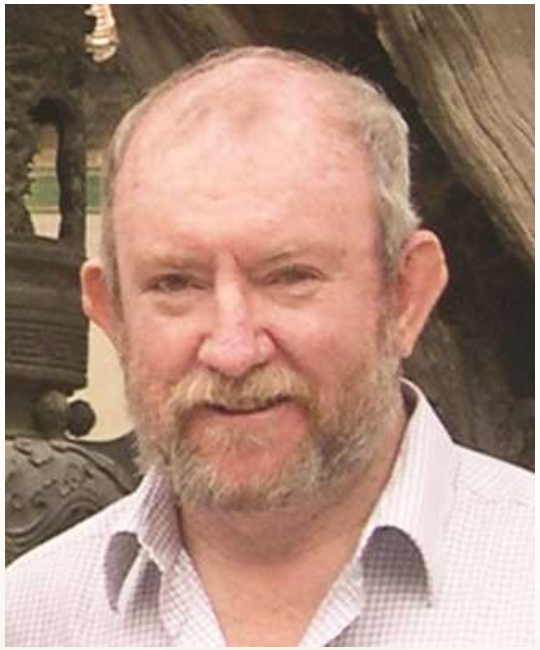

Mr Tony Edwards

Owner, ACE Livestock Consulting

Utilising rendered products as part of the responsible management world feed resources for pigs

4th global feed and food congress South Africa 2013

Organiser Technical Support Host






Utilizing Rendered Products as Part of the Responsible Management of World Food Resources

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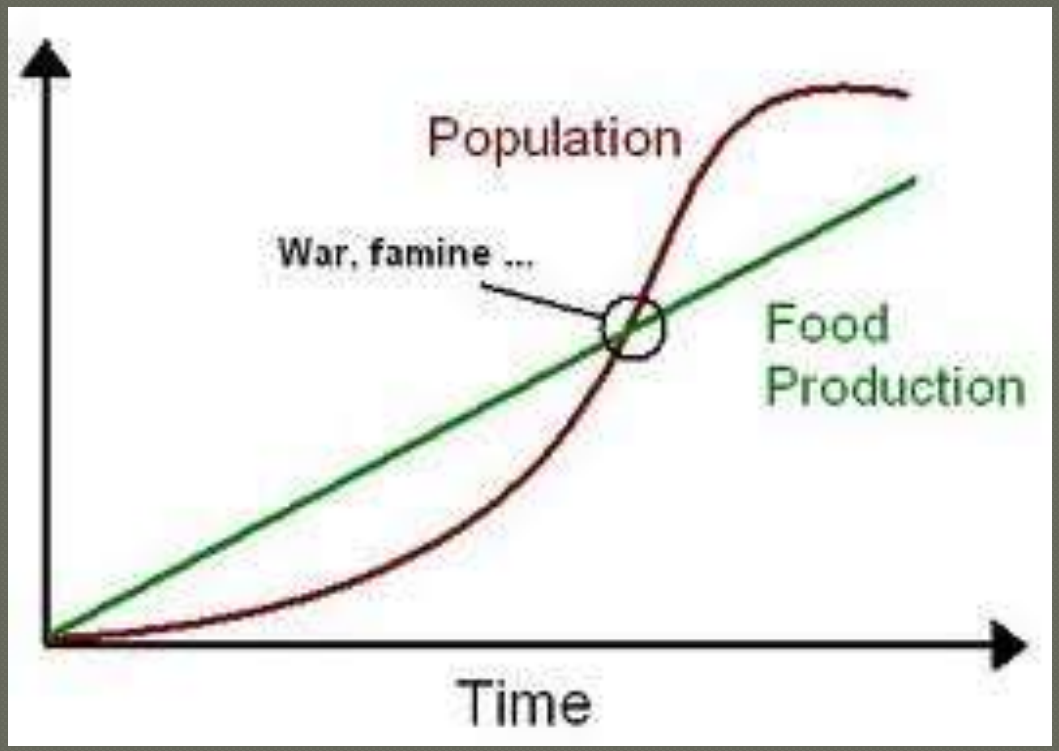
Malthusian dilemma

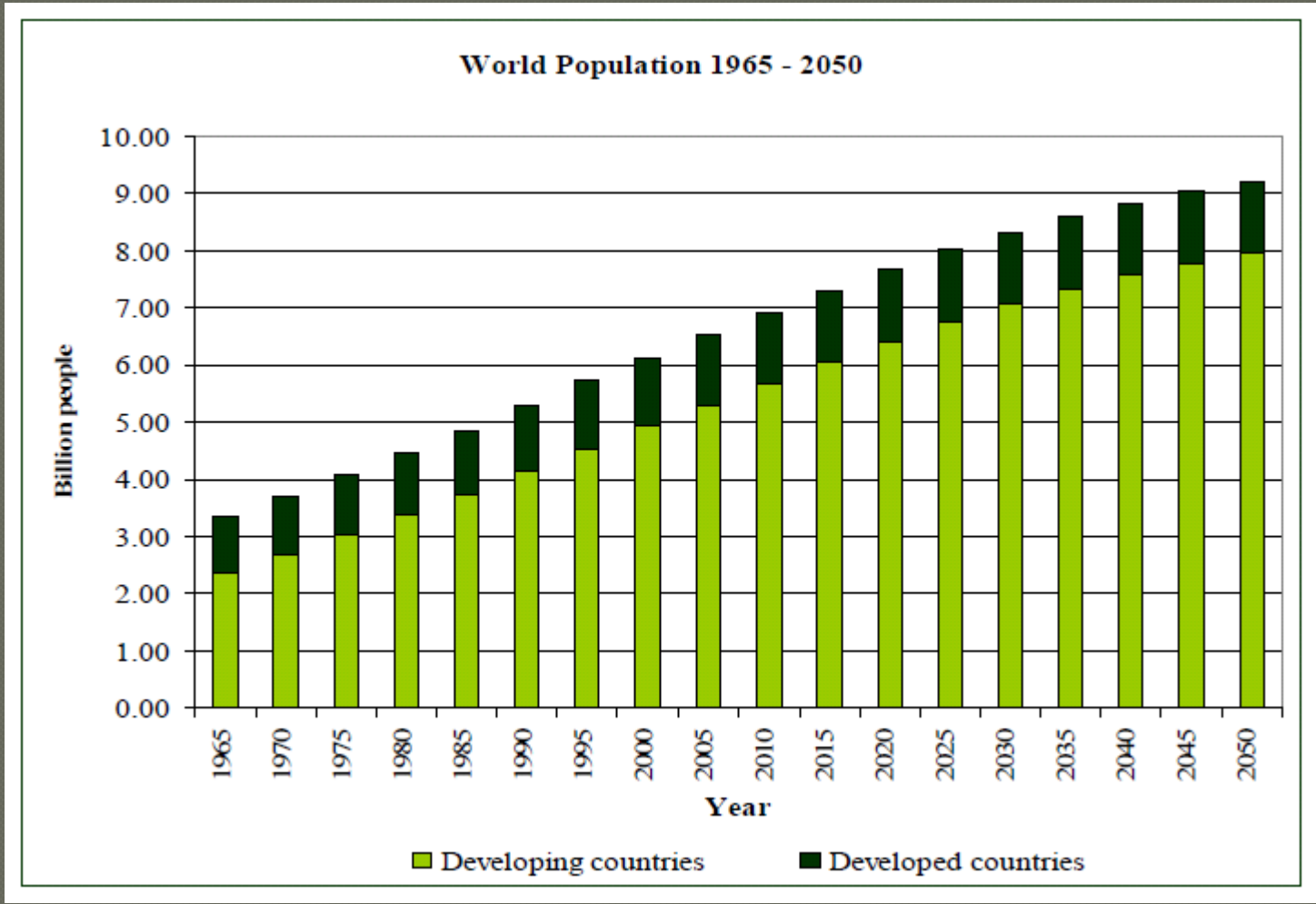
- Malthusian dilemma (exponential population growth overtaking linear food production progress leading to famine) back on the agenda








Global Population Growth








Asian population wealth

Table 2 | **The Asian middle class will grow sharply over the next 40 years**

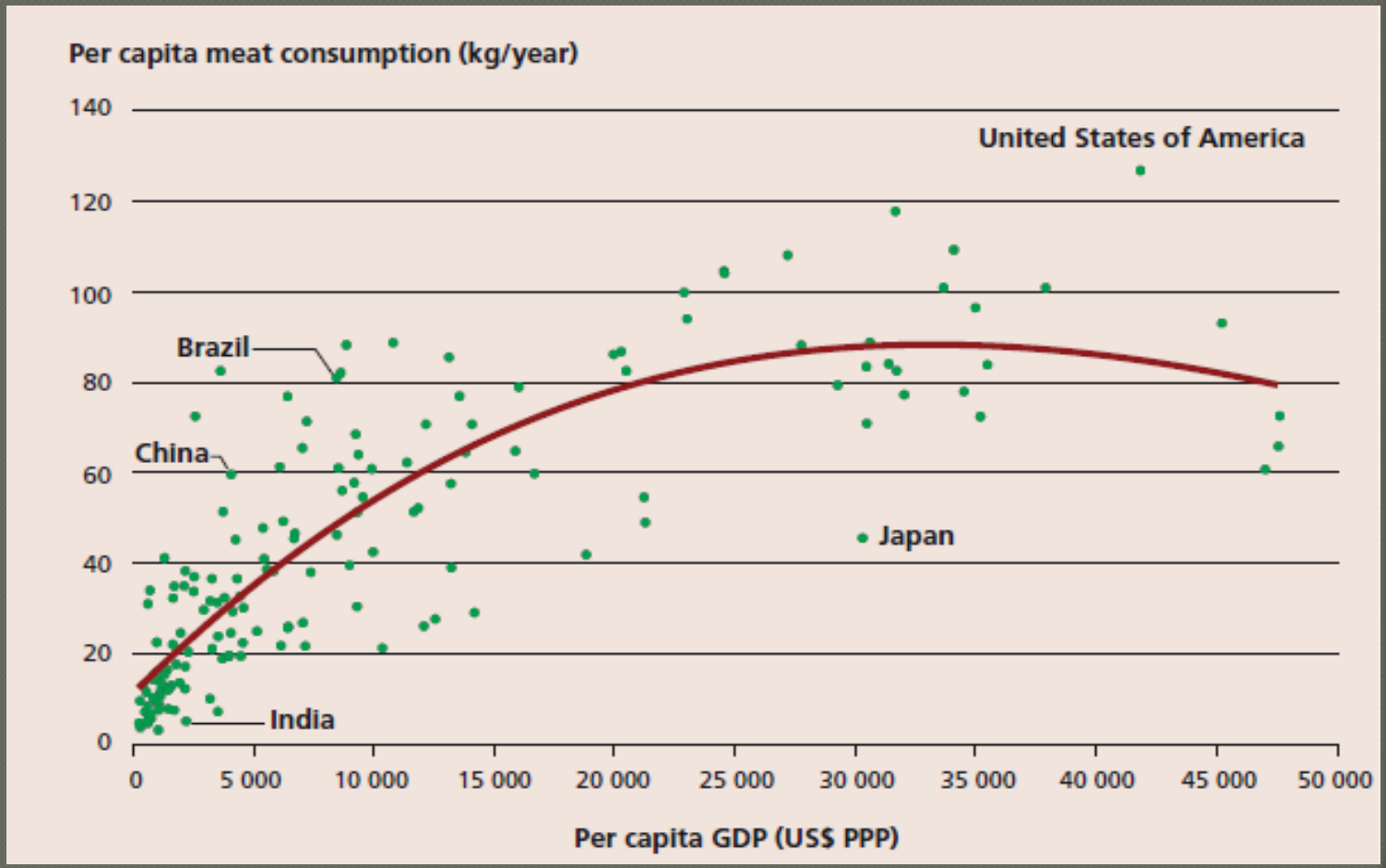
	2030			2050		
	Middle Class Population	Upper Class Population	GDP per capita (PPP)	Middle Class Population	Upper Class Population	GDP per capita (PPP)
PRC	1,120	40	21,100	1,240	190	47,800
India	1,190	15	13,200	1,400	210	41,700
Indonesia	220	5	13,500	250	40	37,400
Japan	100	20	48,900	60	40	66,700
Republic of Korea	30	20	60,200	10	35	107,600
Viet Nam	80	2	11,900	100	15	33,800
World	4,990	580	19,400	5,900	1,500	36,600
US	185	190	65,500	120	290	98,600
Germany	50	30	51,300	25	50	77,800

Source: Centennial Group projections, 2011.






Meat Consumption and GDP



(FAO, 2009)

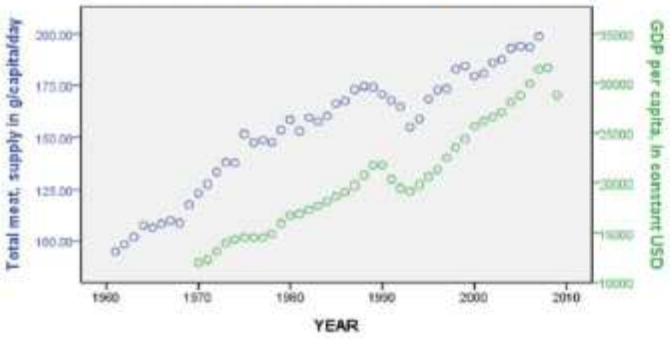




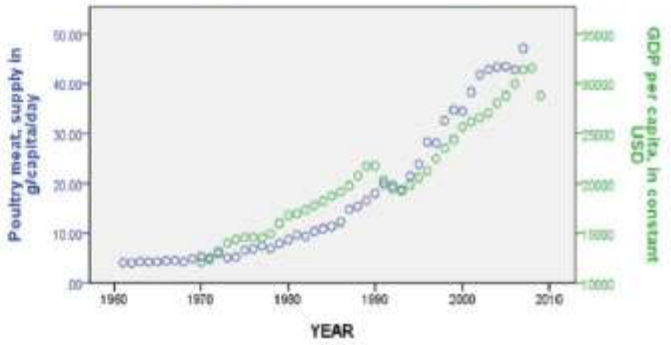

Meat Consumption and GDP

Exploring – Standard of living

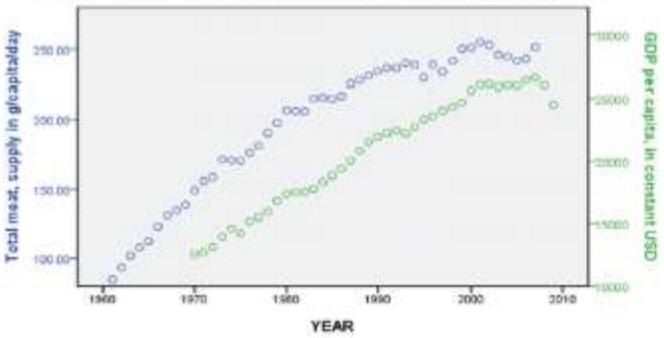
Finland – GDP per capita vs. total meat consumption



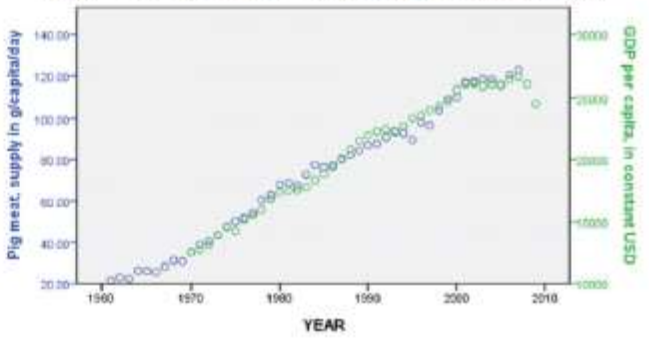
Finland – GDP per capita vs. poultry meat consumption



Italy – GDP per capita vs. total meat consumption



Italy – GDP per capita vs. pig meat consumption








Pig & Poultry diets

- Pig and poultry diets which include animal proteins support superior performance
- Unidentified growth factors
  - Specific amino acid limitations
  - Amino acid digestibility
  - Available phosphorous
  - Vit B12
  - Iodine
  - Selenium






Where is the nutritional value in animal products?

- In monogastric nutrition, prime constraints to growth and productivity are protein, energy and minerals
- Rendered animal productrs can make a useful contribution
- Monogastrics need amino acids in adequate levels in and in the right proportions to facilitate efficient protein synthesis (meat, eggs, milk, organs, ancillary proteins)
- Grains provide substantial levels of protein but the protein is of low biological value and hence needs balancing.






Meeting animal protein requirements

Materials	% Diet	% Total protein	% Lysine
Grain	70	45	20
Soya bean meal	25	54	66
Canola meal			
Legumes			
Fishmeal			
Meatmeal			
Bloodmeal			
Synthetic Amino acids	0.2	1	14






Nutritional value of rendered animal proteins

a) Protein

	Meat and Bone meal	Blood meal	Poultry offal meal	Feather meal	Pig Muscle Tissue
Protein	55	90	65	80	23
Amino acids (g/100g N)					
Lysine	4.86	8.88	5.55	2.45	7.0
Methionine	1.34	1.26	1.76	0.79	-
M+C	2.31	2.35	3.25	5.47	3.5
Threonine	3.15	4.66	3.90	4.61	4.2
Isoleucine	2.71	1.23	3.89	4.62	3.8
Tryptophan	0.62	1.63	0.98	0.55	1.0

Degussa 2001, ARC 1981






Amino acid digestibility within protein sources (%)

	Soya bean meal	Meat & Bone meal	Blood meal	Poultry meal	Feather meal
Lysine	92	84	86	77	65
Methionine	93	86	85	80	71
Threonine	88	82	85	76	78
Isoleucine	91	84	86	81	86
Tryptophan	92	80	88	69	72

(AMI pig 2000)






Nutritional value of rendered animal proteins

b) Energy

	Corn	Wheat	Soya bean meal	Meat & Bone Meal	Blood meal	Poultry meal	Feather meal	Tallow
ME Poultry (MJ/kg)	13.75	13.00	10.00	10.70	12.20	13.90	12.00	34.00
DE Pig (MJ/kg)	14.30	14.00	14.90	11.70	18.00	17.00	14.50	33.50
NE Pig (MJ/kg)	11.18	10.61	8.25	6.84	6.27	11.37	7.29	29.88






Nutritional value of rendered animal proteins

c) Minerals

- Most important mineral in agriculture = phosphorus, It is essential for all life. No substitute
- The dilemma the world faces is that the principle source of phosphorus (phosphate rock) is non-renewable and fast running out
- We are close to peak phosphorus (i.e. where half the known reserves are exhausted
- Most of the phosphorus has been applied to crops to boost yield, but excess in run-off water has resulted in eutrophication of water resources.






Nutritional value of rendered animal proteins

c) Minerals (cont)

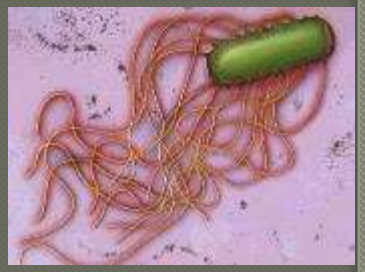
- Need for better management of phosphorus
- Recycling animal proteins reduces the need for fossil phosphates in diets
- Phytase enzymes improve the utilisation of phosphorous from phytate bound sources in vegetable materials, but does not negate the role of animal protein sources.






Constraints to the use of rendered animal proteins

- Concerns to the risk of animal and human health
  - Salmonella is a historical issue
  - Sterile after processing
  - Recontamination an issue
  - Modern processors addressed and largely eliminated this issue
  - Salmonella detected in range of other raw materials
  - Applying SOP's and HACCP
  - Materials handling procedures,pelleting, acidifiers can reduce risk at the mill level.








Constraints to the use of rendered animal proteins

- Concerns re the risk of animal and human health
  - BSE – Biggest impediment to animal product use in Europe
  - Total ban on all animal proteins
  - TSE never reported in pigs & poultry
  - Attempts to achieve oral transmission in pigs and poultry unsuccessful
  - Total ban is unnecessary
  - Recently EU directive allows non-ruminant animal protein in aquaculture diets
  - Next step is monogastric to monogastric and ultimately ruminant to monogastric
  - No issue in Asia, Australia,Nth and Sth America






Cost of not utilising the food value of rendered materials

- Cost of disposal is horrendous and irresponsible if unnecessary.
- A study by APL (Black et al., 2002) on the impact of banning the use of animal proteins in pig diets concluded it would represent a severe impost on the industry e.g. Reduced profitability by 10% and if compulsory incineration was included, by 30%.
- Based on the risks involved– deemed unnecessary.






Constraints to the use of rendered animal proteins

- Public perceptions
  - Less than 2% of the western population are involved in agriculture
  - Little understanding of farm practices
  - Public opinion can easily be manipulated
  - Authority approval vs retailers perception and arbitrary restrictions.

  - Need for collaboration, education,
  - Need to dispel concerns, restore confidence






Constraints to the use of rendered animal proteins

- Variability in composition
  - Long standing criticism
  - Some degree of variability is inevitable
  - Variation between plants due to technology
  - Real-time NIR analysis makes variation of lesser consequence
  - Advanced NIR can determine both total and digestible amino acid levels
  - Variation is manageable and should not restrict the use and value of rendered products






Constraints to the use of rendered animal proteins

- Biogenic amines
  - Double edge sword
    - Small doses = stimulate appetite and gut development
    - High doses = toxic
  - Putrefactive breakdown of amino acids
  - Produces potentially toxic compounds
  - Erodes amino acid content in meal
  - Prevention – prompt processing, refrigeration, organic acids
  - Most modern plants produce product with acceptable level of biogenic amine content






Conclusions

- The challenge to feed the world has many aspects
- Fundamental to the exercise is sustainability
- Alternative systems such as organic, free range and non-gmo may not hold the answers
- The tenets of animal welfare, food safety, and environmental responsibility are not the exclusive domain of these systems , but are shared by all responsible livestock producers
- We do not have to revert to primitive agriculture to observe these tenets
- The recycling of animal protein products is a very sustainable option but require appropriate management
- Consequently responsible feed resource management demands the full value be extracted from animal protein materials and any unnecessary bans restricting their use be reviewed.