

Agricultural Biotechnologies in Developing Countries



Biosafety in the broader context of biosecurity

Principles and concepts of biosecurity

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Setting the scene: What is 'biosecurity'

- Means different things to different countries – some do not recognise the term. *Yet there are “food inspection” agencies, “food safety” authorities, agriculture departments, undertaking ‘biosecurity’.*
- Examples include: **Bhutan** – BAFRA (*Bhutan Agriculture and Food Regulatory Authority*) *within Ministry of Agriculture*; **New Zealand** – NZFSA (*NZ Food Safety Authority*) and Biosecurity New Zealand (MAFBNZ) *within the Ministry of Agriculture and Forestry*

What is 'biosecurity' (2)

- **Reflection of the growing concern in all circles about food security and food safety AND the world's ability to produce food *sustainably* [as for new biotechnologies]**
- Importance means 'biosecurity' has become political, not just government organisations – *Minister for Biosecurity (NZ), Biosecurity Policy (Bhutan, various Australian states, The Gambia), Biosecurity Strategy (various Australian states, New Zealand), Biosecurity legislation (NZ, Fiji, Samoa), etc*

What is 'biosecurity' (3)

- The NZ definition = “Biosecurity is the exclusion, eradication or effective management of risks posed by pests and diseases to the economy, environment and human health.”
- Tasmania, Australia = “Biosecurity is the protection of industries, the environment and public wellbeing, health, amenity and safety from the negative impacts of pests, diseases, and weeds.”

What is 'biosecurity' (4)

- Bhutan's biosecurity vision = "Biosecurity shall contribute to achieving Gross National Happiness by ensuring Bhutanese people, the biological resources, plants and animals are protected from the harmful effects of pests and diseases, invasive alien species, genetically modified organisms, toxic chemicals and food additives."

FAO definition of 'biosecurity'

FAO promotes biosecurity broadly as:

- “A strategic and integrated approach that encompasses the policy and regulatory frameworks for analysing and managing relevant risks to human, animal and plant life and health, and associated risks to the environment.”
- *As such, biosecurity covers the introduction of plant pests, animal pests and diseases, and zoonoses, the introduction and release of genetically modified organisms (GMOs) and their products, and the introduction and management of invasive alien species.*

Biosecurity sectors

This holistic approach to biosecurity:

- Acknowledges the advantages of utilising synergies across sectors at national and international levels

Sector goals:

- *human life and health (including food safety);*
- *animal life and health (including fish);*
- *plant life and health (including forests); and*
- *environmental protection.*

The other important words beginning “bio”

For the purposes of biosecurity, **biosafety** =

- **“the safe use for human, animal and plant health, and the environment, of new biotechnologies.”** [FAO Biosecurity Toolkit]

This begs the question, what is ‘biotechnology’:

- General understanding = technology based on biology, agriculture, food science and medicine.

The other important words beginning “bio” (2)

Biotechnology =

- “Any technological application that uses biological systems, living organisms, or derivatives thereof, to make or modify products or processes for specific **USE.**” [Convention on Biological Diversity]

For discussion here:

- **Biotechnology** “encompasses a wide range of technologies and they can be applied for a range of different purposes, such as the genetic improvement of plant varieties and animal populations to increase their yields or efficiency; genetic characterization and conservation of genetic resources; plant or animal disease[/pest] diagnosis; vaccine development; and improvement of feeds.” [Background to the Conference, www.fao.org/biotech/abdc/about-abdc/confbackground/en/]

Biosecurity frameworks: Example 1

Bhutan – Integrated approach:

- >8 other Ministries/Commissions involved
- Establishment of a National Biosecurity Commission
- Biosecurity Policy of the Kingdom of Bhutan AND a Biosecurity Strategy under development
- Legislation – 8 Acts plus various regulations
- CAC, OIE, CPM Member; Obligations under CBD, CPB
- BAFRA = Competent authority for biosecurity (charged by the government with sector coordination)

Presentation 3 in this session will expand on this.

Biosecurity frameworks: Example 2

New Zealand – Institutional arrangements:

Lead government agencies responsible for broader biosecurity

- New Zealand Food Safety Authority – *responsible for food regulation in the domestic and export sectors*
- MAF Biosecurity New Zealand – *the division of MAF charged with leadership of New Zealand's biosecurity (narrower definition than FAO's) system*
- Environmental Risk Management Authority – *a quasi-judicial, decision-making body that is required to consider and weigh up the adverse and beneficial effects of a 'new organism' or substance*

Biosecurity frameworks: Example 2 (2)

New Zealand – Legislative framework:

- NZFSA – *Agricultural Compounds and Veterinary Medicines Act, Animal Products Act, Dairy Industry Act, Food Act, and others*
- MAFBNZ – *Biosecurity Act 1993*
- Environmental Risk Management Authority – *Hazardous Substances and New Organisms Act 1996 [A new organism could be a plant, animal or micro-organism coming into NZ for the first time or a new species developed through genetic modification.]*

Biosecurity frameworks: Example 2 (3)

New Zealand:

- Risk analysis (using established procedures complying with relevant international standards) is a key activity of NZFSA, MAFBNZ and ERMA
- As for new biotechnologies – some, as in genetically modified plants or animals may be the subject of risk assessment while others may be utilised in the implementation of New Zealand's biosecurity system including the process of risk assessment
- Diagnostic (what is it, is it a risk, is the risk mitigated, where did it come from) technologies – antibody-based pathogen identification; *species-specific PCR*; multi-species/multi-gene diagnosis (macroarray and microarray); *DNA barcoding*