

THE FUTURE OF FOOD. DR. IR. RON McDOWALL

The numbers

- 9-10 billion
- 70-100 percent increase in food demand by 2050 based on 2009 figures
- 80 percent has to be in place by 2030
- NZ's place in all of this.

The 'math' behind production increase.

- 1960 - population = 3 billion.
Average calorie intake 2,360 c/day
= 7,080 billion c/day
- 2008 - population = 6.7 billion
Average calorie intake 2,800 c/day
= 18,760 billion c/day (%165 increase)
- 2050 - population = 10.5 billion
Average calorie intake = 3,300 c/day
=34,650 billion c/day (%85 increase)

Figures taken from: Smeets et al, 2007; Sachs, 2008; F.A.O., 2002/2009.

Absolute versus Percentage.

- ❑ While the percentage increase is less than was achieved in the prior production jump (the Green Revolution) - the absolute increase required over the next 40 years is greater.
- ❑ 1965-2008 = 11,680 billion c/day
- ❑ 2008-2050 = 15,890 billion c/day

Income convergence and food intake.

- More than 70% of the *global* agricultural land use in 2002 was allocated to the production of animal products, while animal products accounted for less than 17% of the total calorie intake.
- To meet the ‘meat’ demands of 2050 we will need to put 10(9) more hectares into agricultural production.
- Predicted that 20% of calories will come from animal products. Currently consumption is ~10%.
(Smeets et al., 2007)

Balancing needs.

- ❑ As population increases, per capita resource allocation (inputs) and waste capacity (outputs) decreases.

Efficiency factor increase.

“Double production” with:

- Less water.
- Less energy.
- Less arable land.
- Less predictability (climate).

= Efficiency factor >2

Food producers of the future:

Will have to be:

- Resilient.
- Adaptive.
- Innovative.
- Sustainable.

Conventional Versus Alternative.

(Bird & Ikerd, 1993; Waltner-Toews & Lang; 2000)

Conventional

- Centralised management
- Emphasis on specialisation
- High ration of hired (outside) workers.
- Separation of management and labour
- Emphasis on standardisation of farming practices.
- High reliance on technology use to minimise real-time, in-field decision making.
- Command & Control view of nature – open loop model
Input-production-output-waste

Alternative

- Farm is owner operated.
- High ratio of farm-family workers.
- Farm is a partnership (between families).
- Structured as a joint management-labour relationship.
- The farm is diversified.
- Emphasis on use of on-farm resources.
- Common use of site-specific and real-time decision making.
- Diverse set of enterprise statements.
- Adaptive ecosystem view of nature – nature is harnessed not controlled.

Sustainable food system:

(Kloppenburg et al., 2000)

- Ecologically sustainable.
- Knowledgeable/communicative.
- Proximate (supply-chain).
- Economically sustainable.
- Participatory.
- Sustainability regulated.
- Sacred.
- Healthful.
- Diverse.
- Culturally nourishing.
- Seasonal/temporal.
- Value-oriented (associative) economics.
- Relational.

Industrial models and feedback sensitivity for sustainability.

(Sundkvist et al., 2005)

- Intensification.
- Specialisation.
- Distancing.
- Concentration & Homogenisation.

Food producers of the future:

- Will need to meet the growing nutritional needs of the population without falling into the traps seen in industrialised models.
- Will need to be highly sensitive and reactive to the feedback driving towards sustainability.
- Have a strong focus on balancing the often contradicting demands from stakeholders.
- It is predicted that those producers with a strong worldview and cultural affiliate will be more sensitive to sustainability driven feedback, and thus more able to balance demands.