

Background

- ✦ **Governments of Nigeria and USA agreed on biotechnology as development tool**
- ✦ **USAID through mission in Nigeria and GON to provide funding for a Nigerian Biotech Program (NBP)**
- ✦ **IITA selected by both as the implementing agency for NBP**

The Role of Agro-Biotechnology in Rural Development

- **Enhanced food production**

Support increases in population plus fuel economic growth

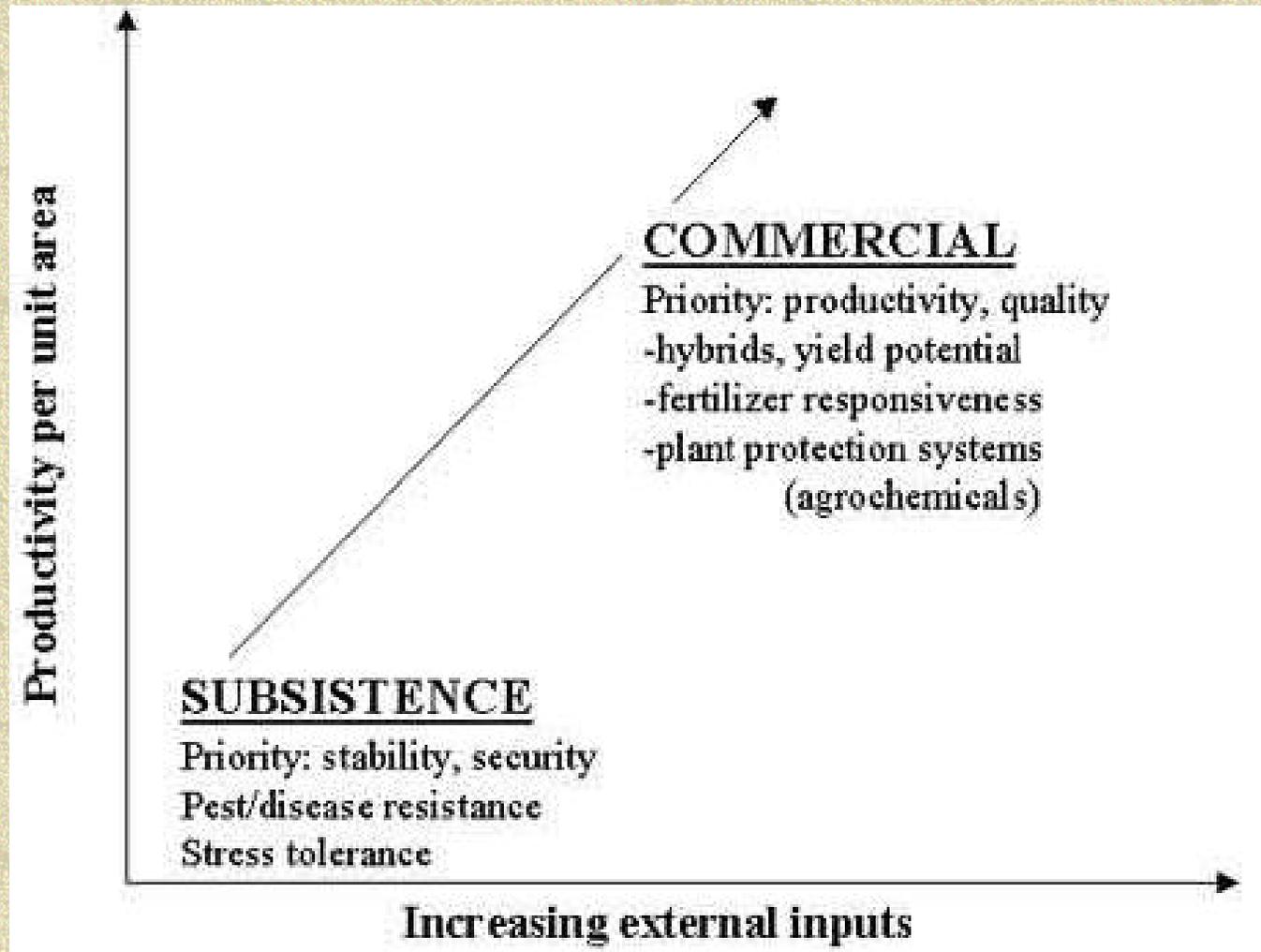
- **Advances in crop productivity**

- **Augmentation of traditional plant breeding**

- **Critical role of applied agro-biotechnology**

Rapid and efficient crop improvement plus achieving new goals

Landholder development trajectory



Two interdependent pathways for rural development of sub-Saharan Africa

✦ (I) Developing commercial “window” opportunities for vulnerable rural populations through e-commerce and marketing agricultural products with high added-value

✦ (II) Increasing food security by broadening the resilience of rural populations (e)

nutritionally superior

Breeding Paradigm

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- **Replacement of old cultivars by new genotypes with better fitness to environmental gradients**
 - **Farmers and breeders search for crop adaptation in these gradients arising from (a)biotic stresses**
 - **Plant Breeding Paradigm: Phenotype = Genotype x Environment x Crop Management x Policy x Institutions x People**

Research-for-Development Framework

Developing a R4D proposal

1. Assess demand or opportunity impact
2. Identify collaborators
3. Propose solutions
4. Use interviews
5. Find or develop technology
6. Deliver outputs to end-users

Implementing the project

NBP Process

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- ✦ **Governments agreed on biotech for Nigeria**
 - ✦ **USAID and GON agree on IITA as “PI”**
 - ✦ **Tri-partite meeting to agree on way forward**
 - ✦ **Planning meeting to identify constraints or market opportunity and pilot projects**
 - ✦ **Proposal development among partners**
 - ✦ **Signing and launching NBP (soon)**
 - ✦ **Stakeholder/partner meeting (1st quarter 2003)**
 - ✦ **Implementing first 3-year project (US \$ 3.4 million –initial commitment USAID + 25% matching by GON to Nigerian Institutes)**

NBP components

✦ Plant Biotechnology

1. Field testing GM-crops
2. Crop genomics

✦ Animal Biotechnology

1. Diagnostics
2. (Vaccines)

✦ Creating Public Awareness

(Capacity building throughout)

NBP GM-crops

✦ **GON issued biosafety guidelines after Cabinet agreed upon. Parliament to enact law but National Biosafety Committee to act following Cabinet guidelines**

✦ **Field testing of available GM-crops:**

- 1. GM-plantain with antifungal proteins (KULeuven through a DGIC project with IITA): fool-proof sterile crop for gene flow**
- 2. GM-cassava (DDPSC/ILTAB with USAID funds lately through IITA, NovaTero, ETH through a SDC project with IITA)**
- 3. GM-groundnut with virus resistance (ICRISAT)**

NBP Crop Genomics

- ✦ **Cowpea: the African legume –particularly SAT**
- ✦ **Building on early investments of CGIAR
unrestricted core to IITA, special projects, e.g.
GCF on DNA marker map (IITA-JIC),
USAID/IITA Linkage Grant to Univ. of
Virginia on mapping *Striga* genes, and USAID
to UC, Davis on markers**
- ✦ **Knowledge of genetics for some traits**
- ✦ **Mapping pops at IITA: RIL for photoperiod,
drought, bruchids, feed/stover quality, *Striga***
- ✦ **Screening methods for traits**
- ✦ **Plant Biodiversity and Genomics Center for
IITA**

Cost-effective marker-aided breeding



- **Selection for a “polygenic” trait if genetics of component-traits well understood**
- **Simultaneous selection for multiple traits**
- **Selection for multiple traits over multiple seasons**
- **Early detection of favorable alleles**
- **Detecting favorable alleles in early generations**
- **Profits from marker-aided selection (e.g., in conventional breeding schemes)**

Livestock Biotechnology

- ✦ **Priority given by GON**
- ✦ **ILRI as sub-contractor of this project through IITA (lab work in Nairobi labs and field work in Nigeria)**
- ✦ **Monoclonal antibody diagnostics of cattle diseases**
- ✦ **Tech transfer of cattle vaccines: contagious bovine pleural pneumonia, Rinderpest, heartwater**
- ✦ **(Interest on assessment of genetic variation of cattle breeds)**

Creating biotech public awareness

- ✦ **IITA Communication and Info Services to work with Nigerian media (press, TV, radio) for materials to reach “clients”**
- ✦ **Training of journalists to provide neutral but factual biotech information to public**
- ✦ **Sensitize GON officers, policymakers, NGOs and public at large on benefits and risks of biotechnology; with accurate information THEY will decide what’s best for THEIR country: Nigeria**

Investment on Capacity Building

- ✦ **The “not”s: infrastructure development (labs), degree training is USA, equipments for empty labs, high-tech biotech if supply-driven or from “ivory-tower” research; intl. conference trips and alike ...**
- ✦ **The “yes”s: “learning-by-doing” of NARS staff in labs undertaking NSP research; assisting Natl. Biosafety Committee by bringing field testing GM-crops; end-of-project: some equipment to NARS labs with needed infrastructure to use and maintain the capital investments**

NBP – a summary

- ✦ **Government will to use biotechnology to address demand-driven issues on rural development**
- ✦ **International development investor and National Government commitment for funding program**
- ✦ **National stakeholders on the driving seat, setting priority R4D areas and pilot projects and willing to work together (Agric. & Rural Dev., Environment, Science & Tech.)**
- ✦ **IARC as “neutral” implementing agency of a demand-driven research setup by stakeholders**
- ✦ **Other labs as sub-contractors owing to their comparative advantage and competitive edge**
- ✦ **R4D agenda leading to impact in project timeframe**