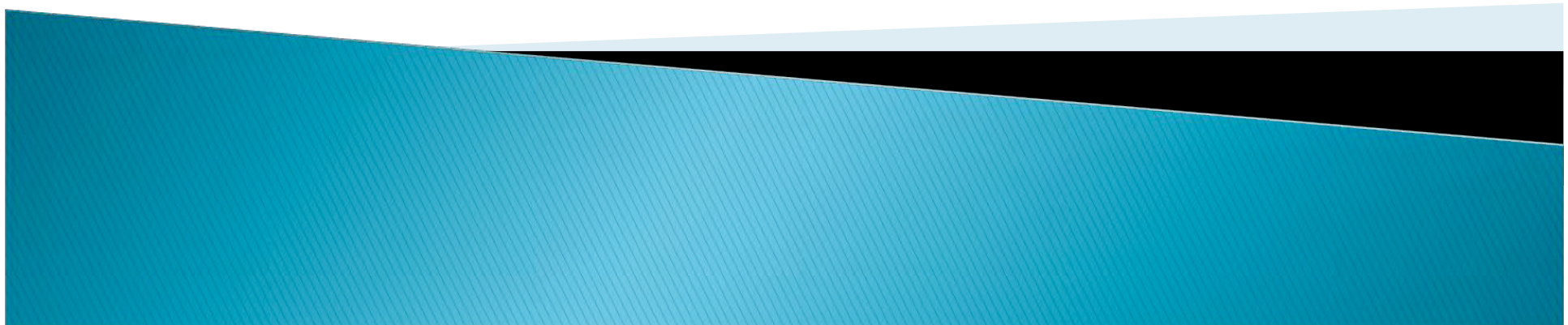


*Teaching Agricultural
Biotechnology and Biosafety: Some
lessons from Zimbabwe and the
Program for Biosafety Systems*

Idah Sithole-Niang
Biochemistry, University of Zimbabwe



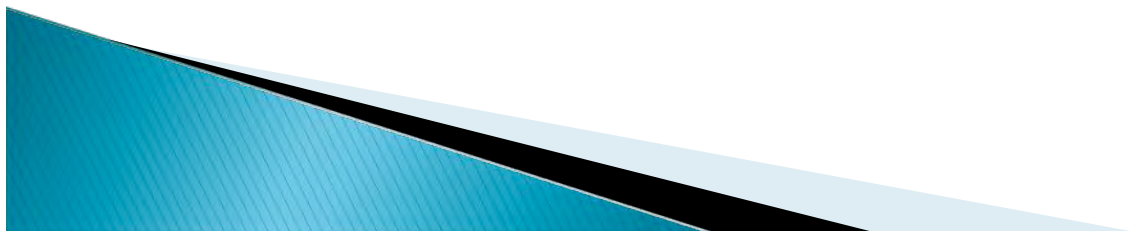
Regional MSc Biotechnology

- ▶ Initiated with funding from SIDA/SAREC and the DGIS for the first 2 years 1991-1992
- ▶ DGIS funded it for another 10 years 1993-2002
- ▶ DGIS partially in 2005-2007
- ▶ SADC and beyond
- ▶ Goal of serving the:
 - Industrial
 - Agricultural
 - Medical sectors
- ▶ Managed by the Biotechnology Trust of Zimbabwe (BTZ)



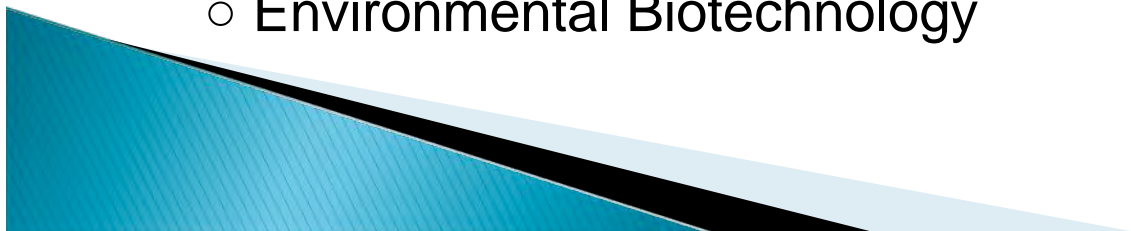
Faculties

- ▶ Science, Agriculture and Medicine
- ▶ Coordinated by the Biochemistry Department
 - Faculty of Science &
 - Medicine
- ▶ Departments:
 - Crop Science
 - Immunology
 - Biological Sciences &
 - Biochemistry



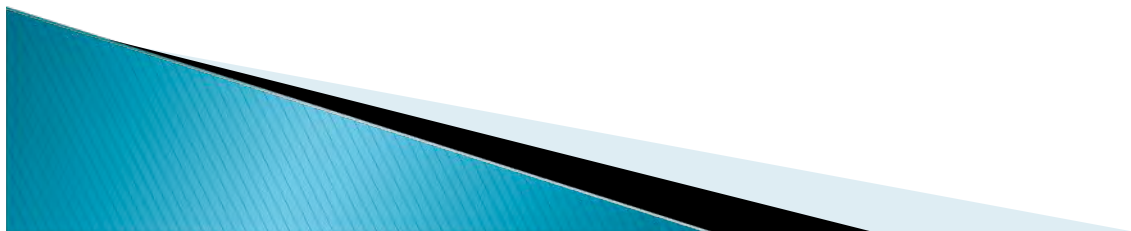
Courses

- ▶ **Coursework in 1st year and project in 2nd year**
- ▶ **Core courses**
 - Basic Microbiology & Fermentation
 - Basic Plant Biotechnology
 - Recombinant DNA Technology I
 - Recombinant DNA Technology II
- ▶ **Elective Courses**
 - Enzyme Technology
 - Advanced Plant Biotechnology
 - Advanced Fermentation
 - Applied Immunology
 - Molecular Virology
 - Environmental Biotechnology



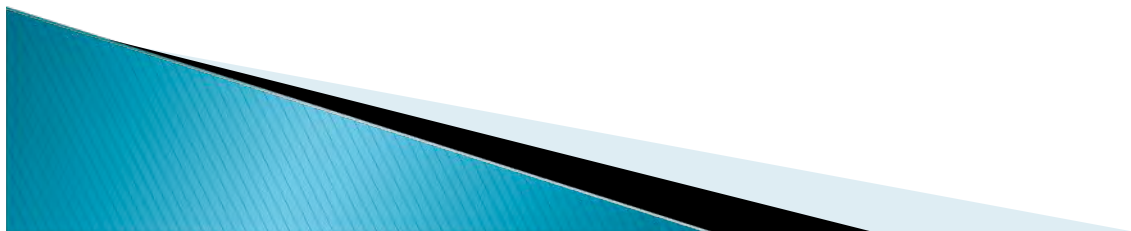
Outputs

- ▶ 82 graduates including some from South Africa, Uganda, Cameroun, Zambia and Botswana
- ▶ Enhanced capacity, placements & networks:
 - Graduates pursuing doctoral degrees at:
 - Local
 - Regional &
 - International institutions
 - Human Resource capacity at:
 - local universities &
 - research institutes



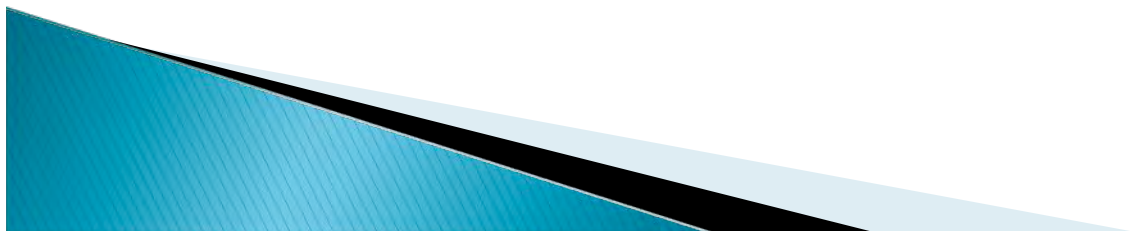
Teaching teachers/Outreach

- ▶ Biochemistry and Molecular Biology Society of Zimbabwe (BMBSZ), also hosted in the department has the task of assisting High School Teachers with biotech syllabus
- ▶ Molecular Biology Group: A-list schools in Harare
 - 2 day workshop in 2007
 - “live” molecular biology demonstration experiments in 2008
 - Aimed for the Agricultural show 2009
 - Booth at Ag show in 2010



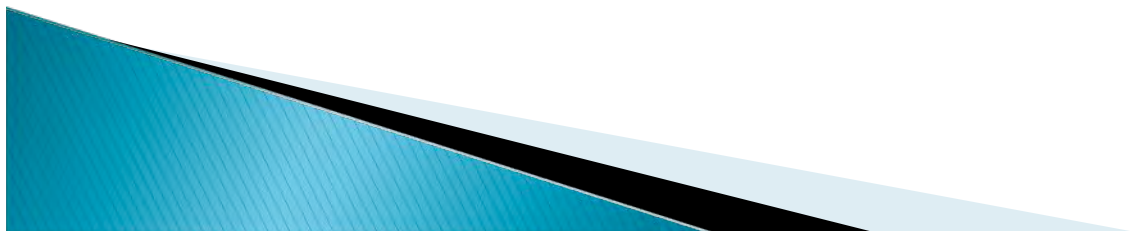
Hands- on Training

- ▶ Regional workshop on molecular markers
- ▶ National workshop on introduction to Molecular Biology
- ▶ SADC workshop on GMO testing

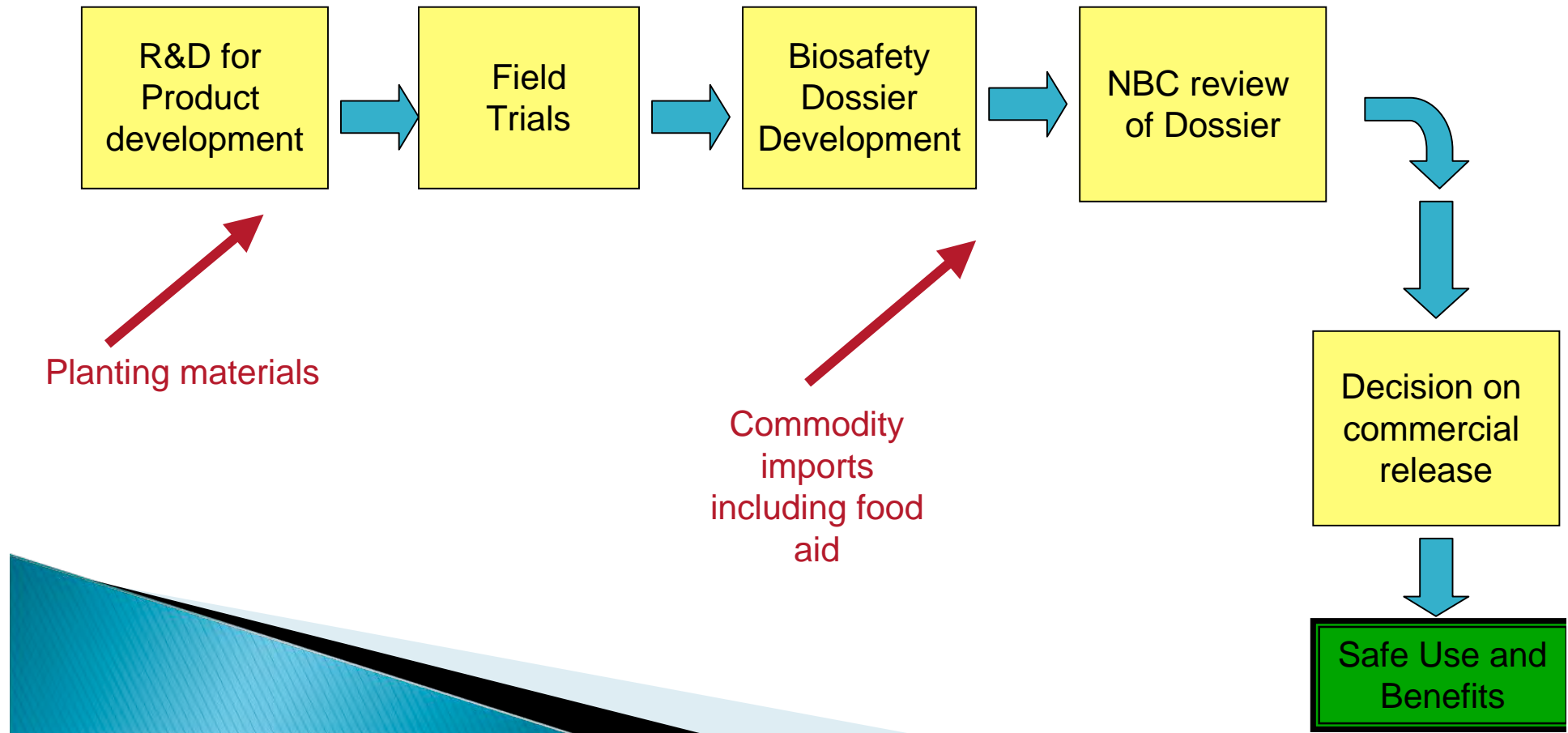


Biosafety teaching & training

- ▶ Select topics taught at MSc
- ▶ Initiatives:
 - UNEP-GEF
 - Africabio
 - Syngenta
 - ABNE
 - RAEIN-Africa &
 - COMESA/FANRPAN/RABESA/PBS
 - PBS



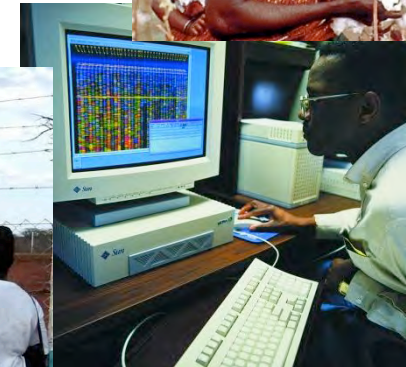
Biosafety review essential in GM product development



Regulation of GM crops moves through different stages of crop development and deployment



General release



Full safety assessment



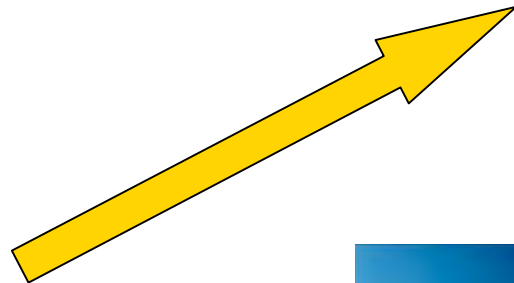
Confined Field Trials



Growth Chamber or greenhouse



Lab



CFT Application

General Release Application

Approval



Biosafety considerations

- ▶ Environmental risk assessment which includes:
 - Effect on non-target organisms
 - Potential for weediness
 - Concerns over gene flow and consequences thereof
- ▶ Food and feed safety
 - Toxicity
 - Nutritional equivalence
 - Allergenicity
 - Digestibility and
- ▶ Socio-economic considerations.



Main components of NBFs

- ▶ Regulatory regime made up of Acts & Regs
- ▶ Biotechnology/Biosafety Policy
- ▶ Institutional arrangements for handling and managing biotechnology:
 - Consent & registration (contained use)
 - Confined field trials (CFTs)
 - Commercial releases
 - Monitoring & inspections
 - Public awareness and public information



PBS Program Mission

- ▶ **Goal:** "...to more effectively address biosafety within a sustainable development strategy, anchored by agriculture-led economic growth, trade, and environmental objectives." (*USAID RFA*)
- ▶ **Mission:** To empower partner countries for science-based biosafety decision-making while strengthening capacity to implement biosafety through an innovative system design.



PBS Program Partners

- ▶ Implemented by an international **Consortium** of US expert, institutes, regional and national organizations in partner countries, and individual biosafety experts
- ▶ **Lead agency:** International Food Policy Research Institute (IFPRI)
- ▶ **Donor organization:** US Agency for International Development (USAID)
- ▶ Program started May 2003-08, 2009-2013



Biosafety Knowledge Base: BBI

- ▶ **Develop strategies** for managing potential risks in the context of agro-ecosystems found in developing countries.
- ▶ **Build collaboration** between Ag research and environmental conservation communities in the U.S. and developing countries.
- ▶ **Build capacity** in risk assessment and risk management research.



BBI Program Outputs

- ▶ 11 projects funded
- ▶ **Scientific leadership** realized through developing country institutes
- ▶ **Priorities identified** through regional coordinators & Advisory groups
- ▶ **Technical reviews conducted** through meetings & international conferences



Integrated Confinement System for GM Plants

- ▶ CFT guidelines adopted in most partner countries (Kenya, Uganda & Malawi)
- ▶ **ICS Portfolio:**
 - CFT guidelines
 - Containment & Confinement manuals
 - Regulatory procedures
 - Trial manager & Inspectors handbook



People Skills: Training & Communication Activities

- ▶ **Enabling the authorization and safe conduct of experimental field trials**
 - Compliance management
 - Training of inspection staff
- ▶ **Regulatory strategies for scientists and regulators**
 - Focus on requirements for the evaluation of field trials, with subsequent training addressing the more extensive requirements for commercial releases
- ▶ **Food safety and environmental risk assessment**
 - Introductory, awareness raising
 - In-depth technical training



Training / Comm. Activities

- ▶ **Communication and outreach**
 - Communication skills for key spokespersons
 - Supporting ongoing communication programs (Africabio & BioEROCC)
- ▶ **Policy development seminars**
 - Review findings from program components
 - Consider options for regulatory efficiencies
 - Regional collaboration and harmonization

Lessons

- ▶ Collaboration
- ▶ Institutional linkages
- ▶ Partnerships
- ▶ IPRs
- ▶ Motivation
- ▶ Biosafety assessments unduly restrictive
- ▶ Socio-economic consideration
- ▶ Stacked traits
- ▶ Biofuels and Climate change



Acknowledgments

- ▶ <http://www.ifpri.pbs/pbs.asp>

