Food and Agriculture Organization of the United Nations

COMMISSION ON GENETIC RESOURCES FOR FOOD AND AGRICULTURE

Contribution of Animal Genetic Resources to Food Security and Nutrition

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CGRFA Special Event - Food security and genetic diversity

IMPLEMENTING THE GLOBAL PLAN OF ACTION FOR ANIMAL GENETIC RESOURCES

Physical availability of food

- 5 main species (cattle, pig, sheep, goats, chicken)
- International transboundary, exotic breeds
- High input systems
- Close to demand centers

- > 37 species
- Locally adapted breeds
- Low input systems

Physical availability of food

	World production (million MT) 2012	
	"Big 5" species	Other species
Meat	279	22
Milk	626	100
Egg	66	5.5
Avg.	87%	13%

Economic and physical access to food by livestock production system

	Grassland-based	Mixed crop-livestock	Landless with ruminants	Landless with monogastrics
Food	x	xxx	xxx	xxxx >80% of global eggs, pork & chicken meat
Draught power		xxxx		
Fertilizer	x	xxx	xx	xx
Fuel		x	xx	xx

* low to ****high;

Economic and physical access to food

Global livestock ownership is often much more equally distributed than land

short cycle animal production can create important incomes with little capital and land requirements

On-farm employment per million liters of milk – 5 in intensive, 200 in small-scale

N from manure is ca 13% of total fertilizer

Africa 85% of livestock keepers in SSA live in extreme poverty (< $1 a day)

2/3 of rural households own livestock

9-22 % of household income is from livestock

Working oxen - 90-900 hours per year

Kenya: for every 1000 liters of milk produced, 77 direct farm jobs are generated

India Small-scale/landless farmers keep 85% of poultry stock

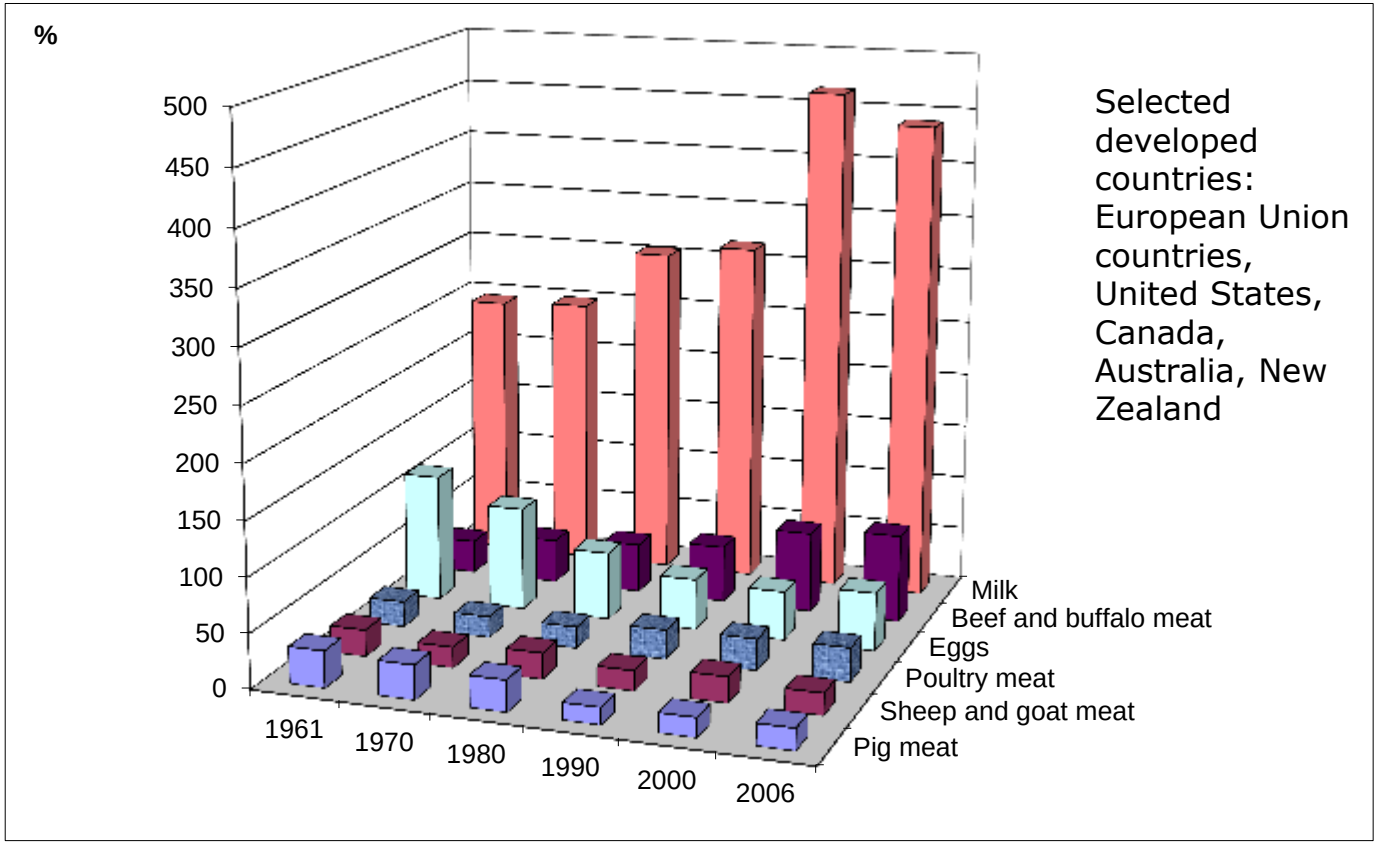
annual per capita availability of one egg or 50 g of poultry meat generates about 20,000 to 25,000 full time jobs

Jobs in dung collection are 50% of jobs created in dairy

Breeding facilitates economic access to food

Production differential

Production differential (%) between selected developed countries that have commercial breeding programmes and the rest of the world (production output/head)



Food utilization

	Avgerage supply (g/capita/day)		Prevalence (%)
	Protein	**Protein of animal origin**	**Undernourishment**
Africa	65	14	20.9
Asia	75	25	14.1
Oceania	72	38	13.5
World	79	31	12.1
Latin America & Caribbean	82	42	7
Developed countries	103	60	0

Food utilization

- 26% of human global protein consumption and 13% of total kcal
  - Per capita and day: 163 kcal (72-301), 12 g fat (4-25) and 10 g protein (5-22)
- Foods of animal origin supply a concentrated variety of essential, highly bio-available nutrients, such as iron, vitamin A, E, B12 and zinc
  - estimated disability-adjusted life years (DALYs) attributed to protein-energy malnutrition, iron-deficiency anaemia and vitamin A deficiency in the developing world are 17.4 million, 15.6 million and 0.6 million respectively (33.6 mill)
- special nutritional importance for vulnerable populations such as children and mothers

Food utilization

Human consumption: men > women and children

Urban (monogastric > ruminants) > rural (all kinds)

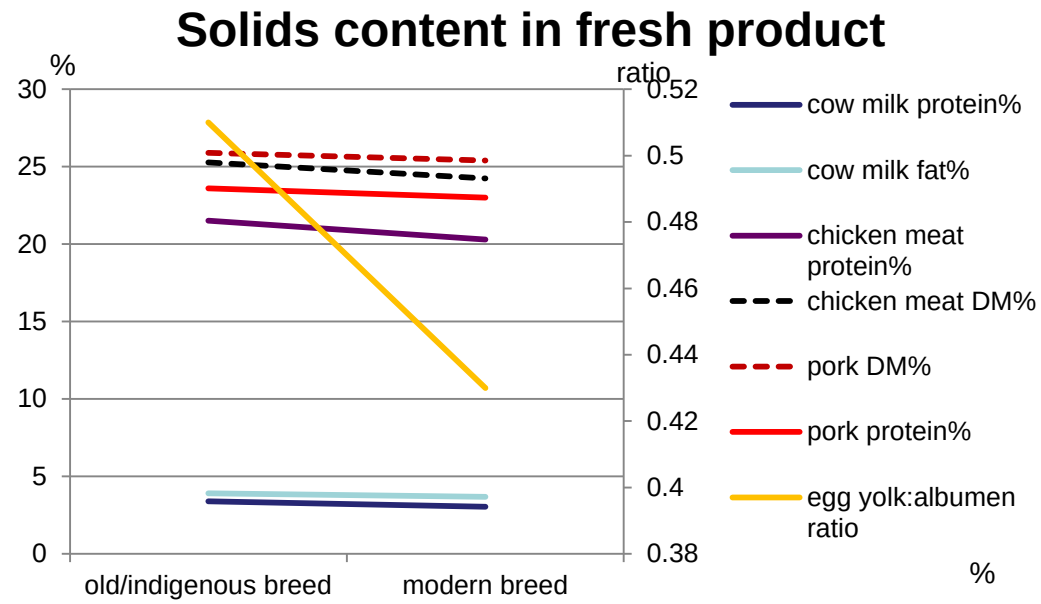
Uptake: zoonoses, food safety (residues, antimicrobial resistance)

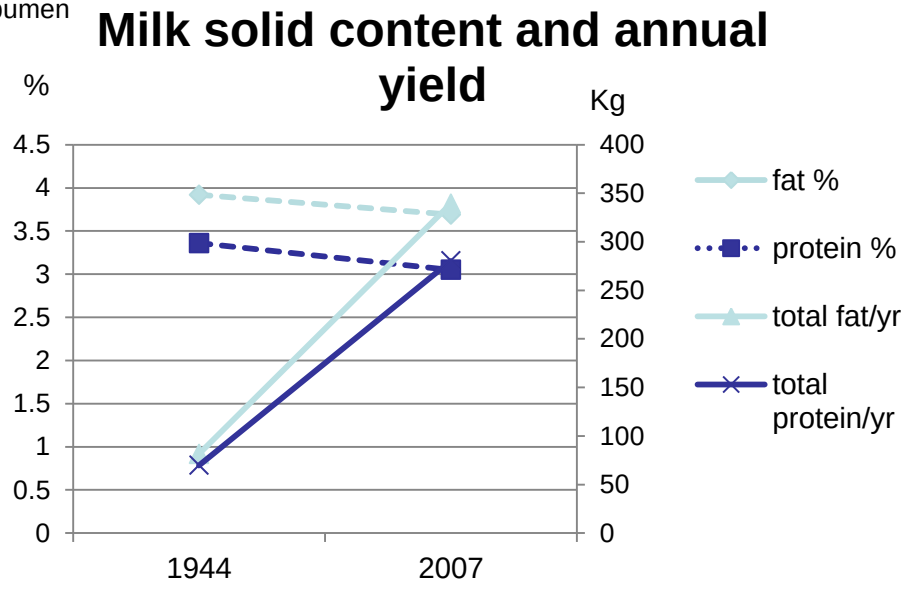
Processing: more micronutrients in many "offal" than lean cuts

Animal: Species, breed, nutrition, age, sex, cut, processing, parity, season influence food composition and quality; some selection on components

- Meat: saturated fatty acids – polyunsaturated FA
- Milk: protein, mineral, vitamin

Food utilization





Tharrington et al. 1999; Oksbjerg et al, 2000; Wattanachant et al. 2004; Capper et al. 2009; Moula et al 2009; Jayasena et al. 2013;

Stability over time – trade-offs in the livestock sector

	Locally adapted breeds - low input smallholder / pastoral systems	**Transboundary, exotic breeds - high input intensive systems**
Multifunctionality, non-animal source food ecosystem services	High	low
Resource use efficiency per unit food product	Low	high
AnGR diversity	high	low
Production losses, diseases	high	low
Risk of AMR	low	high

Stability over time – trade-offs with other sectors

	Locally adapted breeds - low input smallholder / pastoral systems	**Transboundary, exotic breeds - high input intensive systems**
Cereal + protein feed crops use (1/3 of arable land)	Low	high
Use of non-convertible land (grassland, forest) (80% of global feed basket), ecosystem maintenance	high	low
Fish / meat meal use	Nil	high
Water and habitat pollution (drugs, pathogens, nutrients)	Low	high
CO_2 emissions and habitat destruction from land use change	high	high
N + energy use	Low	high

No simple answer

	Locally adapted breeds - low input smallholder / pastoral systems	Transboundary, exotic breeds - high input intensive systems
Availability	xx	xxxx
Physical access	xxxx	x
Economic access	x	xxxx
Utilization	xx	xx
Stability	xx	xx

Thank you