Food Security and Biotechnology in Africa

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Biotechnology Outreach Programmes for Governmental Organizations and Groups involved in Food & Agricultures Value Chain

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Background: The Nature of GOs

- GOs involved in Food and Agricultural value chain include a wide range of professionals with varied backgrounds:
  - Policy makers in ministries, agencies and parastatals
    - in Nigeria, several of these participate in a share cross manner
  - Research personnel in Universities, research institutes and boards
    - over 140 universities and several agricultural and food related research institutes
  - Quality assurance and other personnel in regulatory agencies
    - Regulatory agencies exist in more than four line ministries including Health, Agriculture, Science and Technology and environment
  - Extension workers and related field service officers
    - Most extension workers are staff of ministries of Agricultures in the three tiers of government with concurrent activities in food production)

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Background: Stakeholder Personnel

The academic and professional backgrounds of GO (stakeholder) personnel in this sector is quite varied

- Amongst policy makers
  - Qualifications may range from Bachelors degree to up to PhD. However, the field of expertise may range from natural science to social sciences.
- In the Research Institutes
  - Most research personnel may possess M. Sc or PhD and be quite specialized.
- Quality Assurance & Regulatory Agencies
  - Personnel may be highly trained but mostly also have varied background from natural sciences, biomedical, physical to social sciences.
- Extension and related field service officers
  - These may be trained from diplomas up to B. Sc or higher. They may also come from variety of educational backgrounds including agriculture, natural sciences, rural sociology and other social sciences.

Biotechnology knowledge may be limited across sections of the GO operatives involved in Agriculture and food security value chain.

Outreach materials should be appropriately tailored and delivered

Background: Regional Staples

The food habit /staples of most countries in S-S Africa is quite varied.

- In the tropical rainforests of West and Central Africa (Southern Nigeria), root and tuber crops are major staples along with limited cereals and legumes
- In the Sahel and Savannah regions (Northern Nigeria), cereals are major staples along with limited contributions from root and tuber crops and legumes
- Apart from the cereals, most staples of interest in S-S Africa have not been choice targets for genetic improvement by biotechnology companies.
  - Only limited improvement by modern biotechnology have been implemented in these crops
  - Such improvements have hardly (not) made it to the market/ commercial production
  - Most food production in S-S Africa is implemented by small holder subsistence farmers

Status of African Agriculture; Background

- African agriculture remains predominantly subsistent and manual labour driven
- The region has the least access to food; suffering the most food insecurity. More Africans go hungry than any other populations
- Productivity of African agriculture is the least in the world
- Resource depletion and climate change impacts are aggravating an already dire situation
- Modern technology including biotechnology have the potential to significantly improve the productivity of African agriculture; food security and family income.
    - This background should be reflected in the materials for outreach

What technologies are available?

- Agricultural Biotechnology encompasses a suite of technologies and scientific procedures used to improve agricultural productivity:
  - Conventional plant and animal breeding
  - Tissue culture & Micro-propagation
  - Molecular (marker assisted selection) breeding
  - Genetic Engineering
  - Other newer techniques

What are they able to achieve?

- Improved productivity through greater yield
- Improved nutritional value, e.g.,
  - through crops that are resistant to pests
  - Crops that are resistant to diseases,
  - Crops that have increased drought tolerance,
  - Crops that have higher nutrient content,
  - Fruits that ripens slowly and store better or
  - Crops that are herbicide tolerant
- So, why are they not universally applied in African agriculture
    - These matters should be addressed closely and without excessive scientific technicalities in the outreach

Out Reach Plan and Layout

- Day 1: (all day); Arrival, Registration & Settling of participants
- Day 2: Outreach Activity for GOs
  - End of Registration
  - Opening formalities (Use Government official at level of Deputy Director, Director of relevant agency, parastatal or line ministry or Professor as top officer) (30 minutes max)
  - Assessment of biotech knowledge base of GO participants; informal interactive session (develop or use a convenient simple questionnaire) (30 minutes)

Out Reach Plan and Layout: Day 2 Contd.

- Delivery of Outreach Actions and Content
  - Introduction to African Agriculture (evolution and status)
    - Food Security in Africa (status and comparisons with South East Asia & others) (first session; use appropriate expert and up to 30 slides; 1hr)
  - Agricultural Technologies
    - Introduction, Description, Status and Adoption (second session; up to 20 slides; 30 minutes)
  - Biotechnology in Agriculture (third session) (up to 90 minutes (2x45mins)
    - Conventional plant and animal breeding (10 slides)
    - Tissue culture & Micro-propagation (10 slides)
    - Molecular (marker assisted selection) breeding (10 slides)
    - Genetic Engineering (20 slides)
    - Other newer techniques (10 slides)
  - **Ethics issues, constraints and prospects in agricultural biotechnology for Africa** (use an expert to address prospects and challenges to adoption of biotechnology in African agriculture; emphasize regulatory issues) (fourth Session; up to 20 slides, 1hr)
  - Group and general discussion (fifth session)/ Questions and answers (45 minutes)
  - Exit protocol; questionnaire retrieval.
    - Closing remarks