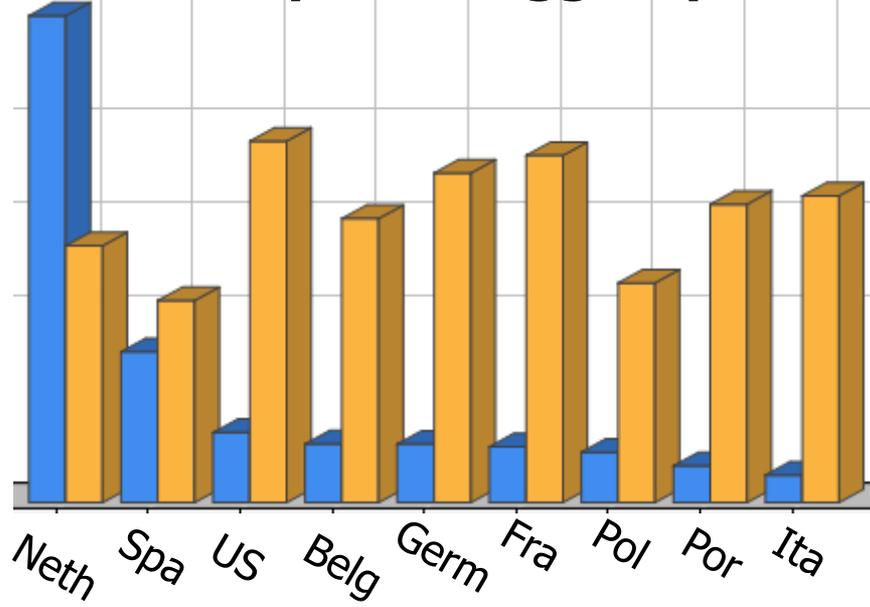
Exports – chicken meat



Imports – eggs liquid

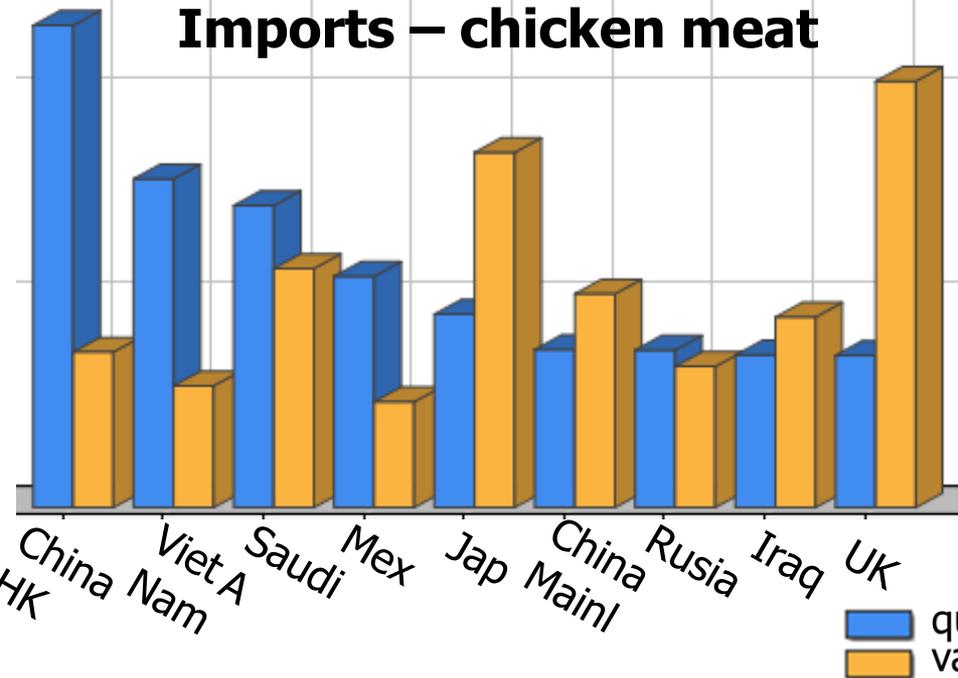


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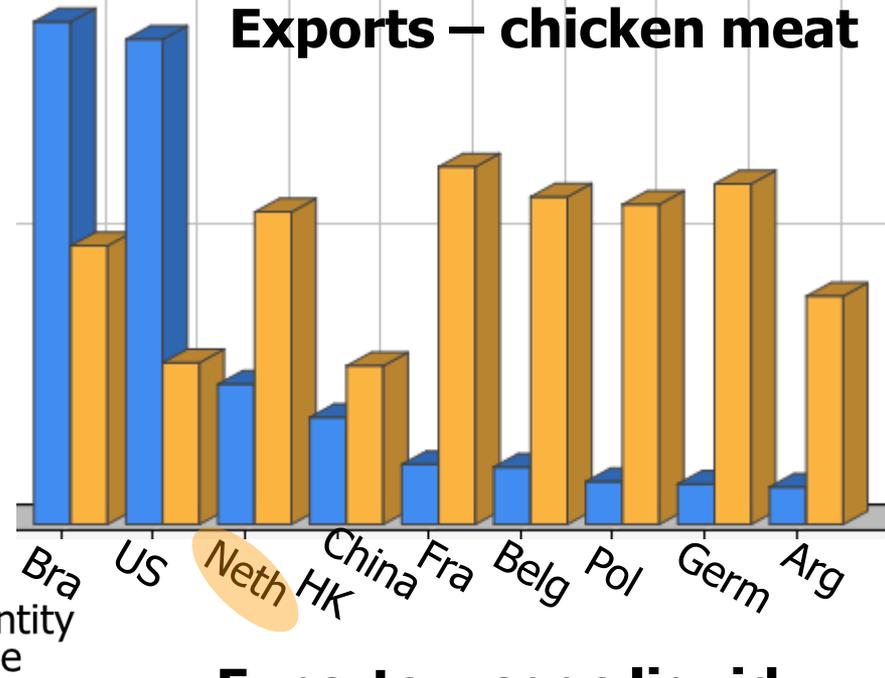


Source: FAOSTAT – 2011 data

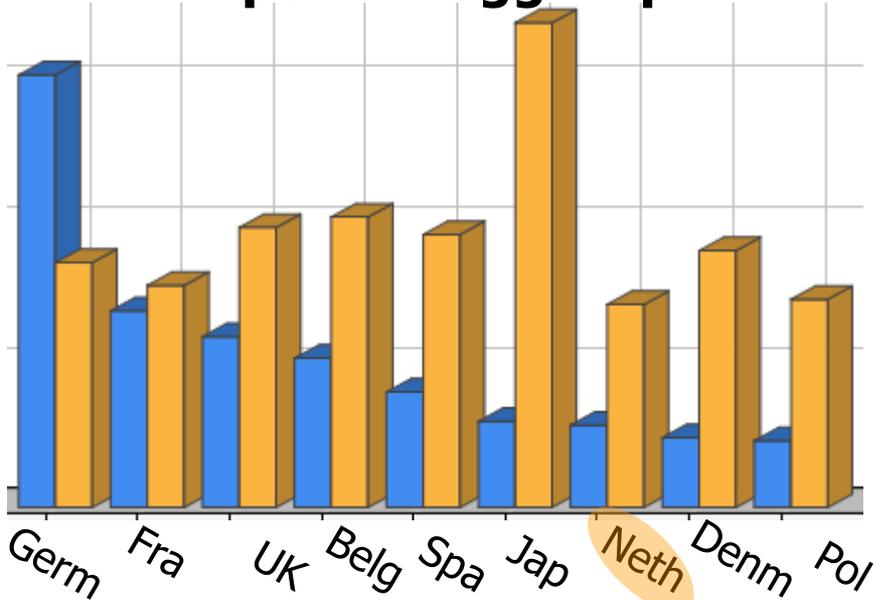
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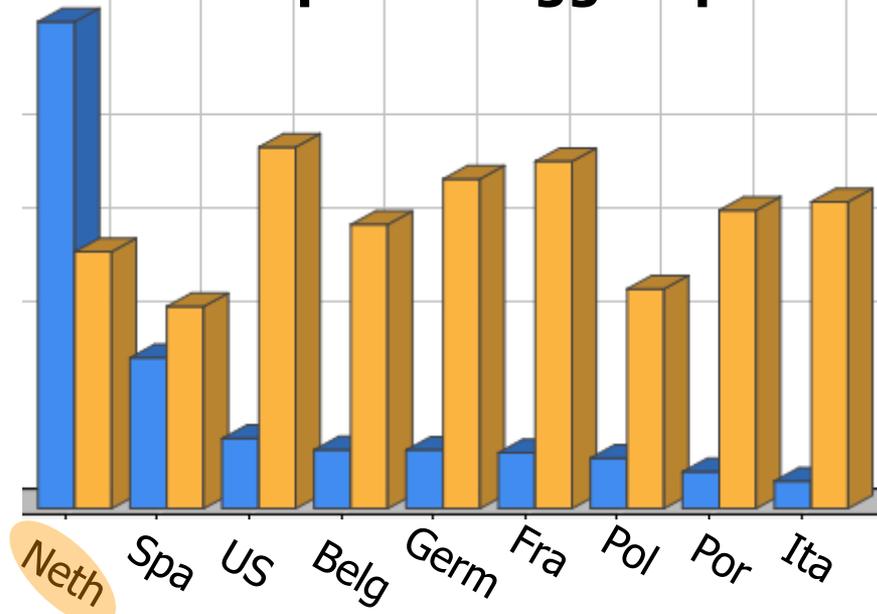
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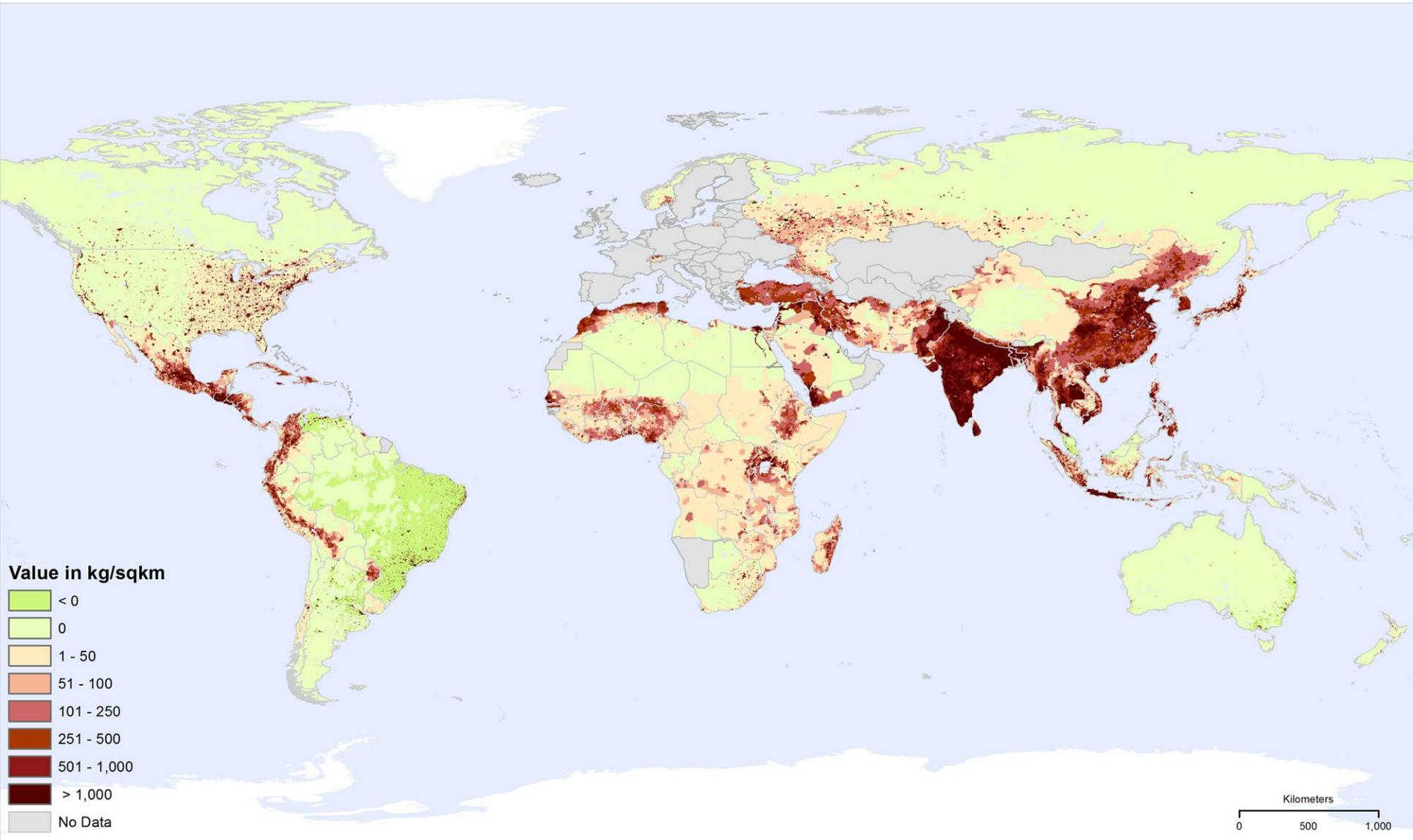
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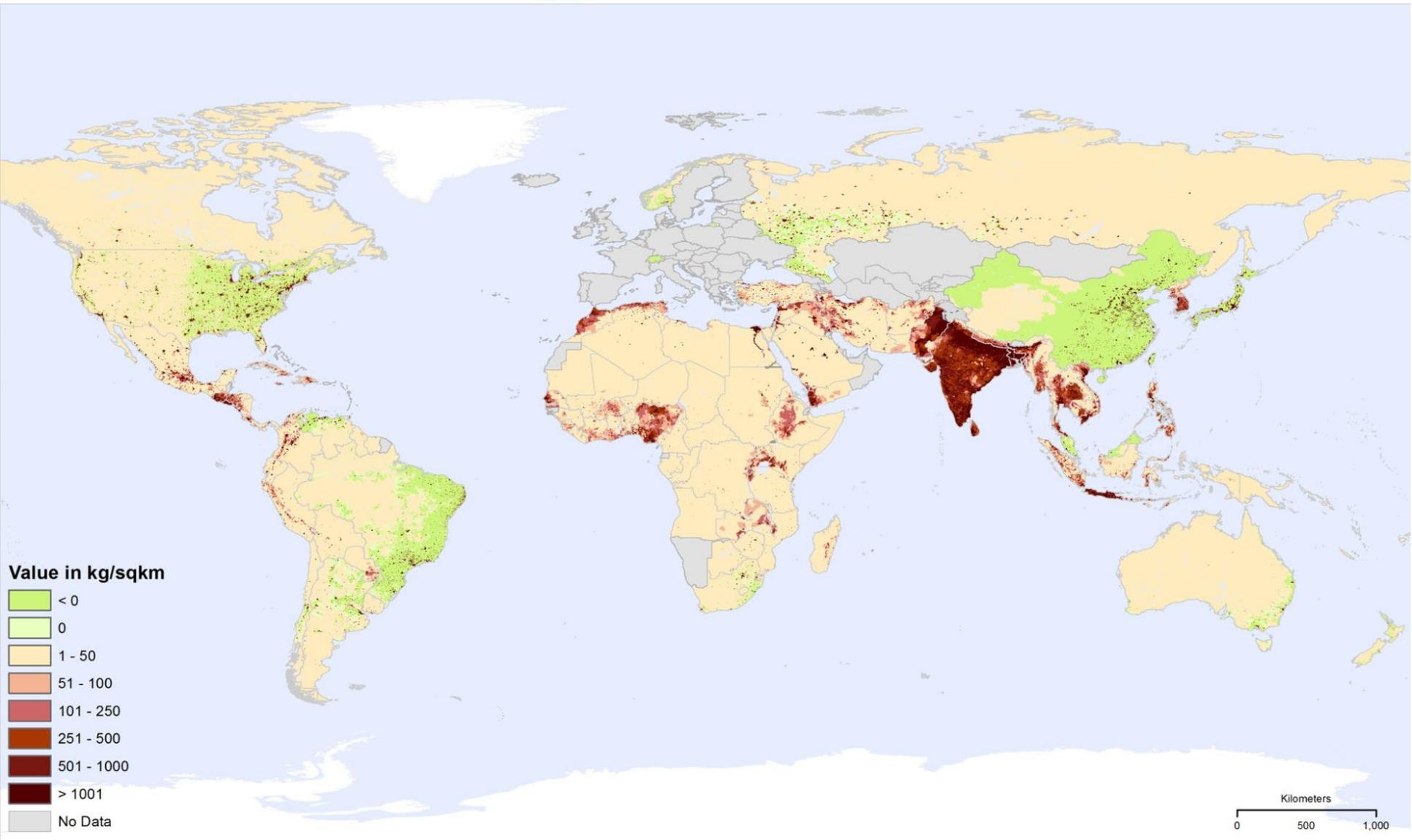
Growth in Demand for Poultry Meat 2000 - 2030



No individual country data available for Europe

The designations employed and the presentation of material in the map do not imply the expression of any opinion whatsoever on the part of FAO concerning the legal or constitutional status of any country, territory or sea area, or concerning the delimitation of frontiers.

Growth in Demand for Eggs 2000 - 2030



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International trade & food security

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What are the consequences for food security?

- Food Availability
- Food Accessibility
- Food Adequacy – Food Safety

International food trade & food security (I)

- Food Availability



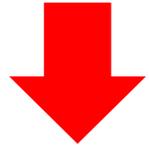
can increase food availability by facilitating that supply meets demand and by broadening the source of supply

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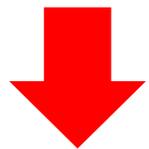


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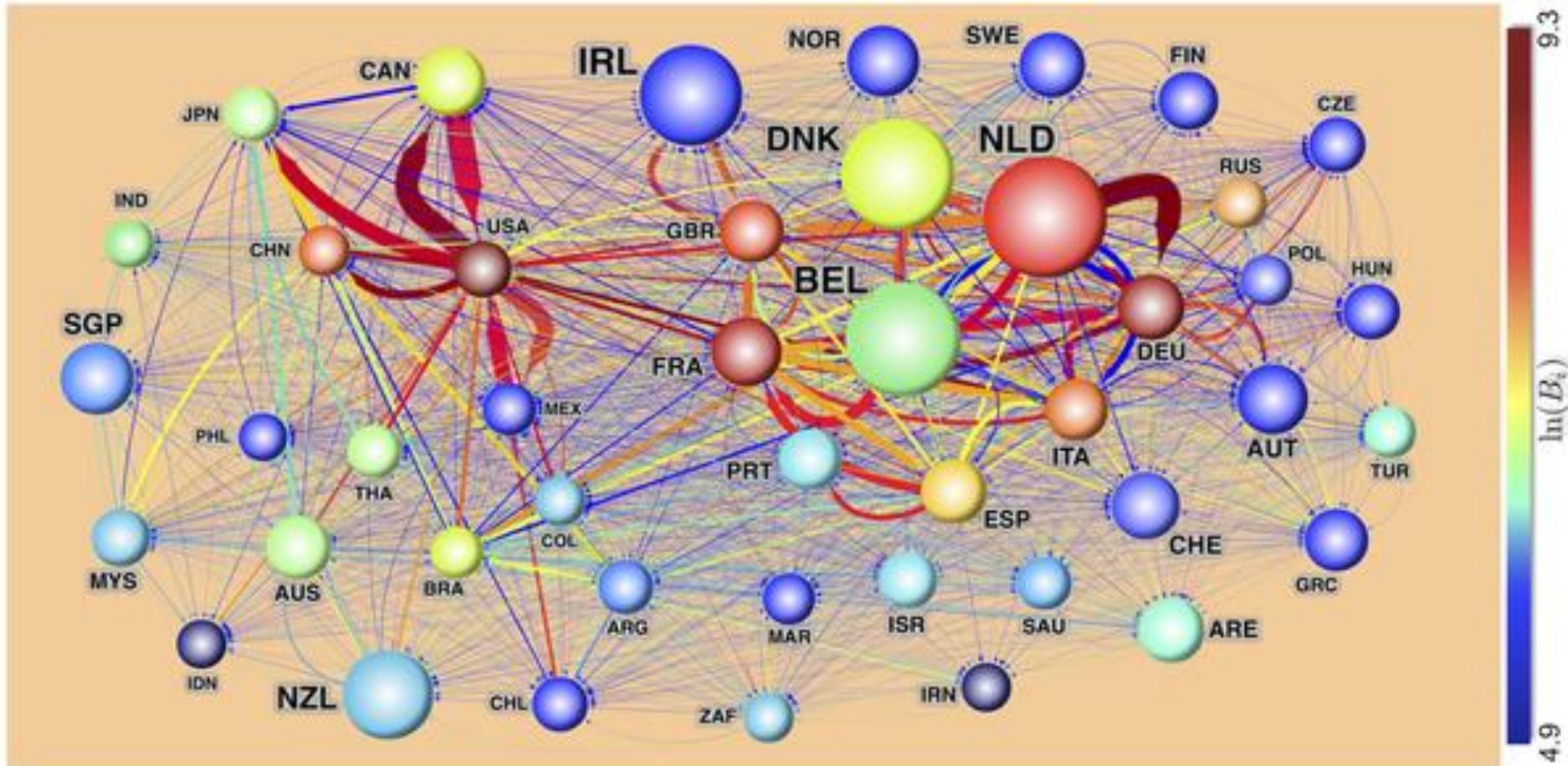


but a large proportion of the global poor depend on agricultural and livestock production for their livelihoods... will smallholders be able to compete with modern farms?

International food trade & food security (II): food safety

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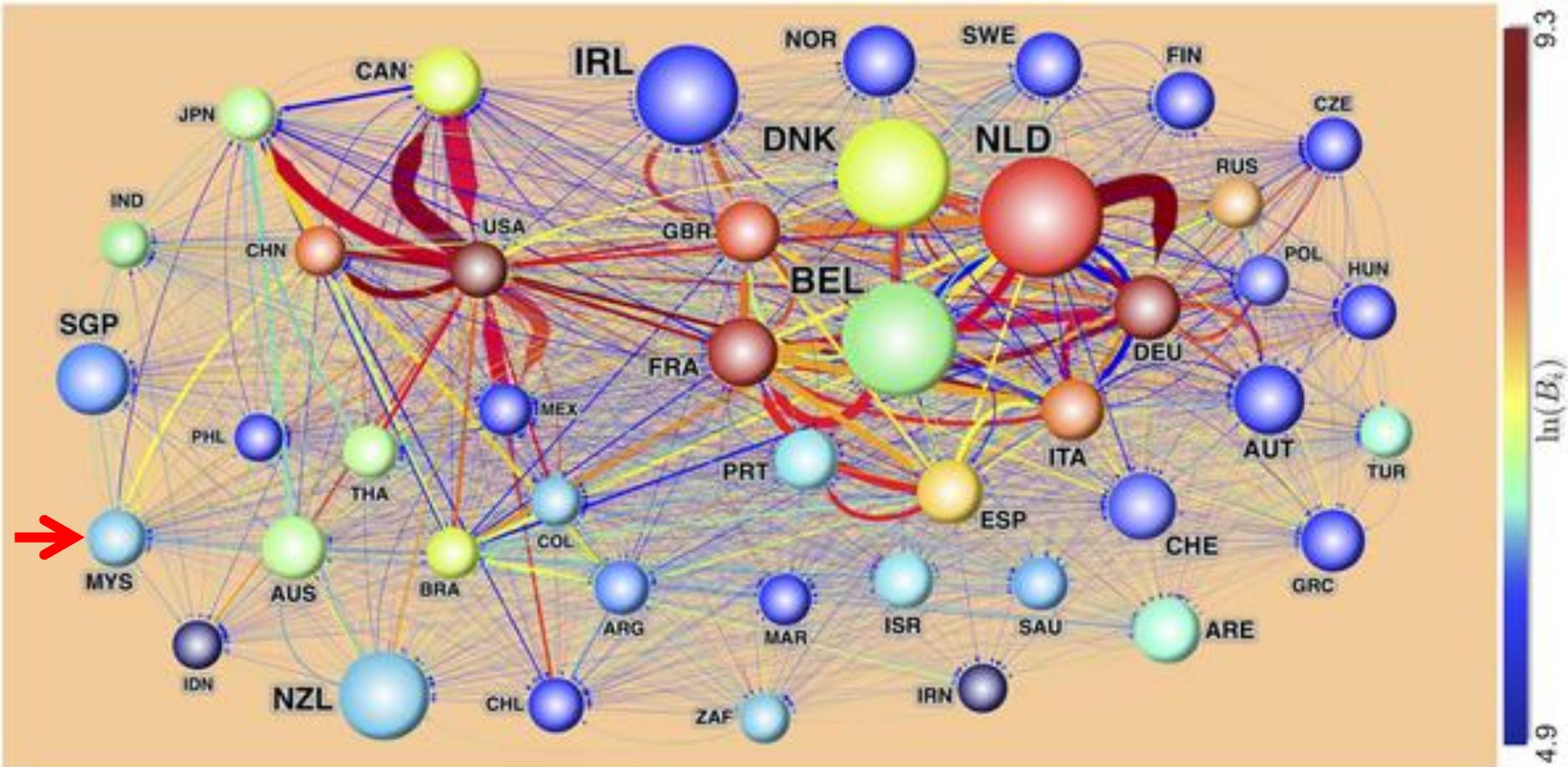
Global Agro-Food Trade Network in 2007 (44 country nodes with largest import+export activity)



Ercsey-Ravasz M, Toroczka Z, Lakner Z, Baranyi J (2012) Complexity of the International Agro-Food Trade Network and Its Impact on Food Safety. PLoS ONE 7(5): e37810. doi:10.1371/journal.pone.0037810:doi/10.1371/journal.pone.0037810

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SOURCE	TARGET
The Netherlands	Germany
USA	Japan
Canada	USA
USA	Canada
USA	USA
France	Germany
The Netherlands	UK
Germany	Germany
The Netherlands	France
The Netherlands	USA

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- Using a simulation model, the pairs “source – target” of largest food contamination potential were identified:
 - increased interconnectivity may not increase the number of events “per se”,
 - but even if the number of events does not increase, when events happen, they are more difficult to trace, sources difficult to identify and spread is more efficient.

SOURCE	TARGET
The Netherlands	Germany
USA	Japan
Canada	USA
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UK – Food Availability



UK major public funders – **Global Food Security Programme** as a research priority area.

The UK exported £12Bn of food and drink in 2007 but its not self-sufficient: it imports 40% of the total food consumed – and the proportion is rising.

As any other country, the UK is also exposed to volatile global markets and experiences food price rises as a result of global commodity markets – in 2005–2006 the poorest 10% of UK households spent 15% of their expenditure on food.



FOODBORNE DISEASE STRATEGY

2010-15

**AN FSA PROGRAMME FOR
THE REDUCTION OF
FOODBORNE DISEASE IN THE UK**

UK – Food Safety

Key foodborne disease pathogens – priorities for FDS action

	Priority for FSA Action	How these priorities are being addressed
<i>Campylobacter</i>	HIGHEST Greatest burden of foodborne disease due to very high case numbers and severity of disease	Foodborne Disease Strategy – new <i>Campylobacter</i> Risk Management Programme
<i>Listeria monocytogenes</i>	High Burden of disease second to <i>Campylobacter</i> - although infection is rare it is very severe.	Foodborne Disease Strategy – new <i>Listeria</i> Risk Management programme, to address: Consumer behaviours/actions; Procurement/provision of food to the vulnerable; Industry compliance/enforcement
<i>E. coli</i> O157	High Infection is rare in comparison to <i>Campylobacter</i> but disease can be severe for affected individuals	FSA Food Hygiene Delivery Programme ⁸ developed specifically to implement recommendations from the Inquiry into the South Wales <i>E. coli</i> O157 outbreak. Supported by FDS research programme
<i>Salmonella</i>	High Although case numbers continue to decrease <i>Salmonella</i> still causes many cases and outbreaks	Implementation of National Control Programmes designed to reduce <i>Salmonella</i> levels in food animal species ⁹ - led by Defra with FSA support
Norovirus	High Burden of disease is moderate as it causes a significant number of cases but infection is generally mild.	Foodborne Disease Strategy – new Norovirus Research Programme to provide improved evidence and understanding as basis for possible future action
<i>Clostridium perfringens</i>	Low Burden is low and foodborne disease syndrome is mild	Foodborne Disease Strategy – Food Hygiene Campaign and Programmes designed to assist catering businesses to implement food hygiene legislation (such as Safer Food Better Business and Scores On The Doors)

UK – Food Safety

Estimated risks associated with food groups,
England and Wales 2000

Food group	Cases	Risk*	Risk ratio
Poultry	414,500	85.49	949.89
Eggs	73,809	35.62	395.89
Red meat	185,087	14.99	165.56
Seafood	96,725	35.05	389.44
Milk	103,715	3.69	41.00
Other dairy products	6,321	2.05	22.78

*Risk – cases/million servings: Risk ratio = compared with cooked vegetables

Source: Adak et al. Emerg Infect Dis. 2005;11: 365-72.

UK – Food Safety: *Campylobacter*

- Most common cause of food poisoning in the UK.
- Considered to be responsible, each year, for around:
 - 460,000 cases of food poisoning
 - 22,000 hospitalisations
 - 110 deaths each
- Most of these cases come from poultry (70% poultry contaminated in retail).

FSA: *Campylobacter* Risk Management Program

- Aim: reduce levels of *Campylobacter* in chicken targeting different points along the food chain - target: reduce the % of birds with highest level of infection (based on 3 level classification) from the current 27% to 10% by 2015.
- If this target is achieved, a reduction in *Campylobacter* food poisoning of up to 30% (90,000 cases/year) is estimated.

UK – Food Safety: *Salmonella*

- Second most common cause of food poisoning in the UK after *Campylobacter*.
- Most common pathogen causing general outbreaks
 - *S. Enteritidis* (poultry)

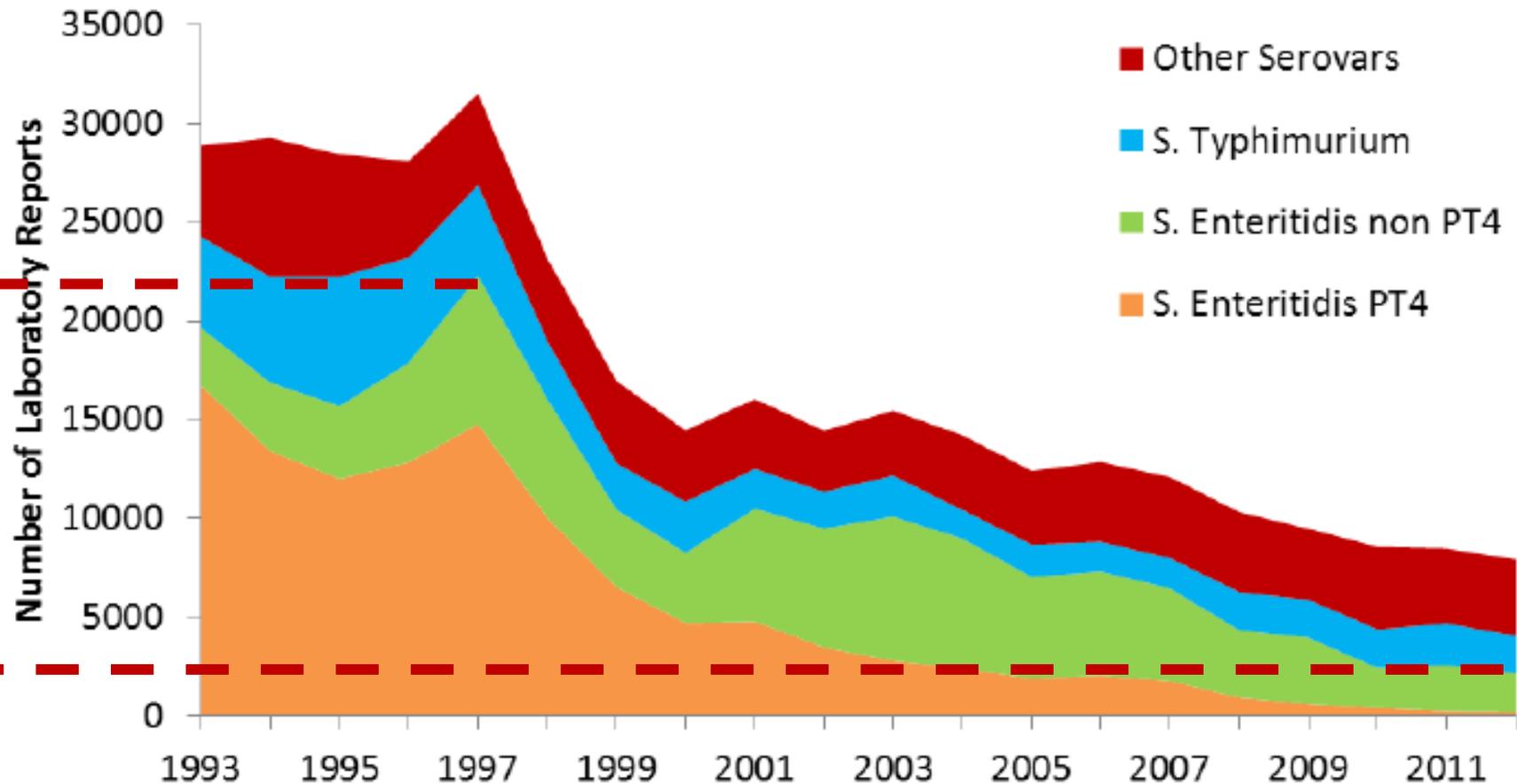
Successful, industry driven code of practice: “*Lion Quality mark*” → approx 85% of UK eggs



Salmonella

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Figure 4: Laboratory reports of non-typhoidal human *Salmonella* cases in the UK, 1993-2012



Conclusions (I)

➤ Food security includes a number of components, among them food safety

- Availability
- Accessibility
- Adequacy (includes safety)
- Acceptability
- Agency (policy for food security)

Tensions
between the
different
components
pose a challenge

➤ Food production is expected to increase... and food trade even more; international trade can affect the different components of food security in different ways in different countries / populations:

- Increasing or decreasing availability
- Increasing or decreasing accessibility
- Modifying food safety risks:
 - Small number of hubs central to the agro-food network
 - More effective dissemination, more difficult identification of source



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