Government Synergies for Harnessing Scientific Research, Innovation and Technology for sustainable development

Prof. Hamadi Iddi Boga
Ministry of Agriculture and Irrigation
Principal Secretary, State Department of Agriculture
psagriculture.research@kilimo.go.ke
Cathedral Road, Nairobi
P. O. Box 34188-00100 Kenya

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The Ministry of Agriculture and Irrigation

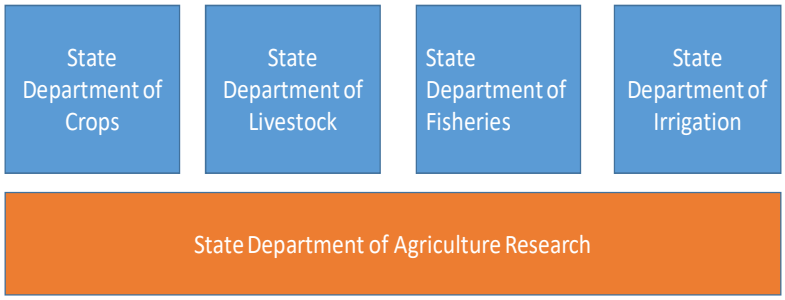
Vision & Mission

Our Vision:

A secure and wealthy Nation anchored by an innovative, commercially oriented and competitive agricultural sector.

Our Mission:

To improve the livelihood of Kenyans and ensures food security through creation of an enabling environment and ensuring sustainable natural resource management.



…About MoA&I

- The Ministry is currently working on the Agricultural Sector Growth and Transformation Strategy (ASGTS) whose outcome is to have a Sustainable, Equitable, Remunerative Agriculture Sector. The Strategy aims at unlocking the potential for Agriculture Sector by transforming it from subsistence to a commercially oriented one through a well thought theory of change.
- At the same time, the Ministry is increasingly concerned with diversifying, improving product quality and food safety, equity in economic growth, capturing and creating markets, and addressing gender parity,

Facts about Science in Africa

- Africa Produces only 1.8% of the global research output
- 50% pf the Research is done in South Africa and Egypt (as measured by Publications)
- Top 8 countries account for 80% of the research publications
- 88% of the inventive activity concentrated in South Africa (Patents)

Pouris & Pouris 2009

- The quantity and quality of research is improving but very slowly
- Most research focuses on Agriculture and Health Sciences
- SSA research output in Science, Technology, Engineering, and Mathematics (STEM) lags behind that of other subject areas significantly.
- SSA, especially East Africa and Southern Africa, relies heavily on international collaboration and visiting faculty for their research output.

Adams et al 2010

Relevance of Science to Kenya

- Food Security
- Health
- Energy/Water
- Environment
- Housing
- Manufacturing

BIG 4

- Social Welfare and Labour issues/Employment/Wealth Creation
- Peace/Political Stability/Democracy/Governance Systems

NB: As was noted in a 2007 UNESCO report, science and technology are critical not only to the continent's economic prosperity but to such matters as food security, disease control, access to clean water, and environmental sustainability

The Disciplines Sciences

- Chemistry
- Physics
- Geology
- Geography
- Mathematics
- Biology
- Humanities

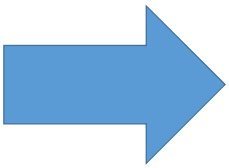
Michael White: "If we want tangible, scientific solutions to society's urgent problems, then we need to invest in basic, curiosity-driven research that's not motivated by its potential for practical applications,"

- Is Basic relevant in themselves? Would they attract funding in themselves?

Reorienting the Focus of Research

Knowledge Products

- ICT
- Surveys
- Databases
- Processes
- Publications
- Technology
- Patent



Knowledge Services

- Social media platforms
- Knowledge platforms
- E or M-Learning
- Improved education service,
- Improved medical service,
- Improved agriculture practice
- information service e.g. Digital TV,

Relevance of Research

- The Quality and Cutting Edge Nature of the Products and Services
- Alignment of the Knowledge Products with the Work of GOK/Private Sector
- Alignment with the themes
- Alignment with emerging global issues
- Quality Assurance
- The Targeting of Audiences
- The Accessibility of the Knowledge Products and Services
- The Dissemination of the Knowledge Products
- The Use and Influence of the Knowledge Products and Services

Challenges of Research In Kenya

- Policy
  - Basic Vs Applied or Basic + Applied?
  - University structures designed more for teaching
- Capacities to Manage Research (GOK, NACOSTI, NRF)
  - Weak human resource at the research management levels
- Funding/Incentives
  - Low local funding sources (except for South Africa)
  - Donor driven/Donor dependence
  - The absence or low of industrial participation
- Personnel
  - Hardly any postdoc schemes
  - Low number of PhDs
  - Shortage of peers
  - Brain drain vs brain gain
  - Intra-Africa cooperation
- Infrastructure
  - Few Research labs/poorly equipped
  - ICT and Information resources
- Relevance of the Research
  - From products to services

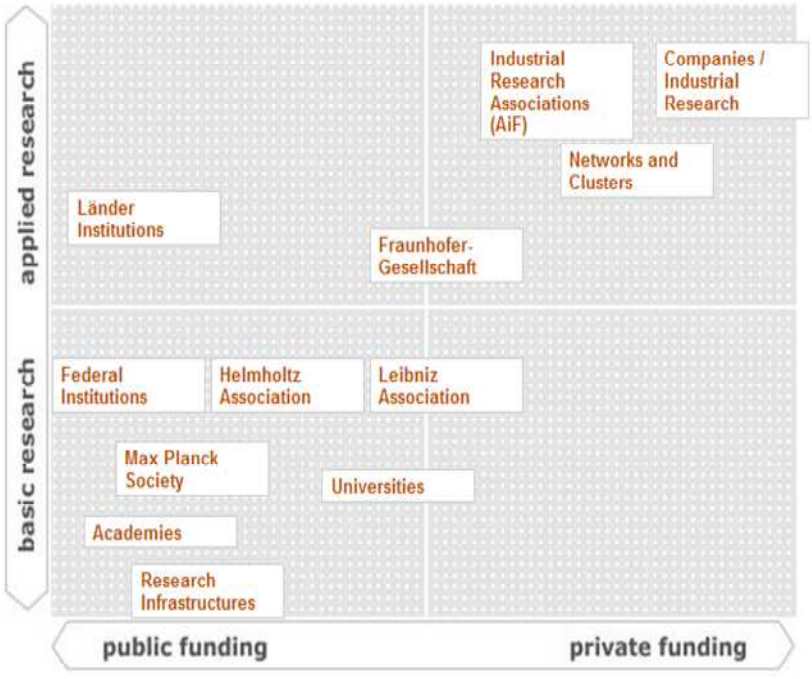
Research System Matrix

adapted from *Systemic Competitiveness* Model of Esser, Mayer-Stamer, and Messner by C. Hansert

DIES

	Macro	Meso	Micro	Meta
Policy	**BMBF** Guidelines - The Big 5 - Competitons - Tax Cuts **HRK** Lobbying by Us **WZB** Policy Analysis	**Stifterverband** Lobbying **Research Institutes** Requirements for Directorships	**FU Berlin** **Potsdam Research Institutes**	**Parliamentary Research Committee** How to get the voters and the media?
Incentives	**DFG** Nation-wide Competitions	**CHE** Multidimensional Ranking **Fraunhofer Society** Platform for U + Industry **Stifterverband** Support	**FU Berlin** Internal Competion, Seed Money	**CHE** Is Ranking PR? Importance of Media Partners
Capacity	**DAAD - HRK - CHE - WZB - Stifterverband** Workshops and Publications **DAAD, HRK** DIES Visits	**Pearls Network** Secretariat – GO:IN **DFN** Research Network	**FU Berlin** Proposal Writing Dahlem Research Sch. **Stifterverband - CHE** Science Management Master Programmes	**FU Berlin** e.g. *Berlin Long Night of Science* for general public
Cooperation	**BMBF** Science Cooperation Agreement?	Cooperative Professorships Open Data	**Networking Evening** **BMZ: DAAD, AvH, GIZ** **BMBF: DAAD, DLR** Support Programmes	**IUCEA-DAAD** QA triggers more research **MdBs** **Embassies**

Research Performing Organisations

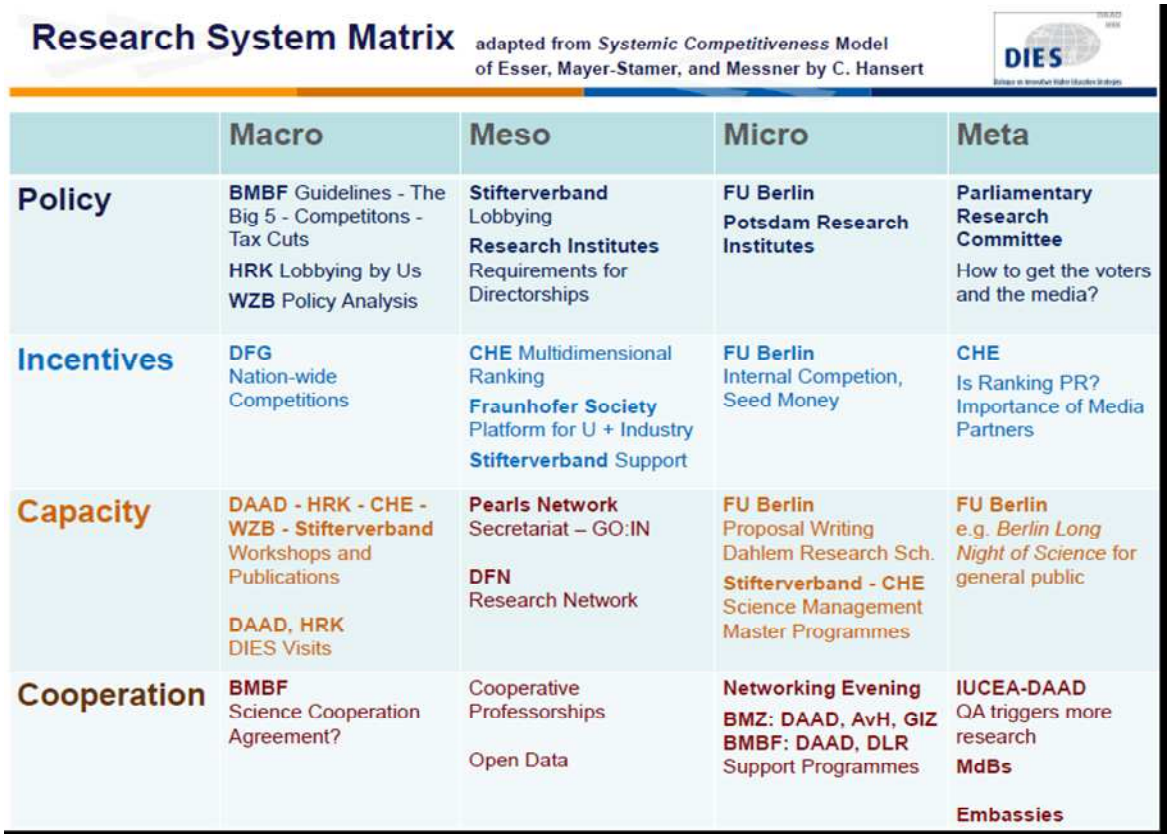


Maps of German Research Institutions

Where does research in Germany happen? Where are regional clusters?

More

The German Research Landscape



Research System Matrix adapted from *Systemic Competitiveness* Model of Esser, Mayer-Stamer, and Messner by C. Hansert

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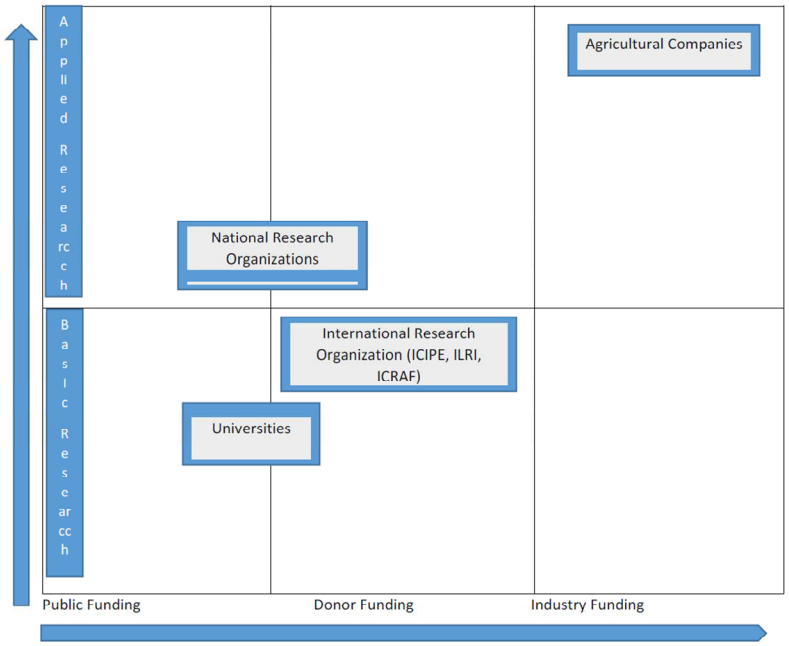
Research Management Matrix – Modified from Christoph Hansert

	Macro	Meso	Micro	Meta
Policy	▪Government Ministries ▪Vision 2030 ▪Big 4 Agenda ▪A Research Agenda ▪Reforming Structures including HE ▪ Learning/sharing ▪ Research funding	▪ Commissions for University Education ▪ Commission for Science and Technology (NACOSTI), NRF, ▪ National Conferences ▪ Study Tours ▪ Kenya Institute of Policy Research and Analysis (KIPRA), LIWA, NBA, NEMA, KEPHIS	▪ Universities VCs, Deans, Senates ▪ KALRAO ▪ CGIAR Centres ▪ QA Visits ▪ Round Tables Meetings ▪ Research Centres ▪ Industry linkages/Industrial research	▪ Parliamentary Committees (Budget/Education) ▪Lobbying Treasury ▪Media Contacts
Incentives	▪ Joint PhD Scholarships with MoEST ▪ Centres of Excellence ▪ A funding formula for research ▪ Research Infrastructure	▪ Field Research Grants for PhD students ▪ Research Group Competition ▪ PhD Scholarships	▪ Additional Master and PhD grants ▪ Guest and Adjunct lecturers ▪ Equipment Grants ▪ "Cooperation Grants" ▪ Centres of Excellence	▪To forester competition ▪ University Ranking ▪ Research Ranking
Alliances/ Cooperation	▪ MoE/MoA&I ▪ World Bank, ECDG ▪ Kenya Open Data ▪ Vice-Chancellors Committee ▪ AU/AAU/COVIDSET	▪ DAAD Alumni/Humboldt Clubs/AGNES ▪ JICA, USAID, etc ▪ Kenya-SA, CHE ▪ ICIPE, ILRI, ANSTI, RUFORUM, FARA ▪ County Government ▪ CGIAR	▪ Alumni-Chapters ▪ Deans ▪ DVCs ▪International Partnerships ▪Science congress in High schools	▪ Media and Science ▪Science for Kids-Opening scientific Institutions for Kids to interest them in science and technology
Capacity	▪ Training on Science management ▪ Capacity of African QA System	▪ Training for Staff of NCST, CUE, Research Centres	▪ for Scholars: E-resources, Posters, Scientific writing, Deans Course ▪ Trainings on new techniques ▪ Roundtable discussions ▪ Summer Schools	Capacity Building of Journalists

Research Performing Organizations in Kenya



The Kenyan Research Management System

- Constitution of Kenya 2010
- Vision 2030
- Mainly anchored in STI Policy and STI Act 2012
- No agreed Research Agenda
- Largely donor dependent. Government pays salaries, researchers source for funds wherever they can.
- Biased towards applied research- assumed to be the only "relevant" research
- Hampered by weak Macro (Policy), Meso (Management) and Meta (Public support and awareness) levels
- A few Institutions focusing on a few areas.
- Few aging researchers
- Existing Macro-Level Institutions (NRF, NACOSTI, KENIA, National Biosafety Authority, NEMA)
- Un-coordinated International Cooperation

The Micro-level in Kenya

- Research Institutes
  - KEMRI-Medical
  - KALRAO-Agriculture/Livestock
  - KEMFRI (Marine)
  - National Museums of Kenya (Culture/Biodiversity/Paleontology)
  - Kenya Wildlife Service (research, conservation, regulation and policing)
- 41 Public Universities and University Colleges
  - Weak postgraduate programs in most universities
  - Weak research output
  - Publication in predatory journals

The Department of Agriculture Research- Renewed Focus

Research is the Key to Food Security

- Conservation of Ecosystems
- New Crop Varieties and animal Breeds
- Pest and Disease Control
- Water and Salt Stress
- Soil fertility
- Climate Change Adaptation
- Socio-Economic and Cultural issues around agriculture
- Gender dimensions
- Market Research (Local and International)
- Governance/Regulation/Policy

What Research Requires?

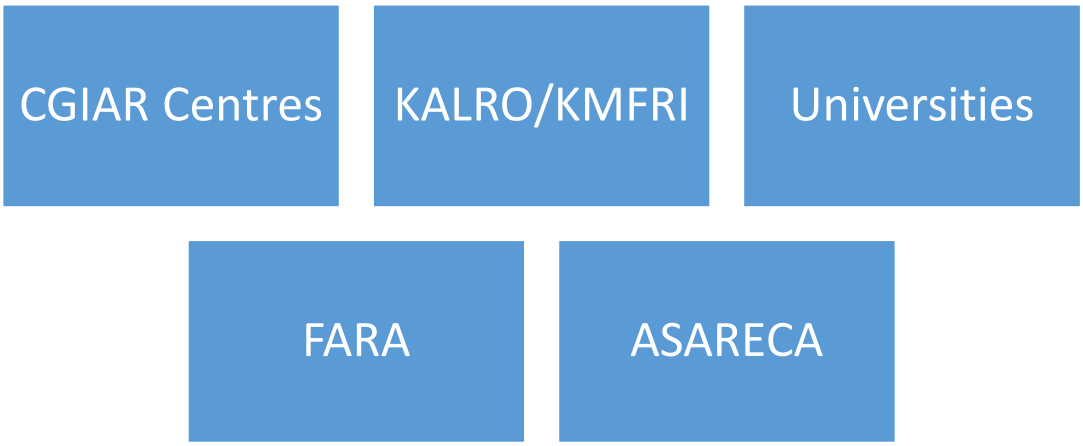
- Adequate Funding
  - National
  - Donor
- Qualified and Motivated Staff/ Have them be affiliated to Universities to Qualify for Professorship (S- Professor)
- Succession Planning (Young Researchers/Postdocs)
- Robust Infrastructure
- Agricultural Research requires adequate Land
- Collaboration (Local, Regional, International)/Partnerships
  - Universities
  - CGIAR Centres (ICIPE, ICRAF, ILRI)

Key Result Areas

- Assess the current status of Agriculture Research and its contribution to the Agriculture Sector/Economy
- Identify Research Gaps in the Agriculture Value Chain
- A Funding Strategy for Agriculture Research
  - Sonderforschungbereich (Special research areas)(special crops)
  - General Research
  - Centres of Excellence in Agriculture Research (chosen through competition)(Priority areas)
- Mobilize and support the Agriculture Research Community
- Strengthen Research and Knowledge Partnerships with Counties
- Strengthen capacity Building in Agriculture (Postdocs, PhD, MSc, Undergraduates)(Pest Scientists, Breeders, Agronomists, Agricultural Economists, Biotechnologists) (Australia, Germany, Israel)
- Adoption of GIS for research and data collection/documentation
- Agricultural Biodiversity Conservation to support research (Genebank)
- Intensification of Biotechnology Research in Kenya- Bt Cotton and Maize
- Strengthen Collaboration
  - Internal (KALRO, Universities, CGIAR Centres, Private Sector, Private Sector)
  - Stronger International Collaboration in research
- Information Packages for farmers/mobile Apps for farmers (weather, soil, pests and crop data, work with JKUAT)Create a new Bureaucracy at the Ministry of A&I
- Streamline KALRO/ Governance
- Terms of service for Researchers working with SRC
- Work with NRF and NACOSTI

Aspirations summarized….

Incentives to Link Research Entities



Some areas of interest

- Modern Biotechnology
- Indigenous foods (vegetables, fruits, meat)
- Bio-fertilisers/Biodesposits
- Linking with Counties around issue of Knowledge Sharing
- Strengthening Informal markets –Changing the way Agricultural produce for the domestic market is managed
- Rice Project (Variety, Value Chain. Partnerships)- Moving away from being a net importer of rice
- Mechanization
- Irrigation and water conservation
- Increasing commercial farming
- Developing Agro-Industries and value addition
- Development of SME out of Agriculture
- The Fall Army Worm (*Spodoptera frugipeda*)
- Youth in Agriculture
- Climate Smart Agriculture

Conclusion

- Research and Innovation are enablers of Socio-economic development
- Working at better coordination of the research and its outputs
- Sustainable funding for Research and Innovation
- Lobbying for improved funding for HR and Infrastructure
- Proposing overhaul of research in research Institutions
- Moving Universities from teaching to research
- Improved Internal (RO-Universities & University-university and University-Industry)
- Better International Collaboration
- Better appreciation of science by policy makers and the general public.