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DEPARTMENTAL COMMITTEE-C- ON EDUCATION, RESEARCH AND TECHNOLOGY

REPORT ON THE COMMITTEE TOUR OF BIOTECHNOLOGY
FACILITIES IN KARI, NAIROBI AND NJORO

27TH MAY 2004

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INTRODUCTION

The Departmental Committee on Education, Research and Technology and representatives from the Departmental Committee on Agriculture, Lands and Natural Resources and other Committees undertook a Tour of Biotechnology facilities at the Kenya Agricultural Research Institute centers in Nairobi and Njoro on 27th May 2004 in order to inspect and report on the state of affairs of the Biotechnology facilities in the centers. The Tour emanated from a request by the Honourable Members during a Biosafety Workshop held in Mombasa in November 2003 to keep Members abreast with advances made by research institutes in the country in the field of Biotechnology.

The following were the Members who undertook the tour;

The Hon. Daniel Karaba, MP.	- Chairman, DCC
The Hon. Raphael Muriungi, MP.	- DC C
The Hon. (Dr.) Sammy Ruto, MP.	-DC C
The Hon. Franklin Bett, MP	- DC A
The Hon. Mwanicha Okioma, MP.	- DC A
The Hon. (Prof.) Ayiecho Olweny, MP.	- DC A
The Hon. Samuel Moroto, MP.	- Library Committee
The Hon. Ekwee Ethuro, MP.	-Public Accounts Committee

Mr. Speaker Sir,

Our country is faced with increasing poverty, hunger caused by food insecurity. With the rapidly increasing human population, these challenges cannot be over emphasized. It is therefore imperative for the agricultural research community and technology disseminators to reverse these worrisome trends and bring hope to the many Kenyans who are perennial victims of drought and famine.

Food production is failing to keep pace with population growth. With every passing year, the country has literally less food per person than it had the year before.

Biotechnology has emerged as a revolutionary tool, which can offer and promise tremendous opportunities and inexpensive solutions to some of our most difficult problems, especially in agriculture.

Biotechnology has enormous benefits to the world population in terms of enhanced taste and quality of agricultural produce, reduced maturation time, improved resistance to diseases and pests, improved animal health and diagnostic methods and increased food security.

However, various controversies surround biotechnology, these include; potential risk to human health (allergens) which are clearly unknown and loss of flora and fauna biodiversity, transfer of antibiotic resistance, domination of world food production by a few companies through intellectual property rights and violation of natural ethics through tampering with nature by mixing genes among species.

Mr. Speaker Sir,

The main purpose of the visit was therefore for the Members to familiarize themselves with advances made by research institutions in the field of Biotechnology and also establish precautionary measures adopted by research institutions to ensure the safe application of products of biotechnology.

Members were able to appreciate the enormous investment made by the Government and donor agencies in the establishment of Biotechnology laboratories and green houses for research, with a view to enhancing crop production and thereby improving food security in the country. The Committee observed various crops under field and laboratory trials such as wheat, maize, cassava, bananas, sweet potatoes e.t.c.

Of great significance to the Committee however, was the containment facility for isolating genetically modified maize that was due to arrive at the KARI Kabete from Mexico for trials.

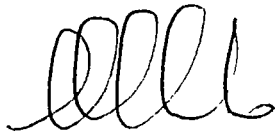
Mr. Speaker Sir,

The Committee was assured that all precautionary measures would be undertaken by the relevant research regulatory bodies like Kenya Plant

Health Inspectorate Services as well as Kenya Bureau of Standards to ensure that the products from the containment facility undergo stringent trials before being released to the farmers for planting and eventual consumption.

Mr. Speaker Sir,

This Report highlights the main findings of the Committee as well as recommendations on the way forward. I urge the honourable Members to use the findings and recommendations as a means to helping resolve the problems that hamper growth in agriculture, especially the application of modern technologies in crop and livestock production so as to make our country millennium compliant.

A handwritten signature in black ink, consisting of several loops and a final vertical stroke, positioned above the typed name.

Hon. Daniel Karaba, MP
Chairman Departmental Committee C on Education, Research and
Technology.
October 2004

BIOTECHNOLOGY FACILITY IN KARI CENTER, NAIROBI

The Members assembled at the KARI Boardroom where the Deputy Director, Dr. E. A. Mukisira and the Chairman of the Board of Management of KARI, Dr. Jamleck Mutugi briefed them on KARI's mandate and the efforts being made to implement various programmes under KARI'S purview.

The Chairman of the Board of Management in his brief informed the Members that KARI has grown from a research unit established in 1900 by the colonial Government, which in those days recognized agriculture as a vehicle for development. To date this vision holds true since agriculture accounts for 80% employment and is also a 60% income earner for Kenyans. This therefore explains the significance of agriculture viz a viz the performance of the economy.

Since its establishment, KARI has diversified greatly to fulfill its mission of development and dissemination of agricultural technologies and its desire to contribute to sustainable improvement of livelihoods through increased productivity as well as improved methods to enhance post harvest value of agricultural products and environmental conservation. KARI therefore has opened 30 Centres countrywide with a staff of 3,400, which includes 450 Scientists.

The Deputy Director KARI informed the Members that the country has over the decades relied on traditional methods of farming to alleviate agricultural constraints. The emergence of modern technologies in the recent past and their ease of integration in the agricultural research system spearheaded by KARI is considered crucial in bringing about change in agriculture and in fostering productivity thus enhancing food security and poverty reduction. The Director further informed the Members of a forthcoming multi-million Kenya Agricultural Productivity Project which is anticipated to help ease food security concerns in the country.

Further, the Biotechnology Department is focusing on increasing production and supply of planting materials, increasing food production, control of pests

and diseases through improved diagnosis. The Department has 48 Scientists undertaking research in biotechnology.

The Department carries out four main programmes in fostering biotechnology, namely tissue culture, molecular marker assisted selection, genetic engineering in crops and genetic engineering in development of novel vaccines and diagnostic kits in livestock production. Tissue culture is used to develop high quality disease-free and propagated plant materials like pyrethrum, bananas, sugarcane, potatoes strawberry and flowers for both large scale and small-scale farmers. Marker-assisted selection is used through DNA markers in identification and evaluation of desirable traits in breeding programmes. It is mainly used for the production of crops that have shown resistance to drought, pests, maize streak virus, blight and strigias. Genetic engineering is used for the development of products that are resistant to viral, mosaic and other diseases and pests such as stem borers. It is also used for gene discovery and transformation in crops.

The Members toured a GMO Laboratory, which is housed in a containment facility / green house established for performing crop productivity experiments using genetically modified maize seeds. The Members were informed that KARI was about to receive maize with BT genes from Mexico for analysis. The maize will undergo evaluation in Biosafety level 2 environment and that the seed multiplication as a result of these trials will be analyzed by the National Biosafety Committee and will be subjected to inspection by Kenya Plant Health Inspectorate. The Committee was assured that all tests would be carried out in the facility and therefore do not pose any risk to human or the environment.

The product will also be combined with local varieties that have shown resistance to various maize diseases while other tests will also be carried out to ascertain its impact on the environment before being released to the farmers for planting.

BIOTECHNOLOGY FACILITY IN KARI CENTER, NJORO, NAKURU.

The Biotechnology Program was initiated at KARI- Njoro in 1997 with major funding through the Kenya Government from International Atomic Energy Agency (IAEA), Rockefeller Foundation and support from National

Council For Science and Technology. The center has 40 scientists and 140 support staff.

The main aim of the program is to support the development of superior crop varieties. The program uses various biotechnological techniques including crop improvement, marker assisted selection, rapid clonal propagation and diagnostics to achieve this goal.

The Center is acknowledged as the best wheat research institute in the world. It works closely with Egerton University, Njoro and together they are undertaking a water project that utilizes water run-off at Lari for the benefit of the residents.

The center Director, Dr. Miriam Kinyua informed the Members that research at the institute has taken two phases: the first phase dealt with the establishment of infrastructure and human resource and the second phase entails the use of research as a vehicle for development through extension services.

The Committee toured the Biotechnology laboratory where molecular genetics is used in breeding. The traits required in plants are selected for breeding through DNA separation.

The laboratory also houses a culture medium where tissue culture for cassava, bananas and sweet potatoes is carried out. The banana culture media has a capacity of 10,000 plantlets.

The center also specializes in research for wheat. Currently 30% of the country can successfully be used for wheat growing. The center is carrying out research for different varieties for each climatic zone. They have successfully developed DH4 variety, which is grown in dry land areas such as Narok, Naivasha, Machakos, Nyeri and Timau. The increased growing of wheat in these areas will help reduce the current shortfall, which stands at five million bags per year. The members also toured facilities where several seedlings like yams, potatoes, bananas, wheat and barley are kept under experiment and also for hardening purposes before being transferred to the field.

Thereafter the Committee assembled in the Boardroom for discussions and the major concerns highlighted include the lack of a food security policy and inadequate funds allocated for research.

The Committee noted the various challenges that agricultural researchers face including the following: -

- Decline in agricultural production due to rising poverty and high cost of farm in-puts;
- Declining land sizes for technological research by institutes;
- Inadequate funding for maintenance and improvement of the physical and human institutional capacity;

MEETING WITH THE KARI DIRECTOR

The Director, Dr. Romano Kiome appeared before the Committee on 25th August 2004 and clarified concerns by Members arising out of the tour of KARI facilities in Kabete and Njoro stations. These concerns mainly touched on the advances made by KARI in research, particularly on the Genetically Modified Organisms and the safety of these organisms to humans and the environment.

The Director stated that:

That the GMO laboratory that was recently opened in Kabete is Bio-safety level 2. The laboratory is enclosed in a greenhouse and therefore does not pose any risk to the environment. Bio-safety level 3 involves cloning of life organisms and is very expensive to install and that there are only 4 such laboratories in the world. He further said that Bio-safety level 4 mainly deals with research on humans and is also very rare and expensive to put up. He further said that levels 3 and 4 are beyond the capacity of the country's reach.

On the widespread sale of GMO foods in our local stores, the Director said that it would be difficult to identify a GMO fruit/product in the market on

the surface unless information is availed from the source. He further said that dangers of eating transgenic foods remain a mystery to researchers and the biggest challenge today remains the introduction of these foods to the environment when these dangers are unknown. The safest legal requirement for producers/exporters is therefore to ensure that the products are labeled as such to warn those who may wish not to consume these GMOs.

The Director emphasized the special role played by KARI in enhancing food security. While their advice to farmers is based on proven scientific facts however, advice by extension officers in the past has been market driven and KARI's advice on the use of drought tolerant crops especially in dry lands has been ignored.

Nevertheless, he said that KARI to date has a gene bank for livestock of about 346,000 varieties out of the FAO's 644,000 and it is a reference bank for Seno and Freisian /Moran breeds.

The Director further outlined the constraints facing research as follows:

- The government does not allocate funds for research. The ideal allocation for the country ought to be 9-10% of the GDP. The failure to boost research has left the economy vulnerable due to the absence of a basis for development. Currently the allocation stands at 0.01% of GDP
- Dissemination of research findings has been handicapped due to lack of effective management/coordination of both research and extension work

- Remuneration for local scientists has remained at its lowest ebb leading to brain drain as scientists opt to move to the private sector or to take up appointments elsewhere where the package is attractive
- Though the government has established several research stations (by crops), there is need to harmonize these activities and provide supervision at scientific level

RECOMMENDATIONS

Arising out of the tour and the Director's presentation, the Committee recommended the following:

- i. That the Ministry of Education, Science and Technology in conjunction with the relevant Ministries makes sufficient budgetary allocations for research in order to empower research institutes and universities undertake various studies to enhance food sufficiency and security. Currently the research funds (0.01% of the GDP) allocated to the National Council for Science and Technology are too minimal to be shared out to research institutes in the country.
- ii. That even though scientists are busy developing new methods of production, the findings do not reach the farmers. The Committee therefore recommends that research, training and extension be combined for effectiveness and that research institutes be mandated to fulfill all three functions
- iii. That the government ought to make a deliberate policy move from small research entities /foundations to allow for scientific supervision of these entities. This will reduce duplication of efforts and also help in dissemination of research findings
- iv. The government ought to give recognition to local scientists by offering better remuneration. Currently the government loses at least

Ksh. 5 million for every scientist who is locally trained and finds employment outside the country.

- v. That the relevant Ministries (Ministry of Agriculture; Livestock and Fisheries; Education, Science and Technology) should establish linkages to draw up a food security policy and urgent measures be taken to promote production of adequate foods through the information generated from our research institutes and universities on various food crops.