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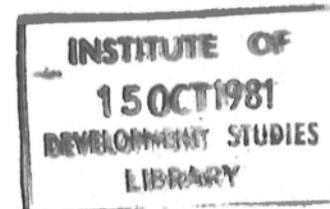
RESERVE (832)

RESOURCE ALLOCATION TO AGRICULTURAL RESEARCH
IN KENYA FROM 1963 TO 1978

By

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WORKING PAPER NO. 345



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OCTOBER 1978

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RESOURCE ALLOCATION TO AGRICULTURAL RESEARCH IN KENYA
FROM 1963 TO 1978.

SYNOPSIS

This paper is a brief review of a study that is being conducted on agricultural research in Kenya from 1963 to 1978. Because data analysis has not been done to date, it focuses on a discussion of the significance of the study, a review of the related literature, the hypotheses that the study will test, the methodology that has been used for data collection and that will be used for data analysis, and a very preliminary presentation of research findings. It is noted that a pattern has been established in the agricultural research system that reflects the colonial history of the country and the resulting maldistribution in the provision of government services and the socio-economic conditions that prevailed in the post-independence period. As well, the significant foreign input into research has had an impact on the shape that research services have taken.

RESOURCE ALLOCATION TO AGRICULTURAL RESEARCH IN KENYA FROM 1963 TO THE PRESENT.

This paper will discuss a study that is being conducted on resource allocation to agricultural research in Kenya from 1963 to the present time. Because we have just completed the data collection in association with this study, the paper will confine itself to a discussion of the theory underlying the study and the hypotheses arising from it, the methodology that has been used for data collection and that will be used for data analysis, and a very preliminary presentation of research findings. It must be mentioned that the data presented in this paper must be interpreted with caution as there are further steps that we still have to take in refining it.

INTRODUCTION

The economic development of Kenya has been strongly influenced by its colonial history. As a result of colonialism, government services were developed to cater solely to settler needs¹. This was true in the case of agricultural research which, prior to the 1950's was totally geared towards service to European farmers.² This resulted in commodity, regional, and farming-systems biases as research focused on European cash crops, the high potential areas where Europeans settled, and the large-scale farming systems that they employed.

In response to the Emergency of the 1950's and with recognition on the part of the colonial government of the dangers of the continued impoverishment of Africans, the Swynnerton Plan was produced.³ This plan recognized the neglect of African areas in the distribution of government services and with respect to agricultural research called for more investigation into systems of farming by African small-scale farmers in the lower potential areas.

In spite of a subsequent widening of the research programme, the established biases remained and at the time of independence the bulk of research resources continued to flow toward cash crops such as coffee, tea, and wheat and stations catering to the former European areas such as the stations at Kitale and Njoro.

In the post independence period and in spite of expressed government objectives to the contrary, these biases to a large extent continued. Therefore, although the 1974 Development Plan advocated a substantial reduction

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1. E.A. Brett, Colonialism and Underdevelopment in East Africa, Heinman, London, 1974, Chapter 6.
 2. Judith Heyer, J.K. Maitha, and W.M. Senya, Agricultural Development in Kenya, Oxford University Press, Nairobi, Chapter 4.
 3. Colin Leys, Underdevelopment in Kenya, Heinman, London, 1975, p. 52.

in the percentage of research funds to be spent on wheat and maize research, these two commodities continued to draw the bulk of these funds. This was partly a result of the replacement of European farmers in the high potential areas by wealthy Africans and their greater success relative to peasant farmers in placing demands on the research system.

However, the system has become increasingly complex and recently significant changes have begun to take place such as a substantial increase in funds available to agricultural research as a whole and shifts of research resources toward food crops, toward marginal areas, and toward traditionally peripheral research stations. To understand these current changes, one has to consider the increasing population pressure within the country, recognition on the part of the Ministry of Agriculture of the irrelevance of the past research to the peasant farmer situation, and the role of international aid donors on the determination of research priorities in Kenya.

The influence of these varying factors will be discussed and assessed within this study in an attempt to understand more fully how agricultural research has developed in Kenya since independence.

SIGNIFICANCE OF THE STUDY

A feature common to most developing countries is the predominance of the agricultural sector in terms of contribution to gross national product, contribution to foreign exchange earnings, and employment of manpower. As a result of this feature, development economists have concluded that attention must be directed to this sector in order to stimulate the economies of these countries in a significant way and to effectively improve the standard of living of the majority of their citizens. Within the agricultural sector itself, there are alternative potentially productive investments and the limited resources of these countries must be distributed among these investments in some way. A decision is required as to the best allocation of these resources given the goals and aspirations of the policy makers.

Agricultural research is one such potentially productive activity. It generates new technologies in the agricultural sector which increases agricultural productivity in a number of ways: by increasing factor productivity, by improving the quality of a product or by creating new products, and by reducing the risk and uncertainty facing farmers. It has been demonstrated in several studies in both developed and developing countries that the rates of return to agricultural research, both national research programmes as a whole and crop-specific research programmes are two to three times greater than

conventional public sector investments.^{4,5,6} However, the developmental implications of agricultural research in terms of both economic growth and income distribution are very strongly influenced by the nature of the research that is undertaken. The choices of crops to be researched; the geographical area towards which research is directed; the discipline being emphasized, that is, whether research is biological, chemical, or mechanical in nature, and the physical characteristics of the innovation as these affect its suitability to various physical, cultural, and socio-economic environments all influence the size and distribution of the benefits from research.

In the light of this fact, that alternative patterns of allocation will lead to alternative development implications, in this study we have chosen to examine the decision-making process with respect to the distribution of research resources in Kenya from 1963 and to attempt to explain how this pattern has been determined.

BRIEF SURVEY OF THE LITERATURE

In the literature, some theory has been developed on the subject of resource allocation to agricultural research from the hypotheses that will be tested in this study arise.

The classical work on this topic is that of Hayami and Ruttan.⁷ They have developed a model in which they argue that profit-maximizing farmers respond to factor-factor and factor-product price changes and in turn put pressure on the agricultural research system to develop technologies that substitute away from the relatively more expensive factor and towards the relatively cheaper. Thus in Japan where population pressure led to increasing land scarcity and higher land values, a highly developed biological technology was generated and in the United States, where land has been relatively abundant, a highly developed mechanical technology was produced. This model has been extended by Abel and Welsch to demonstrate the social optimality of shifting research resources towards relatively more expensive commodities and away from relatively less expensive ones given society's production possibilities and factor endowments.

4. Ardito Barletta, Costs and Social Benefits of Agricultural research in Mexico, Ph.D. dissertation, Chicago, University of Chicago, 1970.
5. H. Ayer, The Costs, Benefits, and Effects of Agricultural Research in a Developing Country: The Case of Cotton Seed research in Sao Paulo, Brazil, Ph.D. dissertation, Purdue University, 1970.
6. R. Eveson, The Contribution of Agricultural Research and Extension to Agricultural Production, University of Chicago, 1968.
7. Yujiro Hayami and Vernon W. Ruttan, Agricultural Development: An International Perspective, Baltimore and London: John Hopkins University Press, 1977.

As well, in a study on hybrid maize in the United States, Zvi Griliches argued that agricultural innovations are supplied in response to the profitability to consumers, producers, and industry of these innovations.⁸ Thus, hybrid maize was made available first to those areas where the size of the eventual market in the area, marketing costs, the costs of innovating in the area, and the calculated rate of acceptance of hybrid seed by farmers in the area were most favourable.

Other authors such as Bruce Johnston⁹ and George Beckford¹⁰ have reacted to the neo-classical assumptions of the Hayami-Buttan model and the conclusion that technological development in agriculture is guided purely by economic considerations. They argue that the social order of a country determines its social institutions and that these social institutions in turn govern economic activity including the development of technology. Also, they emphasize the openness of developing economies and argue that, given the present institutional arrangement of the world economy, external technological changes may have a greater impact on the technological development of a developing country than internal conditions of physical environment and factor endowments.

Along these lines, de Janvry¹¹ has developed a comprehensive model of technological innovation that alternative interest groups: commercial farmers, traditional landed elites, subsistence farmers, landless agricultural workers, industrial employers, urban workers at different income levels, exporters and government place demands for new technologies on the public research system in line with the benefits that they expect to gain from these innovations. Decision-makers within the politico-bureaucratic structure of the research system respond to these demands and, within the constraints imposed on them by the nature and organization of the system, produce a supply of technological innovations. This supply filters through the socio-economic structure of society and results in a distribution of payoffs from research amongst the interest groups. The extent to which they achieved expected economic and other goals will again influence these interest groups to place

8. Zvi Griliches, Research Costs and Social Returns : Hybrid Corn and Related Innovations, Journal of Political Economy, October, 1966, pp. 419-31.

9. Bruce Johnston et al, Criteria for the Design of agricultural Development Strategies, Food Research Institute Studies, 1972, 27-38.

10. George Beckford, Stratégies for agricultural Development: Comment, Food Research Institute Studies, 1972, 149-55.

11. Alain de Janvry, Inducement of Technical and Institutional Innovations: An Interpretive Framework, in Arndt, T.M. et al (eds), Resource Allocation and Productivity in National and International Agricultural Research, University of Minnesota Press, 1977, 551-68.

further demands on the research system. Thus, the process of technological development operates in a dynamic, circular, and cumulatively causative manner.

Evenson and Kislev¹² have focused on the international transfer of technology and have concluded that agricultural technological development within a country is influenced and stimulated by research, both basic and applied, in other countries in similar geo-climatic zones but not by research conducted in other countries in different geo-climatic zones. Their work has also concluded that basic research in developing countries contributes greatly to the promotion of applied research.

HYPOTHESES TO BE TESTED

Arising from the literature outlined briefly above, this study plans to test the following hypotheses for the Kenyan case:

- (i) resource allocation to agricultural research has been responsive to product price changes;
- (ii) resource allocation has been responsive to farmer pressure. Here one must consider the historical development of Kenyan agriculture and the ability of farmer groups: European versus African farmers and large-scale versus small-scale farmers to communicate their needs and make known their constraints and farming conditions to research institutions;
- (iii) resource allocation has been responsive to government goals and aspirations;
- (iv) resource allocation has been responsive to external influences as exercised through foreign markets, foreign aid donors, foreign agricultural research, foreign research scientists working in Kenya, and foreign scientific training of Kenyans. Within this, we want to comment on the feature of transprofessionalism amongst research scientists and the extent to which priorities of scientists are internationally established and how this affects the activities of scientists in Kenya;
- (v) the organization and management and the constraints within the agricultural research system have influenced the supply of innovations;
- (vi) inertia within agricultural research, particularly if the staff is relatively inexperienced, makes the system less responsive to social and economic influences for change, and,
- (vii) that biases exist with respect to basic versus applied research; biological,

12. Robert Evenson and Yoav Kislev, Agricultural Research and Productivity, Yale University Press, New Haven, Connecticut, 1976.

chemical, versus mechanical research; research geared toward increasing yields versus increasing quality or nutritional value or increasing disease resistance; research on traditional versus cash crops; and research on export versus domestically consumed products.

METHODOLOGY

(1) DATA COLLECTION

To this end, we have conducted the following surveys and collected the following information:

- (i) a survey of research stations including Ministry of Agriculture, parastatal, ex-East African Community, international, and University of Nairobi agricultural research stations. In this survey, we collected for each research programme within the stations, the date it was started; funds expended on it annually; the research staff associated with it for each year of its operation with details as to staff nationality, staff education, where this education was attained, and relevant work experience; the geographical orientation of the programme; the input requirements associated with research recommendations; the nature of the programme, whether applied or basic, whether biological, chemical, or mechanical, and whether aimed toward increasing yields or nutrition or disease resistance; the crop(s) and/or animal(s) that it investigates; the percentage of the crop or animal product that is exported annually; the percentage of the crop or animal that is raised by large-scale farmers; the price of the crop or animal in a given year; intended government expenditure on research on that crop or animal in the last Development Plan; and research done on that crop or animal by other research stations in the country;
- (ii) a survey of research scientists to obtain information on the extent of their international professional contact and how this influences their priorities with respect to their work; and
- (iii) a survey of foreign aid donors to collect information on financial and technical assistance to Kenya and the criteria they use in distributing their aid.

Some of this information is presented in Tables 1 to 3.

(2) DATA ANALYSIS

For purposes of analysis, we shall assemble the data for research programmes. Some of this data is general and not time-specific, for example, the date the programme was started, the nature of the programme, and the crop or animal it investigates. Some of it is specific to particular years for the time period 1963 to 1978.

Once the data is assembled, we shall conduct both time-series and cross-sectional multiple regression analyses to test the above mentioned hypotheses.

PRELIMINARY RESEARCH FINDINGS

Because the above mentioned analyses have not been done to date, research findings remain preliminary. From the data as presented in Table 1 to 3, however, one can note certain patterns emerging that arise out of the historical and socio-economic conditions under which the research system has operated. Thus it can be noted:

- (1) there has been a marked concentration on applied versus basic research particularly within the Ministry of Agriculture research stations. This is a result of staff constraints, government goals, and attitudes within the international community that developing countries cannot afford basic research;
- (2) research aimed at breeding higher yielding varieties of crops has far exceeded that to increase crop nutritional value or disease resistance in crops. This stems partly from biases within the agricultural scientific community towards concentration of efforts on increasing yields as opposed to other potential research goals;
- (3) research requiring high input levels has exceeded that which acknowledges small-scale farmer constraints reflecting the development of research to serve larger-scale, wealthier, farmer needs;
- (4) very little research of a mechanical nature has been done. This feature can be understood given the availability over time of cheap labour and the very high cost of agricultural machines and equipment;
- (5) research has focused on breeding and agronomy and the former in the larger and relatively better endowed stations. Staff availability is partly to account for this feature;
- (6) cash crops intended for export have received the bulk of research funds with the exception of maize. The latter drew substantial research resources because in the colonial period, it was being grown by European farmers and the subsequent success of the research programme attracted further support to its;
- (7) livestock research and particularly that focusing on small stock has been relatively neglected. This reflects again the historical bias in the research system to serve European and large-scale farmer needs.
- (8) former European and higher potential areas have until recently received the bulk of research resources. Recently, there has been a substantial shift in manpower towards traditionally peripheral areas and also there has been an increase in the research budgets directed to these areas.

(9) the relative importance of expatriate staff has generally decreased over time but the expatriate staff that exists today is connected to specific, foreign aided projects and is relatively much better qualified than in the past.

(10) the parastatal research institutes and the ex-East African Community research organizations have been and are relatively better endowed in terms of resources than the Ministry of Agriculture research stations reflecting partly a foreign donor preference in the past to support international as opposed to national research stations.

(11) there has been a lack of coordination of research among research stations with some unnecessary duplication which has resulted from poor research organization and management in the past.

(12) the University has been a site for more basic research with much foreign, academic input.

These research findings conform to the general pattern of government service distribution as discussed in the introduction and will be elaborated upon as analysis proceeds in the study.

T A B L E 1

SURVEY OF CURRENT AGRICULTURAL RESEARCH IN KENYA

Ministry of Agriculture, Scientific Research Division

<u>Research Station</u>	<u>Dates of Operation</u>	<u>Geographical Area Served</u>
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National Agricultural Laboratories, Nairobi	1963 to present	Kenya
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<u>Research Programme</u>	<u>Crop/Animal Investigated</u>
1. Soils and Agricultural Chemistry Section	
(i) Maintenance and Improvement of Soil Fertility Trials	-
(ii) Fertilizer and Manure Requirements of 'Bracken Zone' Soils	-
(iii) Evaluation of A20 40 bacteria culture	-
(iv) Comparison of Univert Liquid Fertilizer with Farm land Manure and Mineral Fertilizer	
(v) Herbicides	-
2. Kenya Soil Survey	-
3. Entomology Section	
(i) Pest Control	Wheat barley onions cotton sugarcane wattle cashew sweet potato rice

<u>Research Station</u>	<u>Dates of Operation</u>	<u>Geographical Area Served</u>
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National Agricul- tural Research Station, Kitale	1963 to present	Kenya
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<u>Research Programme</u>	<u>Crop/Animal Investigated</u>
(ii) Rodent monitoring	-
(iii) Army worm research	-
(iv) Storage and bulk handling investigations	Wheat, maize
(v) Insecticides trials	Maize, coffee, cowpeas, grams copra
4. Plant Pathology Section	
(i) General Advisory Services	Vegetables, fruits, cereals, ornamentals, herbarium
(ii) Fungicide screening trials	Passion fruit
(iii) Fertilizer trial	Passion fruit
(iv) Wilting condition investigation	Pyrethrum
(v) Foot Rot investigation	Rice
(vi) Nematology	
(vii) Bacterial Wilt Research	Tomatoes
(viii) Trans Nzoia Disease Research	Maize
(ix) Coffee Stinkers Research	Coffee
5. Irrigation and Drainage Section	
1. Breeding	Maize
(i) Applied Maize Breeding	
(ii) Quality Maize Breeding	
2. Agronomy	Maize
(i) Fertility trials	
(ii) Protection trials	
(iii) Cultural/systems trials	
3. Pasture Research	Pastures
(i) Forage collection project	
(ii) Pasture breeding project	
(iii) Pasture Agronomy	
(iv) Animal Nutrition	
(v) Systems Research.	

<u>Research Station</u>	<u>Dates of Operation</u>	<u>Geographical Area Served</u>
National Horticultural Research Station, Thika	since 1963 1963 to present	Kenya

<u>Research Programme</u>	<u>Crop/Animal Investigated</u>
1. Exotic vegetables (i) Breeding (ii) Agronomy	Tomatoes, carrots, brinjals Capsicums
2. Indigenous Vegetables	Tropical spinach, chinsaga, cowpeas
3. Vegetable Seed Production	Tomatoes, carrots, French beans
4. Grain Legumes (i) Agronomy (ii) Weed control (iii) Pathology (iv) Breeding (v) Bean Production Survey	Beans
5. Fruits Research (i) Agronomy (ii) Nematology	Citrus, grapes, deciduous fruits, pineapples, avocado, macadamia, passion fruit
6. Crop Protection (i) Entomology (ii) Agronomy	Potatoes, citrus, cabbage soya
7. Oil Crops (i) Selection (ii) Agronomy	Sunflowers, soya beans
8. Hard Fibres (i) Breeding (ii) Agronomy	Sisal, kenat
9. Temperate Fruits Research	Apples, plums, blackberries

<u>Research Station</u>	<u>Dates of Operation</u>	<u>Geographical Area Served</u>
National Plant Breeding Station, Njoro	since 1963 1963 to present	Kenya
National Sugar Research Station Kibos	1971 to present	Kenya
National Animal Husbandry Research Station, Naivasha	1963 to present	Kenya
National Pyrethrum Research Station, Molo	1963 to present	Kenya

<u>Research Programme</u>	<u>Crop/Animal Investigation</u>
1. Breeding section	Bread wheat, barley, oil seeds, triticale, durum
2. Agronomy section	Wheat, barley, oil seeds, triticale, durum
3. Plant Pathology Section	
4. Grain Chemistry and Technology Section	
5. Entomology and Crop Storage Unit	
1. Breeding and Variety Selection	Sugar
2. Soil Fertility & Crop Nutrition	Sugar
3. Plant Pathology	Sugar
4. Sugar Technology - Factory Processing	Sugar
1. National Sahiwal Stud	Cattle
2. Dairy Cattle Res. Project	Cattle
3. Pig Unit	Pigs
4. Kimakia Sheep Unit	Sheep
5. Poultry Unit	Poultry
1. Beeding (i) Varietal Beeding (ii) Clonal Beeding	Pyrethrum
2. Agronomy	Pyrethrum
3. Nematology	Pyrethrum

<u>Research Station</u>	<u>Date of Operation since 1963</u>	<u>Geographical Area Served</u>	<u>Research Programme</u>	<u>Crop/Animal Investigation</u>
Dryland Farming Research Station, Machakos	1963 to present	Drier, medium to low potential areas of Kenya	1. Maize breeding 2. Maize agronomy 3. Mixed cropping of maize and beans 4. Pasture/fodder agronomy 5. Grass exploration 6. Livestock Research	Maize Maize Maize, beans Pastures Pastures Sheep, goats
Western Agricultural Res. Station Kakamega	1963 to present	Western province	1. Pasture &ffodder research 2. Horticultural crops " 3. Oil seeds research (i) variety testing (ii) agronomy 4. Cowpeas variety trials 5. Grain Legume Project 6. Maize agronomy trials 7. Animal husbandry trials	Cabbages, onions, tomatoes, peas. Groundnuts sunflowers, soya beans cowpeas beans Maize Cattle
Nyanza Agricultural Research Station, Kisii	1963 to present	High, medium, and low potential zones in Nyanza province	1. Food Crops Section (i) variety trials (ii) agronomy trials 2. Oil Crops Section (i) Variety trials (ii) Agronomy trials 3. Horticultural Crops Section (i) Agronomy trials 4. Farming systems Section (i) Agronomy 5. Pasture & Fodders Research (i) Nutrition & variety trials 6. Animal Production Section (i) Calf Performance trials.	Maize Groundnuts soyabeans Tomatoes cabbages, onions Maize and beans Pastures Cattle

<u>Research Station</u>	<u>Date of Operation</u>	<u>Geographical Area Served</u>
Coast Agricultural Research Station, Kikambala	1963 to present	Coast province the lowland, humid tropics
Embu Agricultural Research Station, Embu	1963 to present	Embu district, Meru " Muranga " Nyeri "

<u>Research Programme</u>	<u>Crop/Animal Investigation</u>
1. Tree Crops Section (i) Breeding (ii) Agronomy	Cashew, mango, Citrus, avocado, Coconuts, grapes, bananas
2. Vegetable Section (i) Variety trials	Watermelons, Cowpeas, sweet melons, onions tomatoes
3. Arable Food Crops Section (i) Variety trials	Maize, sorghum
4. Oil Seeds crops Sect. (i) Variety trials (ii) Agronomy (iii) Herbicide trials	Groundnuts, Sunflowers, Simsim
5. Root Crops Section (i) entomology	Cassava
6. Sugarcane Res. Section (i) variety testing (ii) sweet testing trials	Sugarcane
7. Entomology Section	Cashewnuts, maize, sorghum
8. Pasture section: grass exploration and evaluation	
9. Cotton research section	Cotton
1. Maize Agronomy	Maize
2. Maize Beeding	Maize
3. Grass Evaluation	Pastures
4. Pasture & Fodder Agronomy	Pastures
5. Animal Production	Dairy cattle
6. Grain Legume Project (i) variety testing (ii) agronomy	Beans
7. Millet Adaptation trials	Millet

<u>Research Station</u>	<u>Date of Operation</u> <u>since 1963</u>	<u>Geographical</u> <u>Area Served</u>
Nyandarua Agricul- tural Res. Station, Ol Joro Orok	1963 to present	High altitude areas of Central province
Potato Research Station, Limuru	1966 to present	Kenya
Kenya Inspection Services for Seeds, Nakuru	1969 to present	Kenya
Beef Research Station, Lanet	1968 to present	Medium potential zones of Kenya

<u>Research Programme</u>	<u>Crop/Animal Investigation</u>
8. Banana trials (i) Nemotode control	Bananas
9. Long run rotation trials	Maize - beans - leys - sweet pota- toe vines
1. Pyrethrum section (i) Clonal breeding	Pyrethrum
2. Sheep section	Sheep
3. Dairy Herd	Dairy cattle
4. Wheat, barley, oats section	Cereals
5. Piggery	Pigs
1. Breeding	Potatoes
2. Agronomy	Potatoes
3. Clonal multiplication and seed bulking programme	Potatoes
4. Food technology	Potatoes
5. Virology	Potatoes
6. Bacteriology	Potatoes
1. Seed Advisory Section	
2. Field inspection	Maize, Wheat, barley, oats
3. Sampling and sealing	triticale, sunflowers seed potatoes,
4. Post control	grass seeds, beans
5. Horticultural seeds	vegetables
6. Variety section	same as above
1. Beef research	Beef cattle
2. Sorghum research	Sorghum

8

<u>Research Station</u>	<u>Date of Operation since 1963</u>	<u>Geographical Area Served</u>	<u>Research Programme</u>	<u>Crop/Animal Investigation</u>
Kiboko Range Research Station, Makindu	1971 to present	Range land areas of Kenya	1. Ecology programme 2. Livestock Improvement 3. Sheep and Goat project (i) selection and breeding (ii) management 4. Wildlife section	Podders and grasses zebu cattle sheep, goats eland, zebras
Animal Husbandry Res. Station, Kapsabet	1963 to present	Western province	1. Pasture & fodders section 2. Livestock section (i) Feeding & management 3. Crops section (i) Potato seed production (ii) Herbicides trials	Pastures Dairy cattle Potatoes carrots, cabbages, tomatoes
Animal Husbandry Res. station, Mariakani	1967 to present	Coast province	1. Livestock section 2. Poultry section 3. Pastures section 4. Rabbit section	Cattle Poultry Pastures Rabbits
Mwea Tebere Cotton Res. Station Kerugoya	1963 to present	Marginal, low rainfall areas of eastern Kenya	1. Beeding section 2. Agronomy section 3. Entomology	Cotton Cotton Cotton
Cotton Res. Station, Kibos	1963 to present	High rainfall, cotton growing zones of western Kenya	1. Beeding 2. Agronomy 3. Entomology	Cotton Cotton Cotton
Grass Res. Station, Molo	1963 to present	High altitude areas of western Kenya	1. Sheep section 2. Pastures research 3. Crops section (i) wheat, barley, and oats (ii) pyrethrum breeding (iii) Potato seed production	Sheep Pastures Cereals Pyrethrum Potatoes
Office of the Chief Grader & Inspector Mombasa	1963 to present	Kenya	No research now Did research on insect and pest control in stored products in the past	-

<u>Research Station</u>	<u>Date of Operation</u>	<u>Geographical Area Served</u>
<u>Tea Research Institute of East Africa, Kericho</u>	<u>since 1963</u>	<u>East Africa</u>
	1963 to present	

Coffee Research Foundation, Ruiru
1963 to present Kenya

Kenya Agricultural Research Institute, Muguga
1963 to present Kenya

Kenya Veterinary Institute, Muguga
1963 to present Kenya

Veterinary Laboratories, Kibete
1963 to present Kenya

1. Chemical investigations	Tea
2. Crop environmental investigations	Tea
3. Breeding	Tea
4. Agronomy	Tea
1. Chemistry section	Coffee
2. Entomology	Coffee
3. Experimental Agronomy	Coffee
4. Crop Physiology	Coffee
5. Plant Pathology	Coffee
1. Soil Physics and Chemistry	-
2. Maize genetics	Maize
3. Sorghum & Millet breeding	Sorghum, millet
4. Sugarcane breeding	Sugarcane
5. Plant pathology & nematology	Groundnuts, maize, cassava,
6. Army worm research	rice
7. Animal Production	Cattle
1. Division of Bacterial Disease -	CBPP
2. Div. of General Pathology -	Cattle
trypanosomiasis	
3. Div. of Helminth Diseases	Cattle
4. Div. of Protozoal Diseases -	
East Coast Fever	Cattle
5. Div. of Virus Diseases	Cattle
6. Biochemistry section	-
7. Genetics section	-
1. Foot and Mouth Project	Cattle
2. CCPP Project	Goats
3. Walter Keid Project - trypanosomiasis	Cattle
4. Wildlife project	-
5. Bacteriology section	-
6. Chemistry section	-

<u>Research Station</u>	<u>Date of Operation</u>	<u>Geographical Area Served</u>
	since 1963	

ICIPE - International Centre of Insect Physiology & Ecology
1970 to present International Jurisdiction

ILRAD - International Laboratory for Research on Animal Diseases
1975 to present International jurisdiction

National Irrigation Board

<u>Research Programme</u>	<u>Crop/Animal Investi-</u>
	<u>gation</u>
7. Toxicology & Parasitology Sections	-
8. Protozoology & Virology Sect.	-
9. Poultry diseases section	Poultry
1. African army worm research	-
2. Sorghum shootfly research	Sorghum
3. Mosquito research	-
4. Termite research	-
5. Livestock tick research	Livestock
6. Tse Tse research	-
7. Chemistry & Biochemistry Research Unit	-
8. Histology & Fine Structure Research Unit	-
9. Sensory Physiology Research Unit	-
10. Insect and Animal Breeding Unit	-
1. East Coast Fever research	Cattle
2. Trypanosomiasis research	Cattle
1. Rice Research (i) variety testing (ii) fertilizer trials	Rice
2. Agronomy Research	cotton, Sugarcane, maize, cowpeas
3. Irrigation and Drainage Research	
4. Entomology and Phytopathology	cotton, rice

<u>Research Station</u>	<u>Date of Operation</u>	<u>Geographical Area served</u>
<u>University of Nairobi</u>		
Faculty of Agriculture, Department of Crop Science	since 1963	
	1970 to present	Kenya
Faculty of Agriculture, Dept. of Agricultural Engineering		
	1975 to present	Kenya
Faculty of Agriculture, Dept. of Soil Science	1970 to present	Kenya
Faculty of Veterinary Medicine, Dept. of Veterinary Physiology	1963 to present	Kenya

<u>Research Programme</u>	<u>Crop/Animal Investiga-</u>
	<u>tion</u>

- | | |
|--|-------------|
| 1. Sunflower breeding | Sunflowers |
| 2. Disease existence of field beans | Beans |
| 3. Pigeon peas-breeding and agronomy | Pigeon peas |
| 4. Cowpeas-breeding and agronomy. | Cowpeas |
| 5. Integrated Crop Protection Project | - |
| | |
| 1. Energy requirements of small farms | - |
| 2. Soil Conservation and erosion | - |
| 3. Testing low power tractors | - |
| 4. Bio-gas project | - |
| 5. Irrigation studies | - |
| | |
| 1. Microbiological Resources Centre Project on Nitrogen Situation | - |
| 2. Crop sequences and their effects on soil moisture and situation | - |
| 3. Environmental Physiology of Wild and domestic animals in East Africa. | - |

<u>Research Station</u>	<u>Date of Operation</u>	<u>Geographical Area Served</u>
Faculty of Veterinary Medicine, Dept. of Animal Production	since 1963	North East India

Faculty of Veterinary
Medicine, Dept. of Animal
Production

<u>Research Programme</u>	<u>Crop/Animal Investigation</u>
2. Comparative Physiology of vertabbrates	-
3. Exercise Physiology especially the mechanics and energetics of animal locomotion	-
4. Renal Physiology and electrolyte metabolism	-
5. Ruminant digestion and metabolism	-
6. Reproduction Physiology and endocrinology	-
7. Respiration Physiology	-
1. Evaluation of storage digestability	-
2. Digestability and nutritional value of sunflower	-
3. Heifer production	Cattle
4. Dairy heifer supplementation	Dairy cattle
5. Milk production project	Dairy cattle
6. Forage studies	-
7. Cattle rearing evaluation	Cattle
8. Inactivating Trypsin Inhibitor in Kenya Dry Beans	Poultry
9. Green leaf meals	Poultry
10. Distribution and Productivity of Sheep and Goats	Sheep and goats
11. Comparative growth of cattle, cattle, oryx, oryx, and eland in dry areas	eland.

<u>Research Station</u>	<u>Date of Operation</u>	<u>Geographical Area Served</u>
Faculty of Veterinary Medicine, Dept. of Pathology and Microbiology	since 1963 1963 to present	Kenya
Faculty of Veterinary Medicine, Dept. of Anatomy	1963 to present	Kenya
Faculty of Veterinary Medicine, Dept. of Public Health, Pharmacology, and Toxicology	1972 to present	Kenya

Research ProgrammeCrop/Animal Investi-
gation

- | | |
|------------------------------|--------------------|
| 1. East Coast Fever research | Cattle |
| 2. Cystercases Research | Cattle |
| 3. Pneumonia Research | Variety of Animals |
| 4. Medicinal plant project | - |
| 5. | |
-
- | | |
|----------------------------------|--------|
| 1. Reproductive systems research | - |
| 2. Digestive systems research | - |
| 3. Muscle Research | - |
| 4. East Coast Fever Project | Cattle |
-
- | | |
|--|---------------------|
| 1. Microbiological investigations of food and feeds | - |
| 2. Zoonoses in Kenya | - |
| 3. Wildlife diseases | |
| 4. Medicinal and personous plants/ Residuls and Food Additives in food | Variely of Wildlife |

APPENDIX II - TABLE II - AGRICULTURAL RESEARCH STAFF - 1978 and 1975

1978

1975

NAME OF RESEARCH STATION	KENYAN STAFF			EXPATRIATE STAFF			KENYAN STAFF			EXPATRIATE STAFF		
	BSc	MSc	PhD	BSc	MSc	PhD	BSc	MSc	PhD	BSc	MSc	PhD
1. Agricultural Lab												
1. National Agricultural Lab	30	11	1	0	9	2	21	12	1	2	5	5
2. Kitale Research Station	14	6	2	3	2	3	11	6	2	3	4	6
3. Thika Horticultural Station	6	6	0	1	0	0	10	5	0	1	0	0
4. Njoro Research Station	7	8	1	0	0	0	4	5	2	1	0	4
5. Kibos Sugar Station	2	2	1	0	0	0	4	3	0	0	0	0
6. Naivasha Animal Husbandry	9	4	1	3	1	2	4	2	1	4	0	4
7. Mclo Pyrethrum Station	1	4	0	0	0	0	4	0	0	0	0	0
8. Machakos Dry Land Station	5	2	0	0	0	0	4	2	0	1	0	1
9. Kakamega Station	1	2	0	0	0	0	0	1	0	0	0	0
10. Kisii Station	0	2	0	0	0	0	2	1	0	0	0	0
11. Coast Station	2	6	0	0	0	0	9	1	0	0	0	0
12. Embu Station	2	0	0	0	0	0	6	2	0	0	0	0
13. Lanet Beef Research Station	4	0	0	2	1	0	2	3	0	1	0	2
14. Nyandarua Station	1	0	0	0	0	0	0	0	0	0	0	0
15. Kiboko Range Research Station	3	3	0	0	0	0	9	1	0	0	0	2
16. Kapsabet Animal Husbandry	1	0	0	0	0	0	2	0	0	0	0	0
17. Mwea Cotton Research Station	3	1	0	0	0	0	9	0	0	1	0	0
18. Tea Research Institute	1	2	0	3	2	0	9	2	0	2	2	0
19. Coffee Research Foundation	2	10	3	0	0	3	4	8	3	2	0	4
20. Agricultural Research Instit.										11	3	7
21. Vet Labs	37	5	1	5	5	9	12	5	1	10	6	12
22. ICIPE	4	8	2	0	4	31	2	6	2	0	4	22
23. LIRAD (1976)	0	0	2	0	0	13						
24. University of Nairobi	10	13	19	1	9	27	2	13	14	2	7	32
TOTAL	143	95	53	21	33	90	122	76	29	39	32	103

Sources: National Agricultural Lab, Plant Pathology Section, Annual Report for 1972
 National Agricultural Lab, Soils and Agricultural Chemistry Section, Annual Report 1977
 National Agricultural Lab, Kenya Soil Survey, Annual Report of 1977
 Ministry of Agriculture, Annual Report of the Research Division, 1971
 Ministry of Agriculture, National Agricultural Research Station, Kitale, Summary of Research and Farm Activity, 1978
 Ministry of Agriculture, National Horticultural Research Station, Thika, Annual Report 1975
 Ministry of Agriculture, National Plant Breeding Station, Njoro, Annual Report 1975
 Ministry of Agriculture, Annual Report 1976, National Sugar Research Station, Kibos

APPENDIX II— TABLE II— AGRICULTURAL RESEARCH STAFF— 1969 and 1966

TABLE III - FINANCIAL ALLOCATION TO AGRICULTURAL RESEARCH
1976-77

STATION	ALLOCATION (KSh)	YEAR	RECURRENT	DEVELOPMENT	TOTAL
1. National Agricultural Lab	2,008,284	1978-79	2,752,953	1,613,385	4,366,336
2. Kitale Research Station	1,544,940	1977-78	2,368,679	1,487,323	3,856,002
3. Thika Research Station	902,000	1976-77	1,880,735	684,064	2,564,799
4. Njoro Breeding Station	512,600	1975-76	1,447,445	498,033	1,945,478
5. Kibos Sugar Station	536,100	1974-75	1,212,066	425,859	1,637,925
6. Naivasha Animal Husbandry		1973-74	1,127,672	408,311	1,535,983
7. Molo Pyrethrum Station	465,300	1972-73	296,315	538,262	828,517
8. Kakamega Station	624,300	1971-72	271,903	380,526	652,429
9. Machakos Dryland Station	712,640	1970-71	303,975	385,753	689,728
10. Kisii Station	360,300	1969-70	265,141	250,689	533,830
11. Coast Research Station	643,700	1968-69	225,087	187,621	412,708
12. Embu Station	37,700	1967-68	111,472	171,626	185,098
13. Nyandarua Station	341,100	1966-67	383,554	51,493	145,047
14. Potato Research Station	371,080	1965-66	77,321	56,517	135,838
15. KIS, Nakuru	820,000	1964-65	66,816	32,625	99,441
16. Beef Research Station	1,440,800	1963-64	152,276	235,885	368,161
17. Kipoko Range Station	824,000				
18. Kapsabet Station					
19. Merikani Station	161,800				
20. Mwea Research Station	263,520				
21. Kibos Cotton Station	228,080				
22. Molo Grasslands Station	104,000				
23. Coffee Research Found.	632,671				
24. Muguga-Agriculture	10,950,900				
25. Muguga-Veterinary	8,235,800				
26. Vet Labs	936,835				
27. TIRAD		8 million dollars			

SOURCES: Government of Kenya, Recurrent and Development Expenditure Estimates
Ministry of Agriculture, Expenditure Returns