Provider n. 2224

La vulnerabilità della salute ai determinanti ambientali e climatici: rischi sanitari emergenti e strategie di adattamento

17 - 18 giugno 2014

Organizzato da

CNESPS - Istituto Superiore di Sanità

e DG Prevenzione - Ministero della Salute

Cambiamenti climatici e sicurezza alimentare

Umberto Agrimi

Istituto Superiore di Sanità

Food safety and Food security

"A suitable product which when consumed either by a human or an animal does not cause **health** risk to consumer."

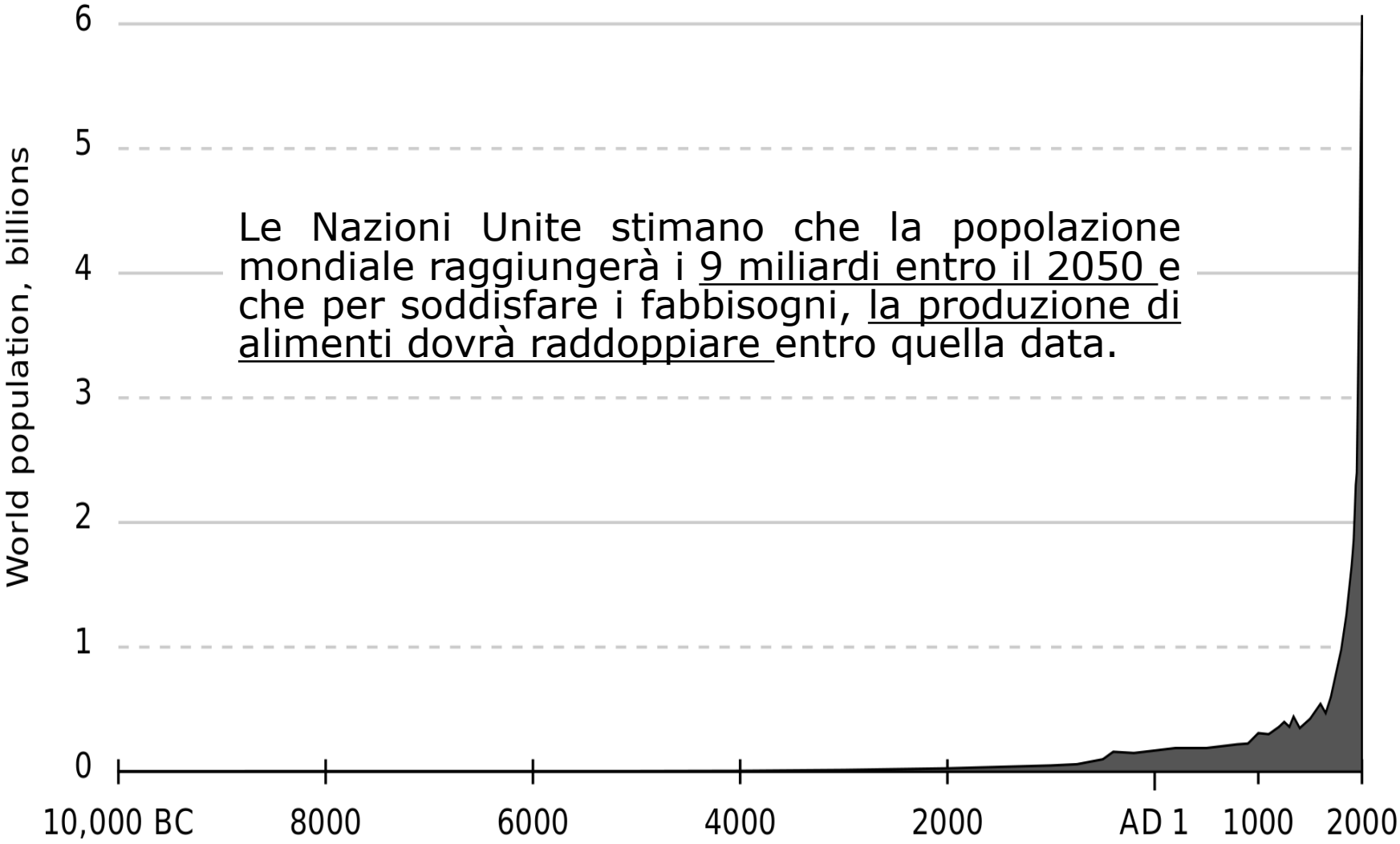
"... when all people, at all times, have physical, social and economic **access** to sufficient, safe and nutritious food that meets their dietary needs and food preferences for an active and healthy life" (FAO. 2002. The State of Food Insecurity in the World 2001)

MILANO 2015

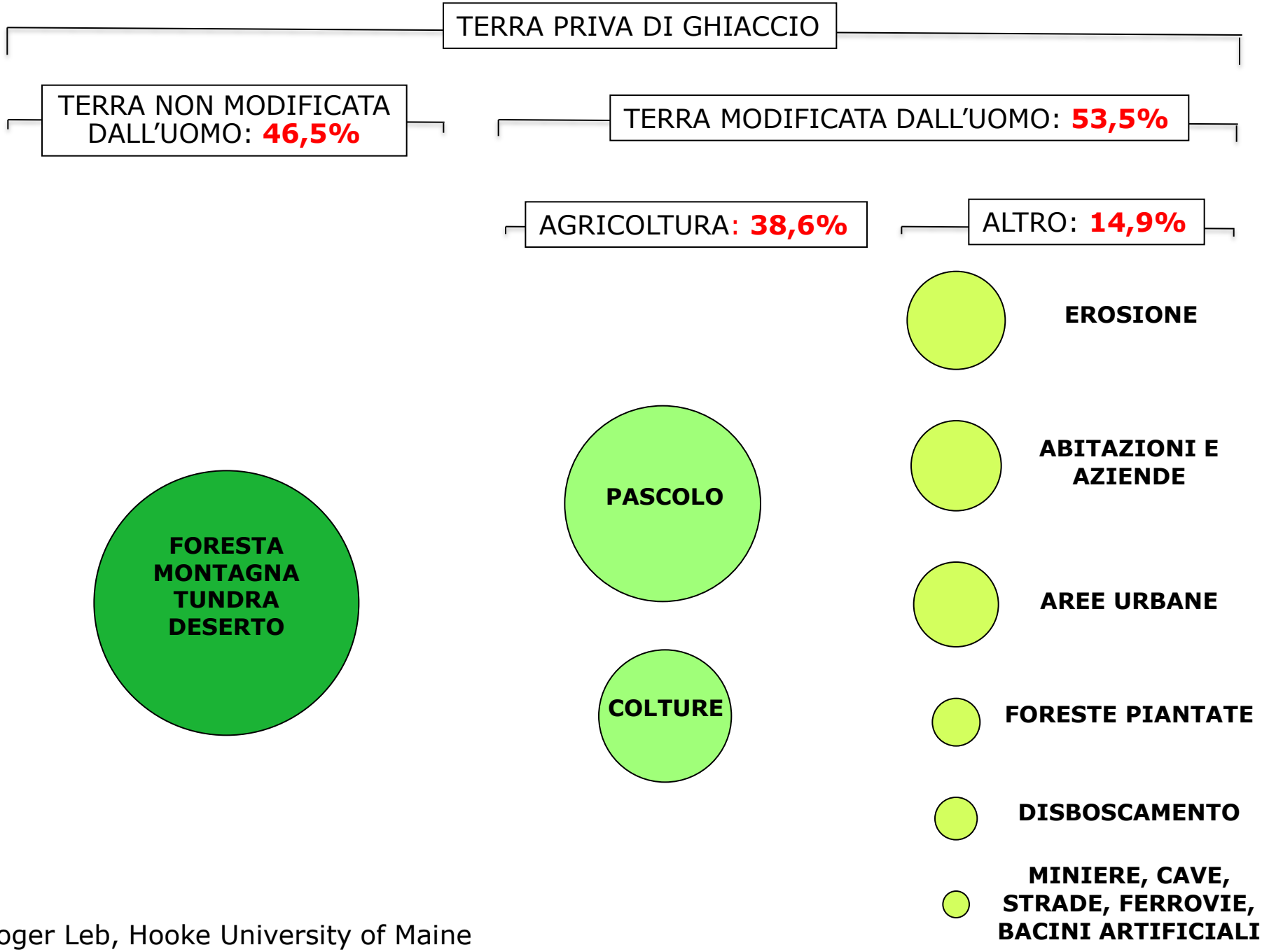
LE PAROLE CHIAVE DI EXPO2015

- FOOD SECURITY
- FOOD SAFETY
- NUTRIZIONE
- SOSTENIBILITA’

CRESCITA DELLA POPOLAZIONE UMANA MONDIALE

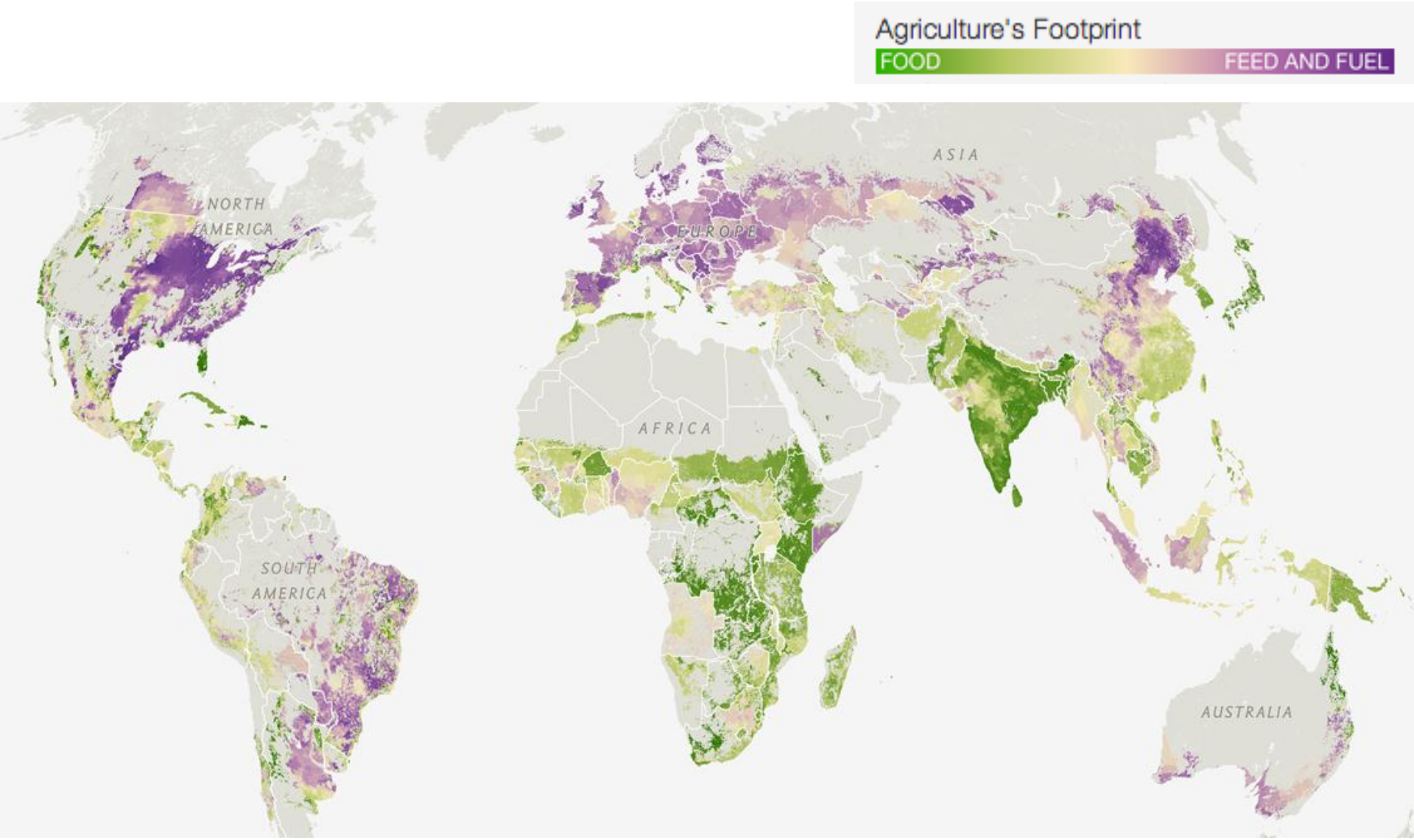


Le Nazioni Unite stimano che la popolazione mondiale raggiungerà i 9 miliardi entro il 2050 e che per soddisfare i fabbisogni, la produzione di alimenti dovrà raddoppiare entro quella data.



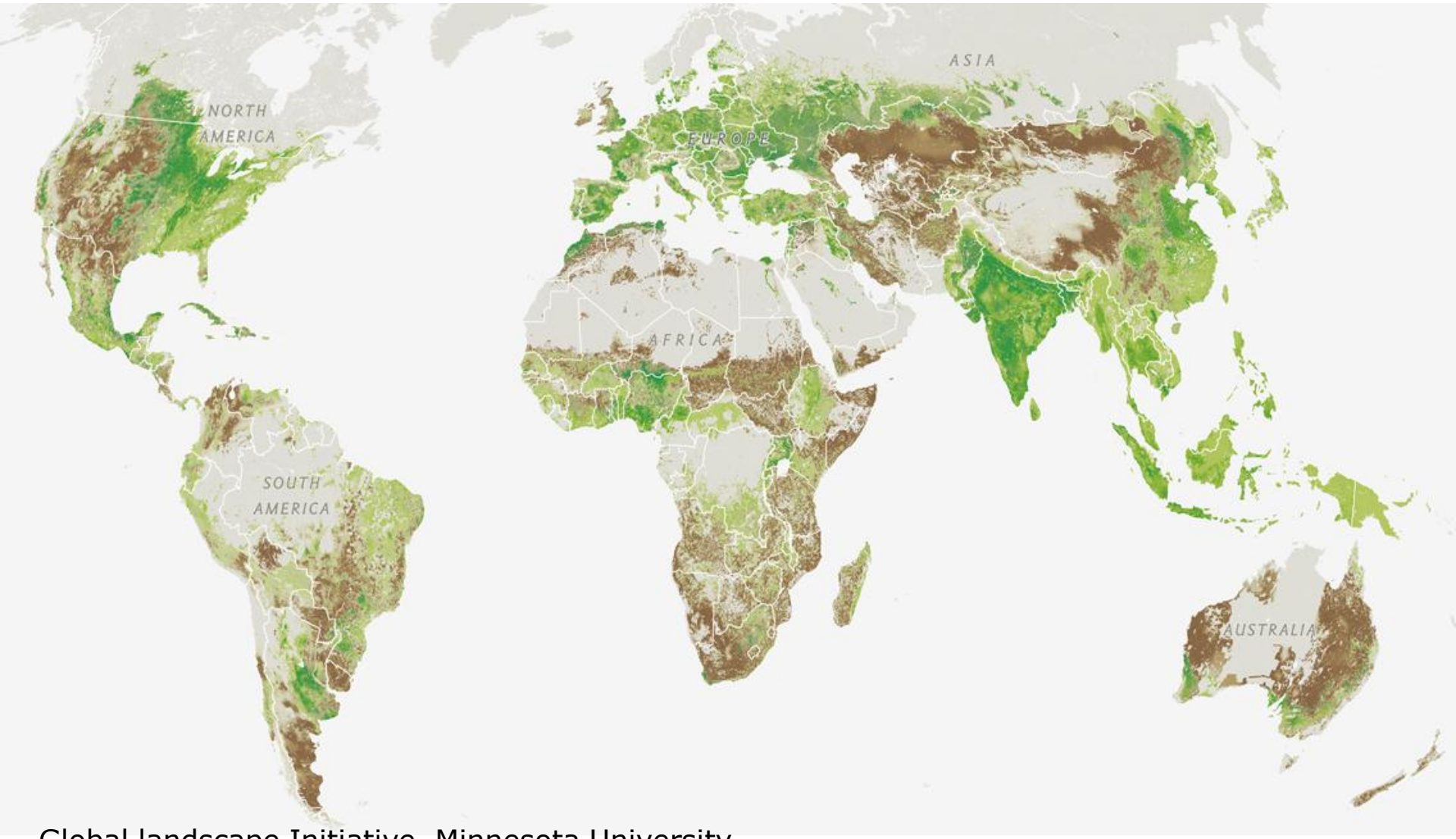
Roger Leb, Hooke University of Maine

Solo il 55% delle calorie delle colture nutre direttamente la popolazione umana, il resto è destinato alla produzione di mangimi (36%) o biocarburanti (9%)

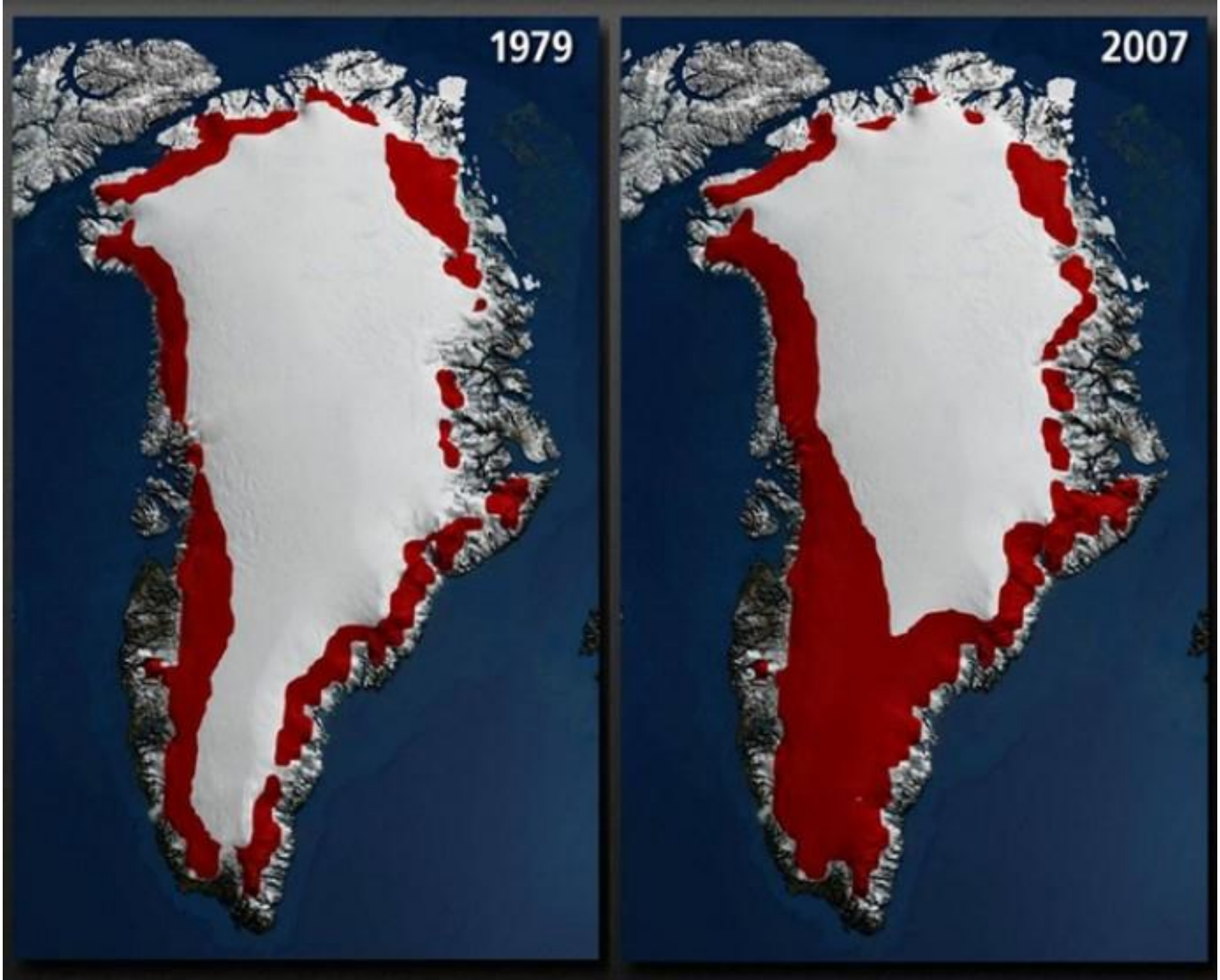


Global landscape Initiative, Minnesota University

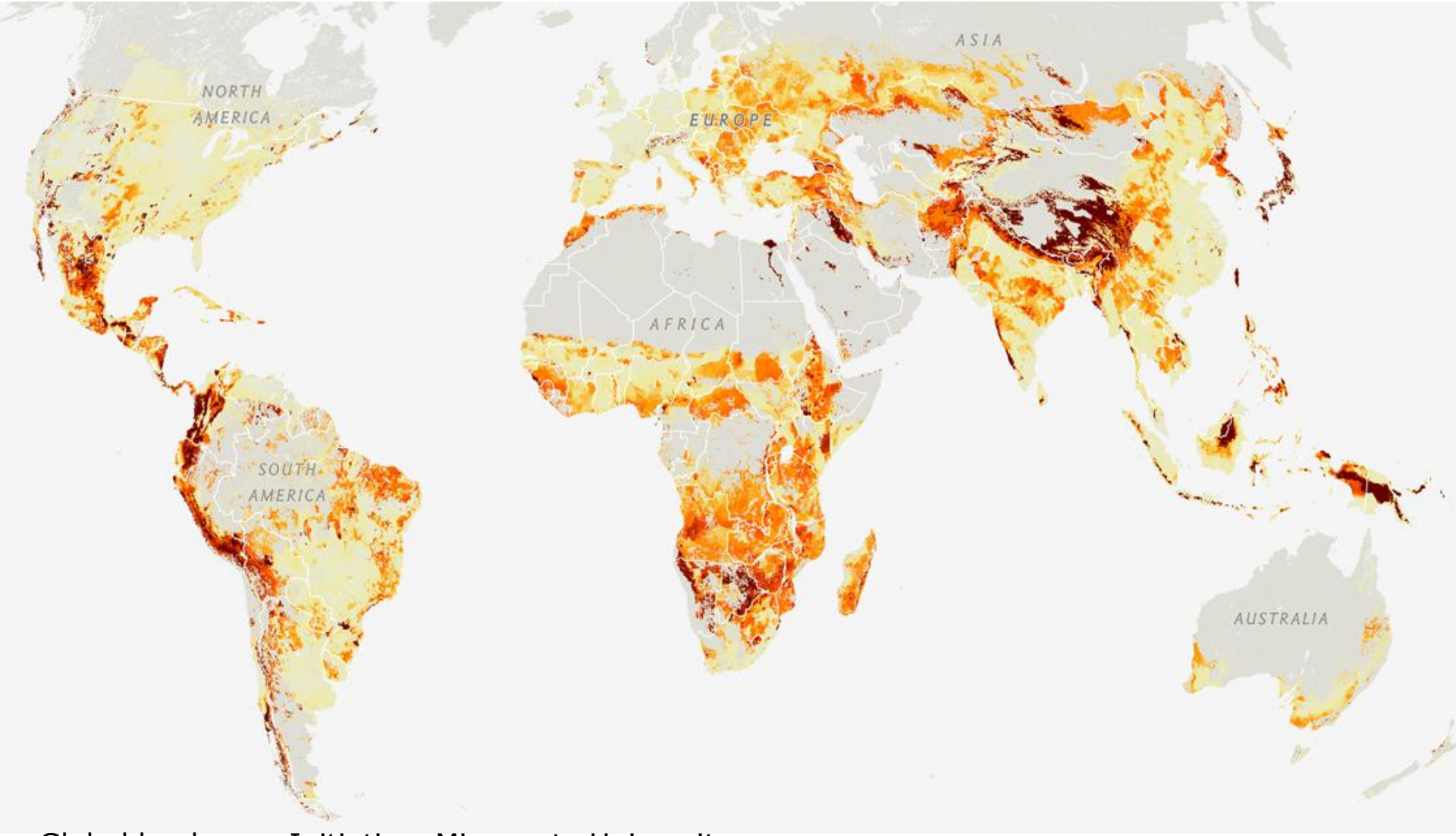
Quasi tutta la nuova produzione alimentare nei prossimi 25 anni dovrà provenire da terreni agricoli esistenti.



Global landscape Initiative, Minnesota University

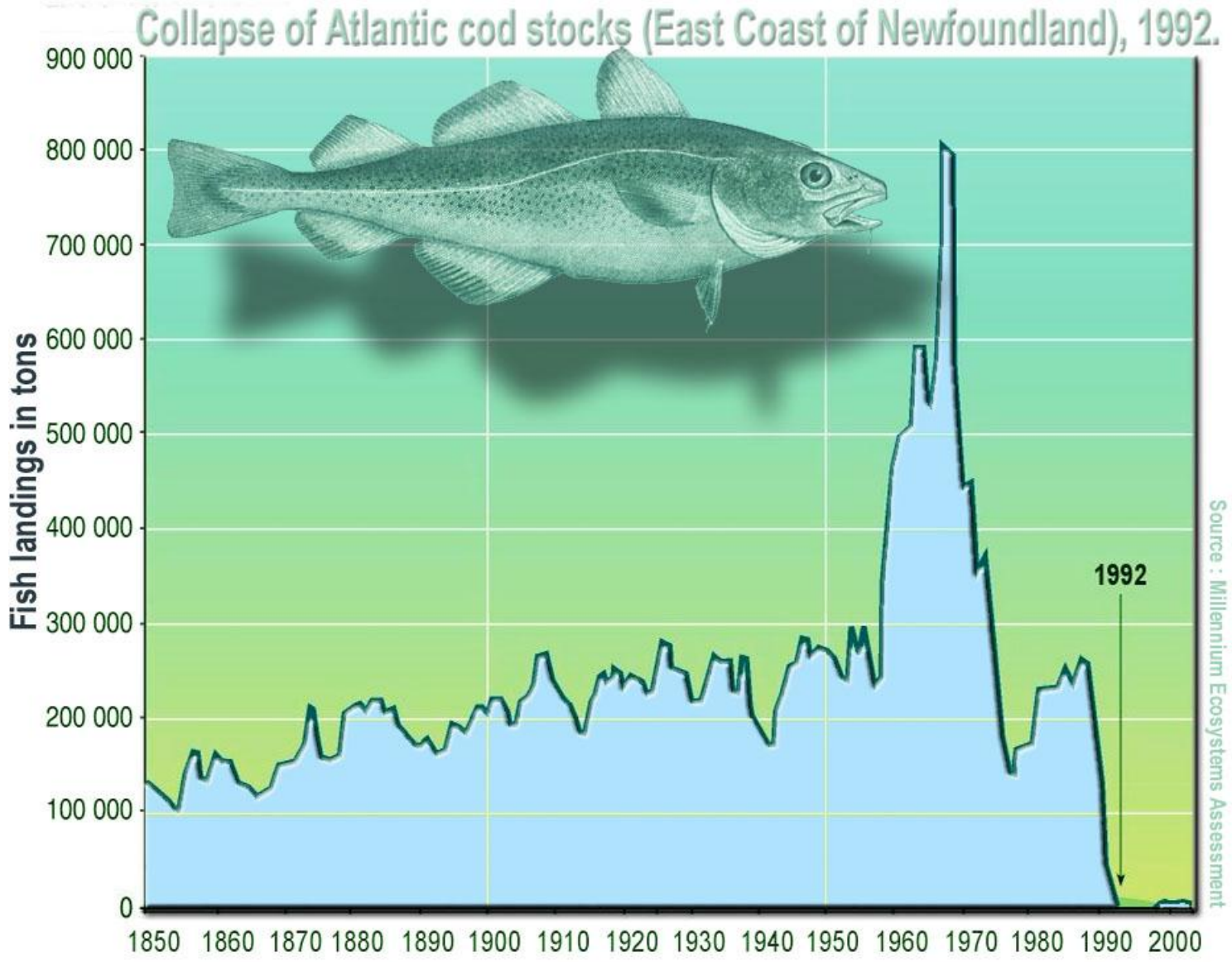

1979
2007

Migliorare il rendimento delle aree agricole dove questo è più basso potrebbe tradursi in un aumento del 58 per cento della produzione alimentare mondiale



Global landscape Initiative, Minnesota University

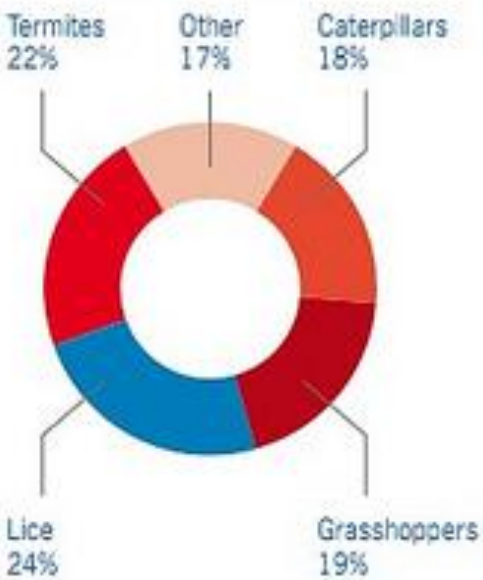
L’aumento del fabbisogno di pesce non potrà provenire dalla pesca

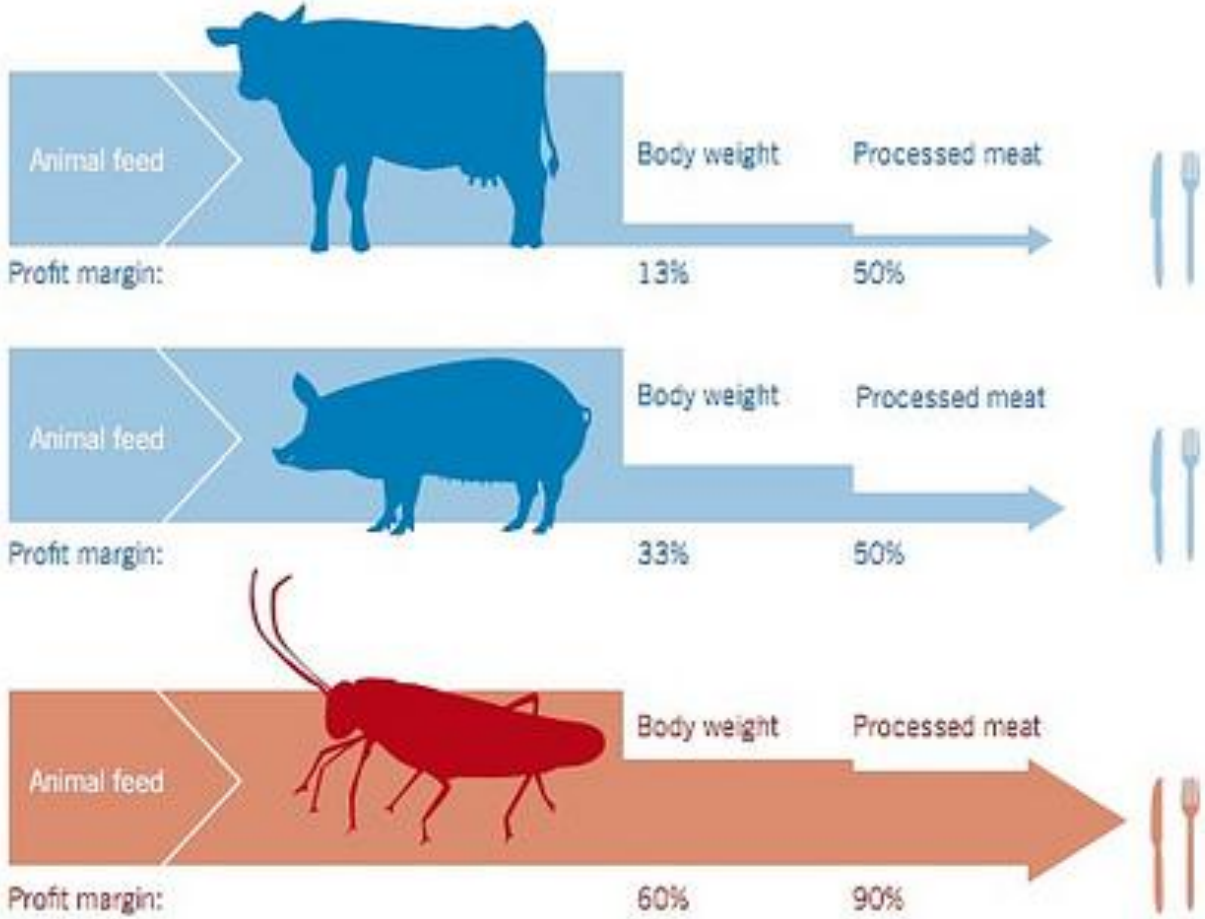


http://www.sciencelearn.org.nz/Contexts/The-Noisy-Reef/Sci-Media/Images/Collapse-of-the-cod-fisheries

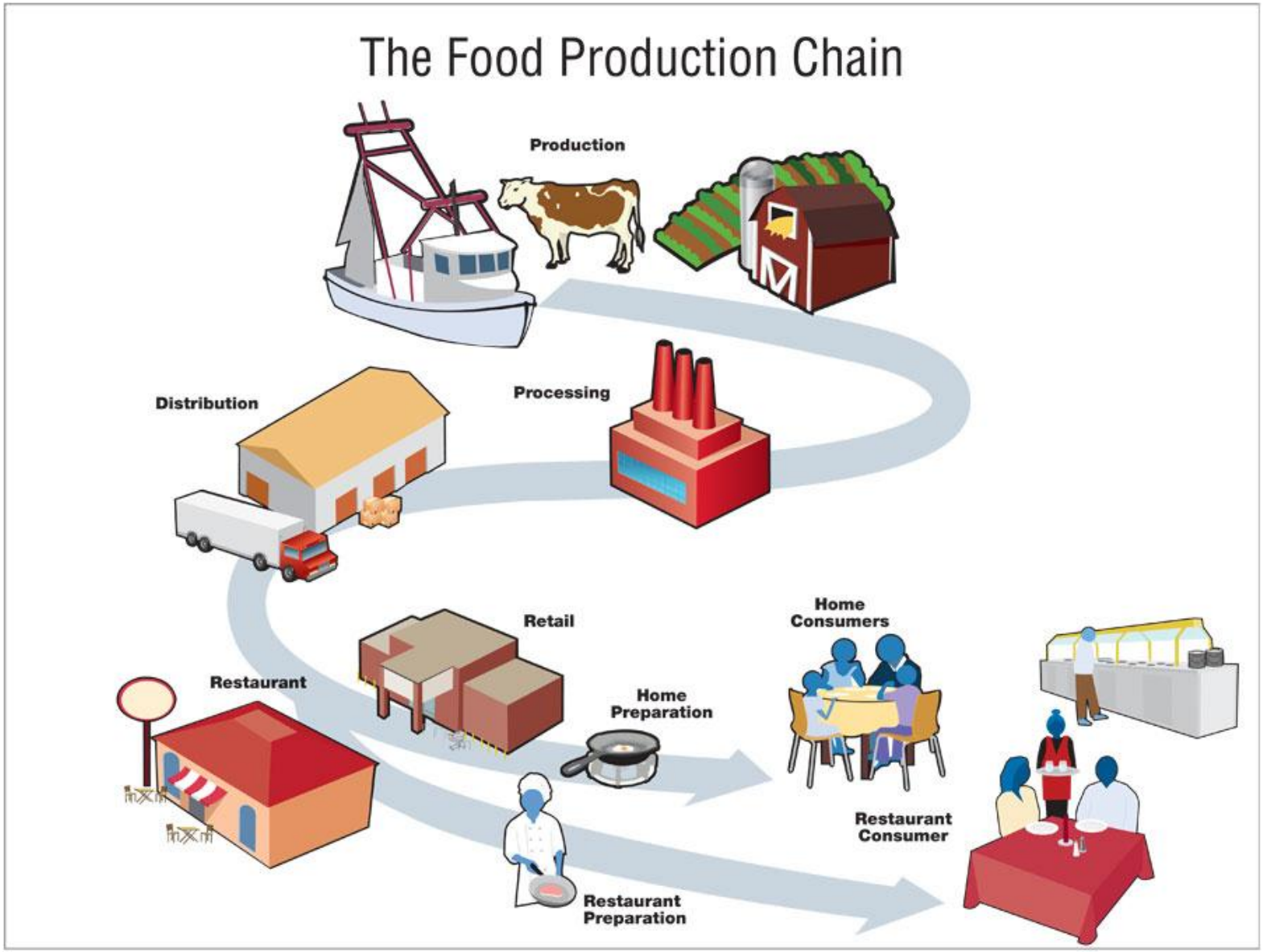
INSECTS AS FOOD

Most commonly eaten insects worldwide

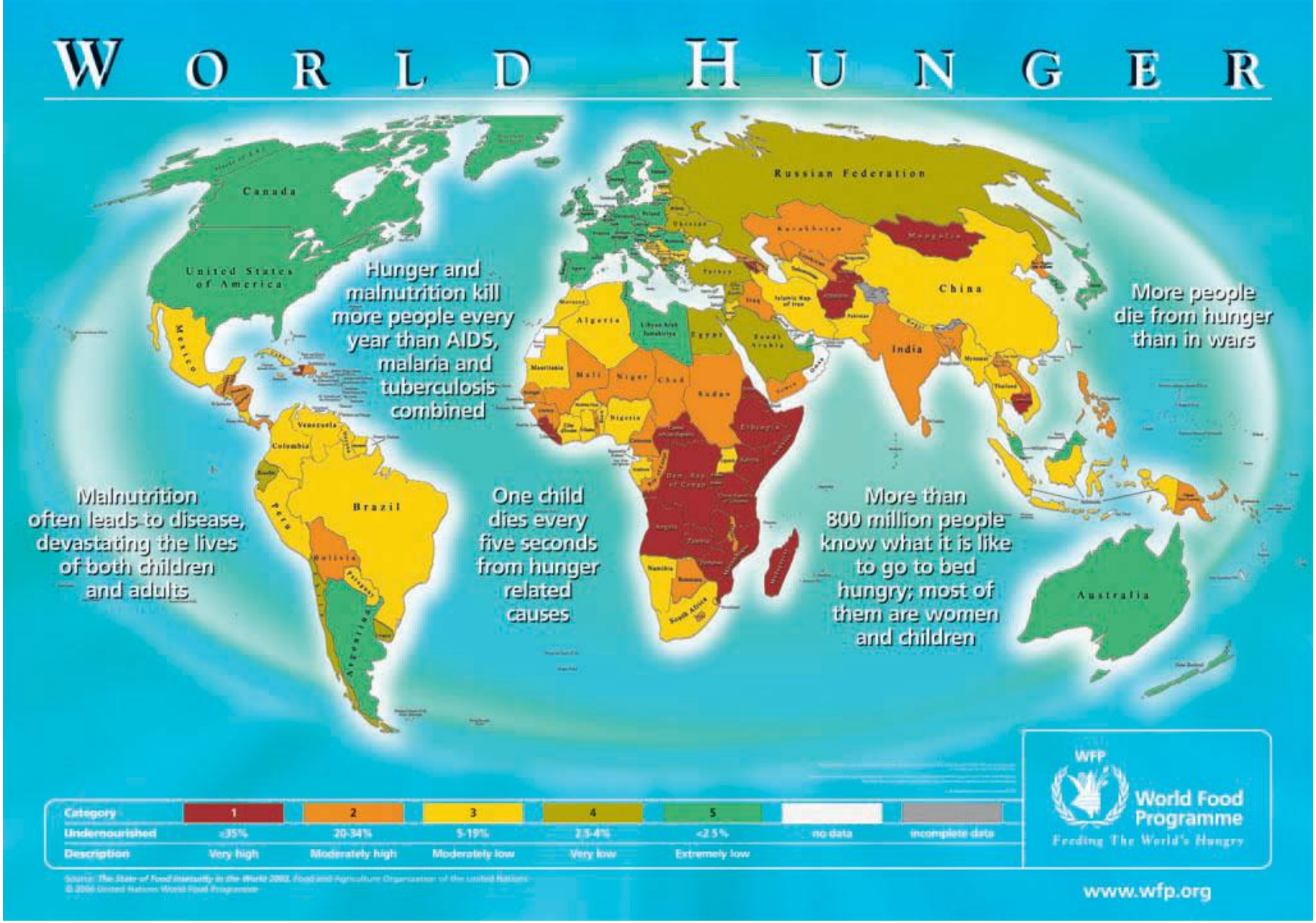




Conversion of animal feed into body mass and processed meat.



Climate change and variability may have an impact on the occurrence of food safety hazards at various stages of the food chain, from primary production through to consumption.



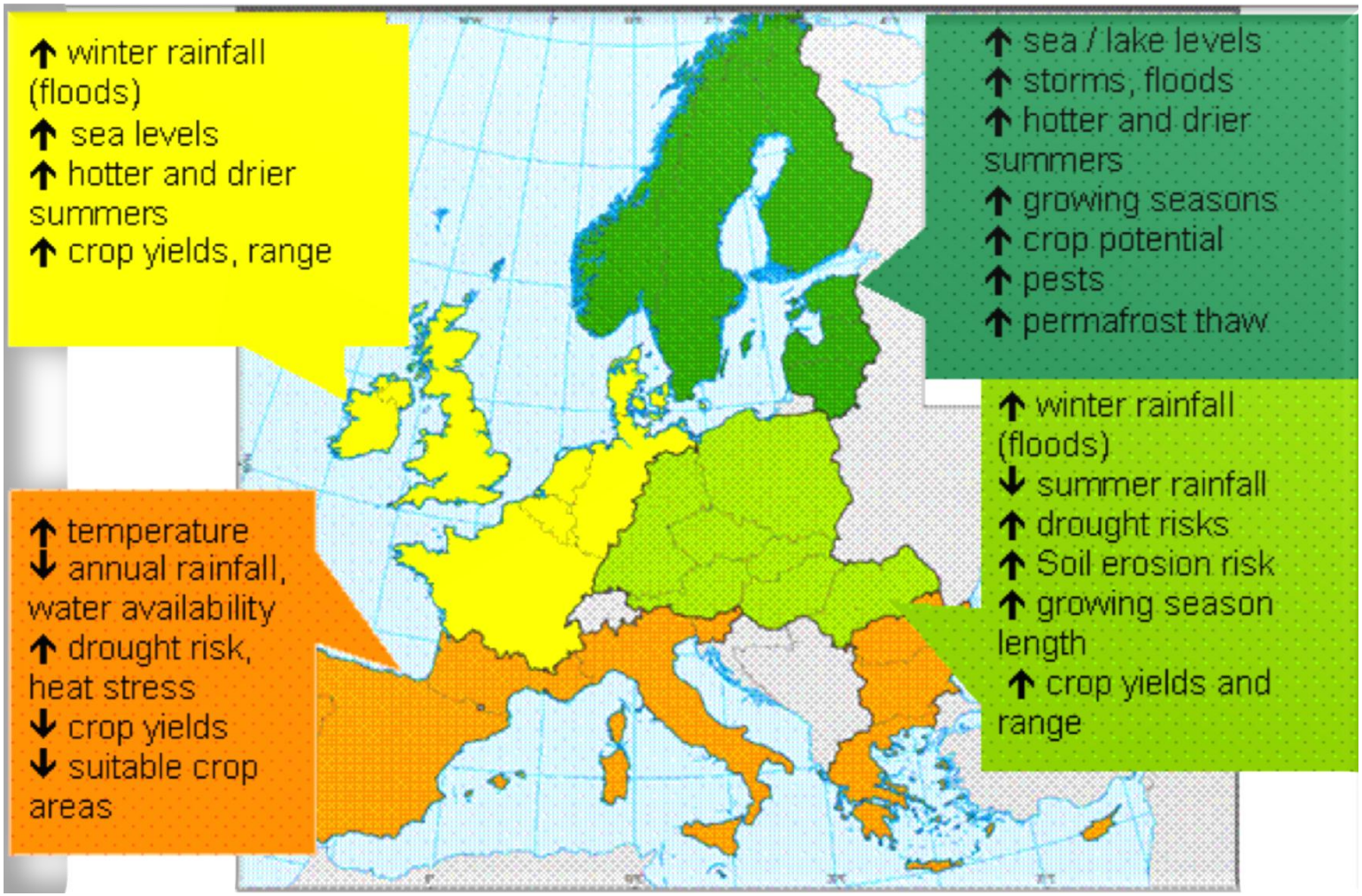
Climate change may also affect socio-economic aspects related to food systems such as agriculture, animal production, global trade, demographics and human behaviour which all influence food safety.

There are multiple pathways through which climate related factors may impact food safety including: changes in temperature and precipitation patterns, increased frequency and intensity of extreme weather events, ocean warming and acidification, changes in contaminants' transport pathways and changes in the ecology of living organisms, among others.

Cos’è l’ECOLOGIA

Parte della biologia che studia le relazioni tra organismi o gruppi di organismi e il loro ambiente naturale, inteso sia come l’insieme dei fattori chimico-fisici (clima, tipo di suolo, luce, nutrimento, ecc.) sia come l’insieme dei fattori biologici (parassitismo, competizione, simbiosi, ecc.), che influiscono o possono influire sulla vita degli organismi stessi (http://www.treccani.it/vocabolario/ecologia/).

Dal greco: οἶκος, *oikos*, "casa" o anche "ambiente"; e λόγος, *logos*, "discorso" o “studio”, è la branca delle scienze naturali che studia l'ecosfera, ossia la porzione della Terra in cui è presente la vita in aggregati sistemici detti "ecosistemi", le cui caratteristiche sono determinate dall'interazione degli organismi tra loro e con l'ambiente circostante o ancora porzioni dell'ecosfera stessa. L'ecologia rappresenta il *trait d'union* tra le scienze della terra e le scienze della vita (http://it.wikipedia.org/wiki/Ecologia).



http://ec.europa.eu/agriculture/climate_change/images/zones.gif

Examples of microbiological agents that could be affected by climate change and variability and their mode of transmission to humans.

Bacteria	Host	Mode of transmission to humans
Salmonella	Poultry and pigs	Faecal/oral
Campylobacter	Poultry	Faecal/oral
Vibrio spp.	Shellfish, Fish	Faecal/oral
E. coli O157	Cattle and other ruminants	Faecal/oral
Anthrax Clostridium	Livestock and wild birds	Ingestion of spores through environmental routes, water, soil and feeds. Associated with outbreaks of after droughts
Yersinia	Birds and rodents with regional differences in the species of animal infected. Pigs are a major reservoir	Handling pigs at slaughter is a risk to humans
Listeria monocytogenes	Livestock	In the northern hemisphere, listeriosis has a distinct seasonal occurrence in livestock probably associated with Feeding of silage
Leptospira	All farm animal species	Leptospirae shed in urine to contaminate pasture, drinking water and feed
Virus	Host	Mode of transmission to humans
Rift Valley fever Virus	Multiple species of livestock and wildlife	Blood or organs of infected animals (handling of animal Tissue), unpasteurized or uncooked milk of infected animals, mosquito, hematophagous flies
Nipah virus	Bats and pigs	Directly from bats to humans through food in the consumption of date palm sap (Luby & et al., 2006). Infected pigs present a serious risk to farmers and abattoir workers
Hendra virus	Bats, and horse	Secretions from infected horses
Hantavirus	Rodents	Aerosol route from rodents. Outbreaks from activities Such as clearing rodent infested areas and hunting.
Hepatitis E virus	Wild and domestic animals	Faecal-oral. pig manure is a possible source through contamination of irrigation water and shellfish
Encephalitis tick borne virus	Sheep, goats	Unpasteurized milk
Parasites	Host	Mode of transmission to humans
Tapeworm *Cysticercus bovis*	Cattle	Faecal-oral
Liver fluke	Sheep, cattle	Eggs are excreted in faeces
Protozoan parasites		
Toxoplasma Gondii	Cats, pigs, sheep	Cat faeces are a major source of infection. Handling and consuming raw meat from infected sheep and pigs
Cyptosporidium	Cattle, sheep	Faecal-oral transmission. Waterborne. (Oo)cysts are highly infectious and with high loadings, livestock faeces pose a risk to animal handlers
Giardia	Cattle, cats, dogs	Faecal-oral transmission. Waterborne

Tirado et al., 2010

Box 1: Climatic influences (e.g. temperature, humidity) on the prevalence of some diseases:

- Increases in disease notifications, particularly salmonellosis (D'Souza et al., 2004) and to a lesser extent campylobacteriosis (Kovats et al., 2005) are frequently preceded by weeks of elevated ambient temperature.
- An eastern regional gradient has been observed in Australia for notifications of salmonellosis, i.e. rates of notification increase with decreasing latitude and hence, increasing average yearly temperature (Hall et al. 2002).
- Higher temperature and humidity in the week before infection has been correlated with decreased hospitalization rates for children diagnosed with rotavirus. This is particularly interesting because survival of the virus is favoured at lower temperature and humidity (D'Souza et al., 2008). Rotavirus is considered a significant cause of foodborne illness (FAO, 2008a).
- El Nino-associated rises in cholera have been documented for both Peru and Bangladesh, as have been increases in diarrhoeal disease in Peruvians (reviewed by Hall et al., 2002) *.

Tirado et al., 2010

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Effects of *El Niño* and ambient temperature on hospital admissions for diarrhoeal diseases in Peruvian children

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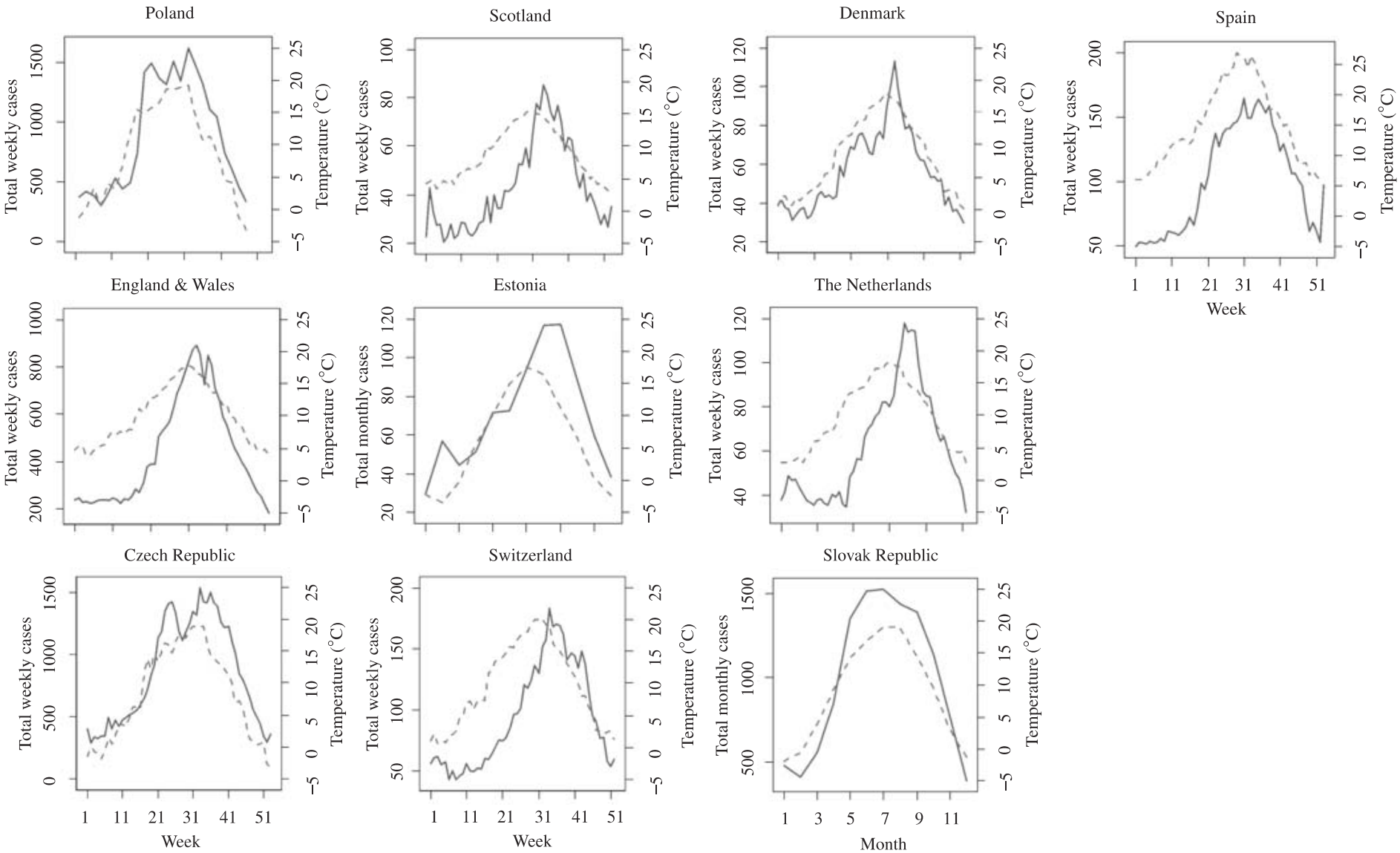

Epidemiol. Infect. (2004), **132**, 443–453. © 2004 Cambridge University Press
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The effect of temperature on food poisoning: a time-series analysis of salmonellosis in ten European countries