

Food Innovation Gateways

*Industrial Expectations from
New Technologies*

Henry Lyons

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Summary

- Overview of innovation and technology transfer
- Expected benefits
- Barriers and negatives
- Marine food and ingredients - challenges
- Primary food production
- Future

The 20 Most Significant Inventions in the History of Food and Drink -1 to 10

1. Refrigeration
2. Pasteurization / sterilization
3. Canning
4. The oven
5. Irrigation
6. Threshing machine/combine harvester
7. Baking
8. Selective breeding / strains
9. Grinding / milling
10. The plough



The 20 Most Significant Inventions in the History of Food and Drink – 11 to 20

11. Fermentation
12. The fishing net
13. Crop rotation
14. The pot
15. The knife
16. Eating utensils
17. The cork
18. The barrel
19. The microwave oven
20. Frying

Sources of new technology

- Universities/ Third Level Institutes
- State food research centres
- Manufacturers
- Patents , trade magazines
- Trade shows, Exhibitions
- Technology transfer, brokers
- Converging technologies

Sources of new technology-2

- Word-of-mouth contact with peers
- Internal / In house
- Internet
- Acquisitions
- Serendipity
- Salesmen!

Expectations - general

- New product(s)
- New/improved process(es)
- Competitive advantage
- Economics : Energy, labour, increased capacity
- Quality
- Environment
- Regulations

Expectations - Food Industry

- Natural, Minimal processing, organic
- Green technology
- Integrated process(es)/waste minimisation
- Recycling
- Craft , artisan
- Back to basics

Barriers

- Risks , fear of failure
- Long term fit – not a fad or flash in the pan
- Unforeseen implications,
- Costs esp capital
- IP, confidentiality
- Competition
- Regulations

Barriers cont'd

- Planning
- Environmental issues
- Timescale
- Commercial vs academic outcomes
- Focus

Marine Algae Sector

- Biomass in the oceans
- Traditionally : Food in Far East,
Alginate, agar and carrageenan
- Attention/ Focus now on nutraceuticals, functional foods, supplements and pharma products
- Unique biopolymers ; alginate , fucoidan, laminarin, ulvan
- Oligosaccharides

Industry

- Industry – up to now one component extracted and rest dumped as waste
- New approach. Biorefinery /integrated manufacture
- Research in Ireland/ EU.
- Nutramara
- Irish resource

Challenges

- Natural raw material of variable composition
- Composition is function of species, location, season etc
- Complex biopolymers-cell walls & intracellular sites
- Degree of polymerisation
- Often found in combined forms e.g. glycoproteins
- Polyphenols bound to proteins ---enzyme inhibition
- Extraction processes may alter composition

Structure and Bioactivity

- Biopolymers
- Linear and branched, linkages (eg glucose)
- Oligosaccharides eg beta glucans
- Degree of polymerisation
- Degree of sulphation for fucoidan
- Synergies

Processing Technologies

- Drying, milling and micronising
- Solvent extraction (Vary pH, T, P, Time)
- Cryocrushing
- Differential pressure – cell bursting
- Ensilation

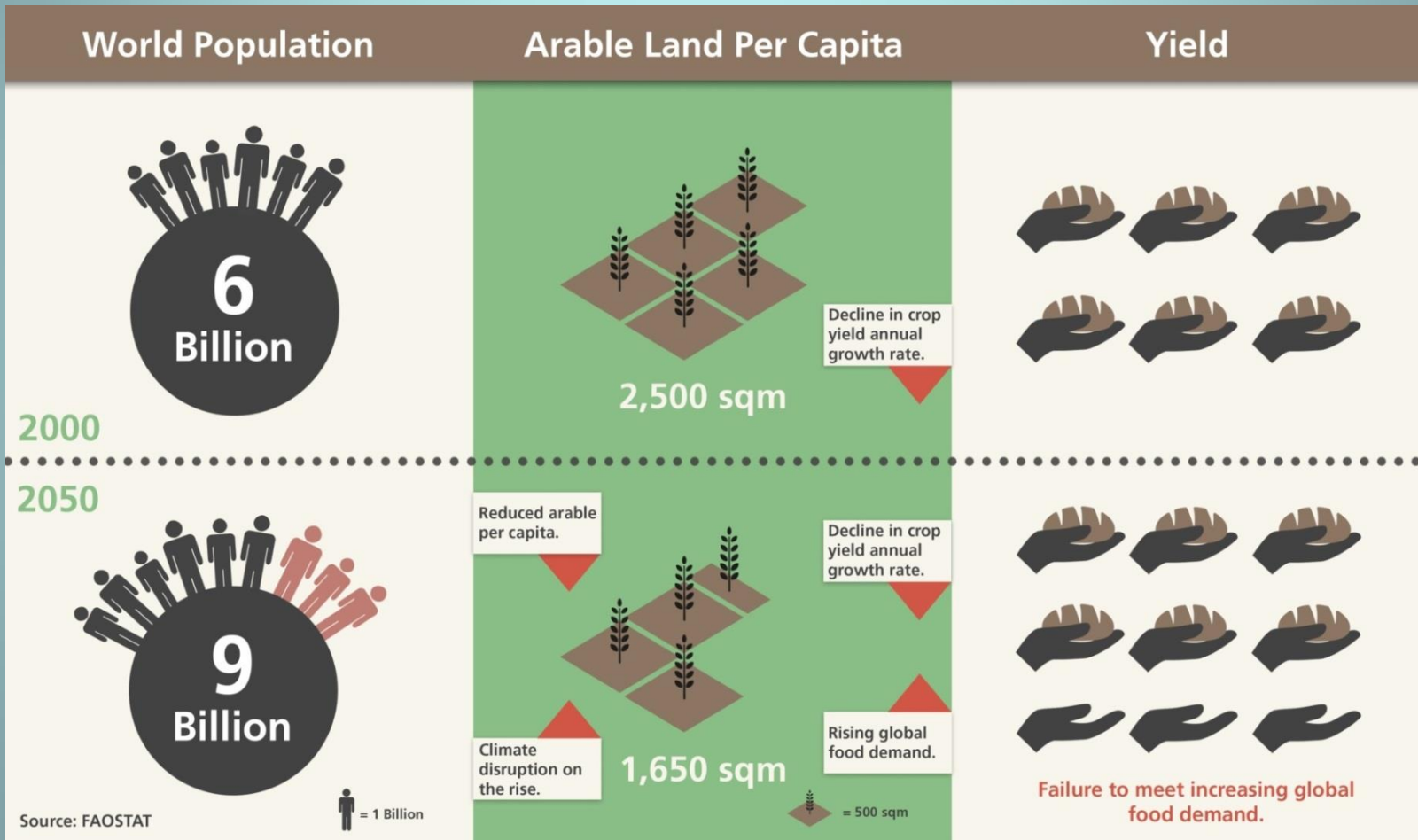
New technologies being tested

- Bioprocessing
- Microwave
- Ultrasonics
- High Pressure Processing
- Supercritical fluid extraction
- Expectations

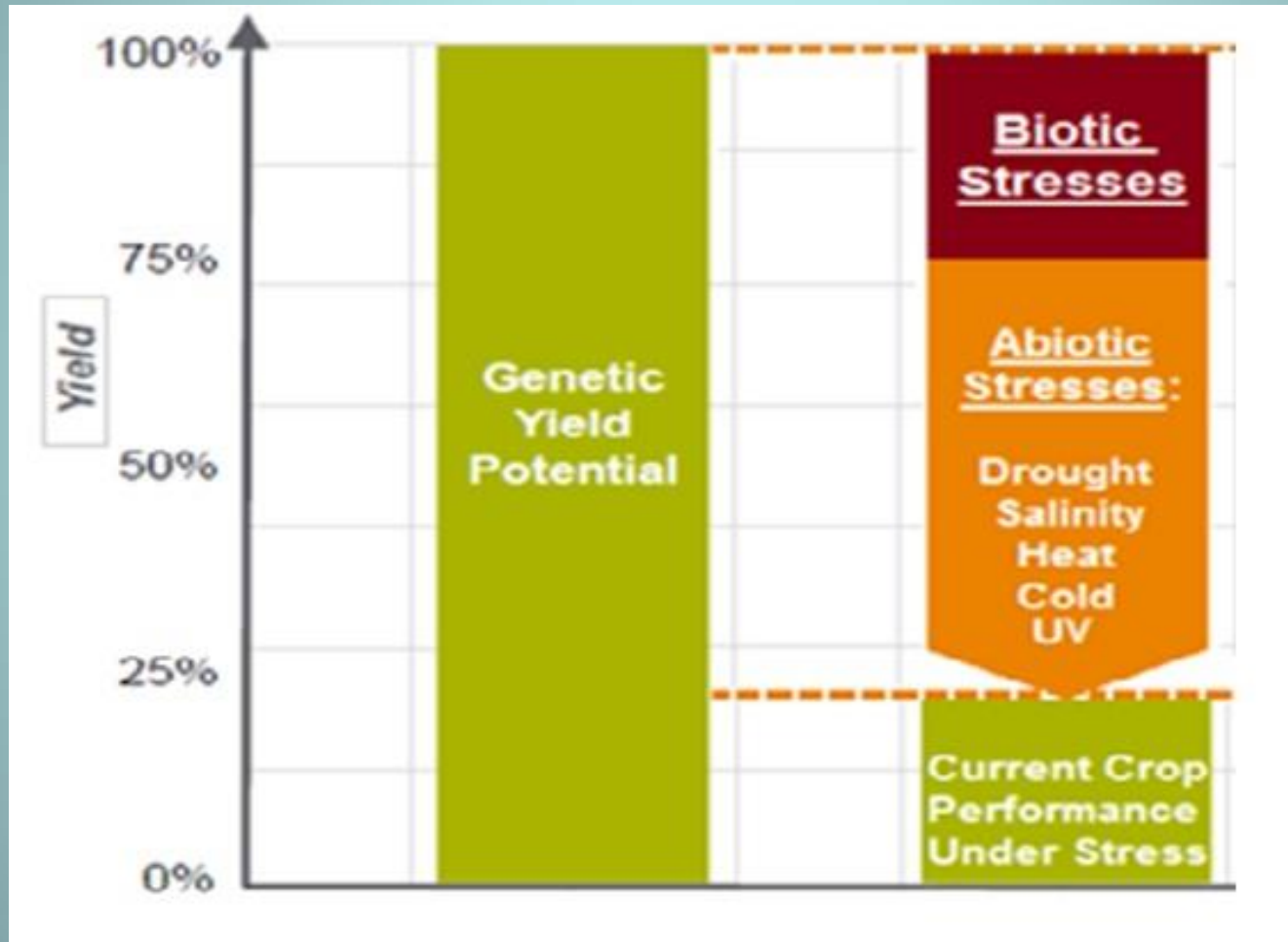
Chitin and Chitosan

- Crustacean shells – crab and shrimp
- Second most abundant biopolymer
- Estimate 10 trillion tonnes
- Applications – chitosan and glucosamine
- Challenges --oligochitosans
- Expectations
- Munster University research

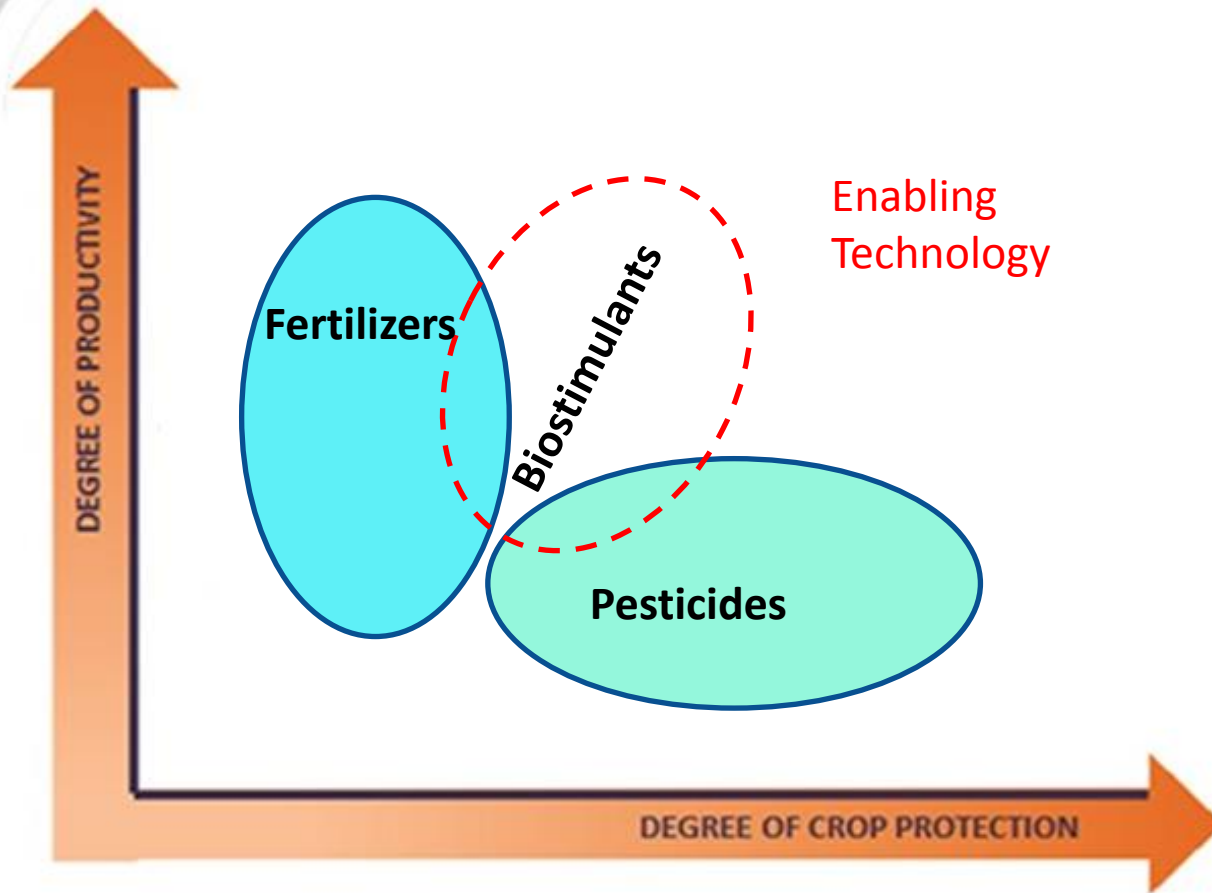
Primary Food Production



The Challenge



Growers "Tool Box"



Some Potential Solutions

Precision agriculture

Digital technology, Big data etc

GM technologies

Natural Plant Protection Products and Biostimulants using bioactive oligosaccharides and peptides derived from:

- Marine algae
- Crustacean, Yeast and other food wastes

Go raibh maith agaibh

Thank You



LITTLE **SAMPHIRE** ISLAND

SEAWEED