STAFF AGING AND TURNOVER IN AFRICAN AGRICULTURAL RESEARCH

A Case Study on Kenya Agricultural Research Institute

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Acronyms and Abbreviations

ASARECA	Association for Strengthening Agricultural Research in East and Central Africa
ASTI	Agricultural Science and Technology Indicators
CGIAR	Consultative Group on International Agricultural Research
FARA	Forum for Agricultural Research in Africa
FTE(s)	Full-time equivalent(s)
IFPRI	International Food Policy Research Institute
ISNAR	International Service for National Agricultural Research
KARI	Kenya Agricultural Research Institute
KESREF	Kenya Sugar Research Foundation
KETRI	Kenya Trypanosomiasis Research Institute
KEVEVAPI	Kenya Veterinary Vaccines Production Institute
R&D	Research and Development
STI	Science, Technology, and Innovation

Abstract

This study was conducted from May to July 2011 as part of a series of five national case studies analyzing the scope and magnitude of the human resource challenges facing national agricultural research institutes. The study's purpose was to gather information on how other countries have tackled such challenges and provide suggestions on strategies that work within specific country contexts. It is hoped that other African countries will be able to draw valuable lessons from this research.

The Kenya Agricultural Research Institute (KARI) is the country's largest agricultural research institution, accounting for approximately half of the yearly national agricultural research and development (R&D) budget and human resource capacity. Like many other R&D institutions in Africa, KARI is challenged by having a large pool of aging staff, no clear succession plan, and difficulties in retaining well-qualified scientists. For the period under study, 2001–10, it was determined that KARI employed an average of 568 scientists, 30 percent of whom were female and about two-thirds of whom were qualified to the MSc level or higher. More than half of all scientists were more than 50 years old as of the end of 2010, and relatively few scientists were recruited during the study period. In order to address this issue, KARI successfully lobbied the government to increase the retirement age of scientists from 55 to 65 years. KARI's scientists worked in several agricultural disciplines during the study period, primarily focusing on research relating to crops, livestock, natural resources, and socioeconomics. Data show that 168 scientists departed the Institute during 2001–10 for a variety of reasons, and the ratio of scientists to support staff declined from a high of 1:7 in 2001 to 1:5 in 2010.

In order to address the dual challenges of aging staff and staff retention, the Institute initiated and implemented several incentive measures including (1) raising the scientist retirement age from 55 to 65 years; (2) introducing an elaborate training program for scientists and other staff; negotiating with the government to secure better remuneration packages for staff; and (4) institutionalizing a transparent and participatory performance-based evaluation system for scientists, and yearly appraisals for all staff. In order to meet its research mandate and motivate staff more effectively, the results of the study indicate that KARI should (1) recruit some junior scientists to work under and be mentored by its senior scientists; (2) develop a more competitive remuneration package to assist in retaining well-qualified scientists; (3) provide less-qualified staff with training in higher degrees, and short refresher courses to staff already holding higher degrees; (4) continue to seek additional funding for agricultural research from the government and donors; and (5) continue to establish effective partnerships with relevant institutions to ameliorate the effect of gaps in human resource skills.

1. INTRODUCTION

Many countries in Africa have renewed their commitment to agricultural research, development, and innovation, recognizing the importance of agriculture to rural livelihoods, poverty reduction, and economic growth (Box 1). Human resource capacity forms the foundation of agricultural research and development (R&D) institutions and the basis for the efficient and effective use of all other institutional resources. In Kenya, as in many countries in the region, remuneration packages, incentives, and conditions of service for research scientists are generally poor, and a number of agencies are beginning to institute staff retention strategies in efforts to address this problem. Attracting and retaining staff is an even more serious problem in countries with small research capacities, further highlighting the importance of regional initiatives focusing on the needs and vulnerabilities of such countries. Given the critical impact of human resources in R&D institutions, an assessment was carried out of the status of and trends in human resource capacity in five case study countries (Burkina Faso, Kenya, Senegal, South Africa, and Zambia), with a view to gaining information and insights of relevance to other countries and agencies in Africa.[1] The Kenyan case study focused on the Kenya Agricultural Research Institute (KARI) because it accounts for about half the country's human resource capacity related to agricultural R&D.

The objectives of the study were to assess the characteristics of staff employed at KARI during 2001–10 in terms of (1) the capacity of both research and support staff by gender, qualification level, and discipline; (2) the age profile of scientists; and (3) trends in the recruitment of new staff and staff turnover. Finally, an underlying purpose of the study was to identify the incentives, strategies, and policies instituted by KARI to motivate and retain staff.

Box 1. Kenya's Renewed Commitment to Science, Technology, and Innovation

In its current iteration, Kenya's *Vision 2030* identifies science, technology, and innovation (STI) as key foundations for its economic, social, and political development strategy (Republic of Kenya 2007). In turn, however, developments in STI depend on effective national research and development (R&D) institutions to generate and catalyze the adoption of technology, knowledge, and information. In Kenya, as in many other African countries, agriculture will remain a key sector in socioeconomic development for a long time to come because a high proportion of the population lives in rural areas where agriculture is the primary source of livelihoods. *Vision 2030* also acknowledges that agriculture will need to grow at 7 percent per year if Kenya is to attain and sustain the recommended 10 percent rate of yearly economic growth. The country recently devised an Agricultural Sector Development Strategy, pledging to support agricultural R&D to generate technologies and information required to support agricultural and ultimately more general economic development (Republic of Kenya 2009).

2. CASE STUDY METHODOLOGY

A recent study by the Agricultural Science and Technology Indicators (ASTI) initiative of the International Food Policy Research Institute (IFPRI) and KARI identified about 30 national institutions involved in some form of agricultural R&D activity (Flaherty et al. 2010). These agencies primarily comprise Kenya's national agricultural research institutes, together with agriculture-related faculties and departments of the country's public and private universities. Of these institutions, KARI is the largest in terms of funding

[1] The case studies were commissioned by the Agricultural Science and Technology Indicators (ASTI) initiative of the International Food Policy Research Institute (IFPRI) and formed the basis of a synthesis paper for the conference "Agricultural R&D: Investing in Africa's Future–Analyzing Trends, Challenges, and Opportunities" which is being organized by ASTI/IFPRI and the Forum for Agricultural Research in Africa (FARA).

levels and full-time equivalent (FTE) staff involved in agricultural R&D (Beintema, Murithi, and Mwangi 2003; Flaherty et al. 2010). In 2008, KARI accounted for 533 FTEs or 53 percent of the all staff involved in agricultural R&D (1,012 FTEs) and 49 percent or 2.2 billion Kenyan Shillings of the total funding (4.5 billion Kenyan shillings, both in 2005 constant prices).

KARI has a network of 23 main centers and over 10 subcenters, but all staff information is centrally located at head office in Nairobi. In order to implement the case study effectively given the time and resources available, head office–based personnel data were used for the period 2001–10, which averted the need to interview staff. These data were supplemented with other Institute-based information, such as the reports prepared in collaboration with IFPRI's ASTI initiative, employee satisfaction and work environment surveys, staff evaluation and appraisal processes, and terms of service documents.

Unlike ASTI's data collection (Flaherty et al. 2010), which considered only those staff who were actively in service at the time (based on the payroll), data collected for this case study captured all staff, even if they were not earning a salary during part of the year. Also, although the current study counted absolute staff numbers and ASTI data are presented in FTEs (to account for time spent on non-research activities, for example, by university faculty), the distinction is redundant for KARI, given its 100 percent focus on agricultural research.

3. RESULTS AND DISCUSSION

Number, Gender, and Age of Scientists

The number of scientists employed at KARI during the 10 year study period ranged from 505 individuals in 2001, to 605 in 2004. Since then, total scientists number decreased to 545 scientists in 2010 (Table 1). There had been a general decline of scientist aged between 25 and 29 years over the review period. This could be a reflection of the non-hiring of fresh young graduates from the universities due the employment freeze. Female scientists were on average generally younger than male scientists.

Table 1. Number of scientists by gender and mean age, 2001–10

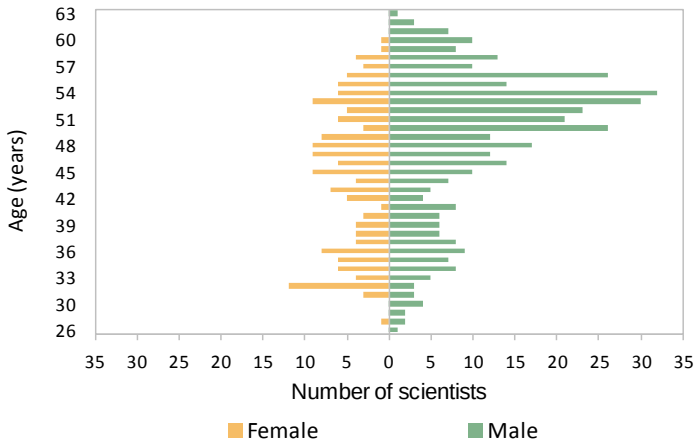
Age category (years)	Gender	Year										Share of 2010 total (%)
		2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	
25–29	Male	14	19	19	19	14	7	8	11	9	5	0.9
	Female	13	20	25	27	22	16	15	5	1	1	0.2
	Subtotal	**27**	**39**	**44**	**46**	**36**	**23**	**23**	**16**	**10**	**6**	**1.1**
30–39	Male	86	81	75	79	74	72	72	79	63	59	10.8
	Female	43	52	43	53	52	47	45	47	54	51	9.4
	Subtotal	**129**	**133**	**118**	**132**	**126**	**119**	**117**	**126**	**117**	**110**	**20.2**
40–49	Male	230	259	256	240	223	181	158	141	117	95	17.4
	Female	59	72	81	80	83	81	76	67	64	61	11.2
	Subtotal	**289**	**331**	**337**	**320**	**306**	**262**	**234**	**208**	**181**	**156**	**28.6**
50–59	Male	56	67	66	90	105	137	161	164	189	203	37.2
	Female	3	7	10	16	22	28	37	53	49	48	8.8
	Subtotal	**59**	**74**	**76**	**106**	**127**	**165**	**198**	**217**	**238**	**251**	**46.1**
60–65	Male	1	1	1	1	2	2	4	4	11	21	3.9
	Female	0	0	0	0	0	0	1	0	0	1	0.2
	Subtotal	**1**	**1**	**1**	**1**	**2**	**2**	**5**	**4**	**11**	**22**	**4.0**
TOTAL		**505**	**578**	**576**	**605**	**597**	**571**	**577**	**571**	**557**	**545**	**100**
Mean age	Male	43.3	43.3	43.7	44.0	44.9	458	46.3	46.2	47.8	48.9	
	Female	39.0	39.1	39.4	39.6	40.3	41.4	42.0	43.7	43.7	44.6	
	All	**42.3**	**42.2**	**42.3**	**42.7**	**43.5**	**44.5**	**45.0**	**45.5**	**46.6**	**47.6**	

Source: Compiled by authors.

During the review period, the number of scientists employed fluctuated. In 2001, some staff (mainly those with MSC and PhD degrees) departed the Institute when the Kenya Sugar Research Foundation (KESREF) was formed. Similarly, in 2003 KARI gained all staff from the former Kenya Trypanosomiasis Research Institute (KETRI) and Kenya Veterinary Vaccines Production Institute (KEVEVAPI), which at that time became part of KARI's network of research centers. In 2009, however, KEVEVAPI was transferred back to the Ministry of Agricultural and Livestock Development and became a commercial entity for production of veterinary vaccines (Flaherty et al. 2010).

The mean age of scientists increased from 42 years in 2001 to 48 years in 2010, likely due in part to the government employment freeze in place during 1988–2003 which prevented the intake of younger scientists. The employee freeze had been effected under the structural adjustment programme policies which the Government adopted at that time. By December 2010, approximately 46 percent of the scientists were aged between 50 and 59 years, while 4 percent were 60 years or older (Table 1; Figure 1). Only one percent of scientists were under 30 years old, and only 21 percent were under 40 years old, implying a serious succession problem. In 2004, KARI successfully lobbied the government to increase the retirement age of scientists from 55 to 65 years in efforts to address this problem (Flaherty et al. 2010).

Figure 1. Age of KARI researchers as of December 31, 2010



Source: Compiled by authors.

The mean number of scientists employed at KARI during the 10-year period of the study is 568, and the proportion of female to male scientists rose from 23 percent in 2001, to 30 percent from 2005 onward. On average, female scientists represented 29 percent of the total scientists, whereas male scientists represented 71 percent over the study period (Table 2). KARI has endeavored to comply with the current requirement of the Kenyan Constitution that neither gender comprise more than two-thirds of institutional staffing (Republic of Kenya 2010). Tables 1 and 2 show that the share of women has increased in all age categories, most striking in the 40–49 year old age bracket, from only 5 percent in 2001 to 19 percent in 2010. Of the 22 scientists aged 60 years and older, only 1 is female. It is noteworthy that there was a drop in the share female scientists in the 25–29 age bracket (48 to 17 percent), but this is in part due to the large decline in absolute numbers. In 2001 there were 14 male and 13 female scientists, whereas in 2010 there were 5 male and 1 female scientists in this age category. Figure 1 shows that the majority of male scientists are aged 50 years or older (59 percent), whereas the majority of female scientists are younger than 50 years (69 percent).

Scientist Qualifications

KARI classifies staff as scientists if they have at least a bachelor's degree in a relevant discipline from a recognized university. On average over the 10 year period, 33 percent of scientists held a BSc degree, 50 percent held MSc degrees, and 17 percent were qualified to the PhD degree level (Table 2). The number of BSc-qualified scientists declined over the years as these younger scientists gained higher skills and because the recruitment of junior staff was restricted by the aforementioned recruitment freeze. As a result, most new BSc-qualified scientists were drawn from existing diploma- or certificate-qualified technical staff who undertook degree training to qualify for promotion (Flaherty et al. 2010).

Table 2. Number of scientists by highest degree and gender per year, 2001–10

Highest qualification in current appointment	Gender	Year										Yearly mean	Share of 2010 total (%)
		2001	2002	2003	2004	2005	2006	2007	2008	2009	2010		
BSc	Male	75	133	131	139	150	145	144	88	87	87	118	16.0
	Female	35	70	72	78	91	91	90	55	55	55	69	10.1
	Subtotal	**110**	**203**	**203**	**217**	**241**	**236**	**234**	**143**	**142**	**142**	**187**	**26.1**
MSc	Male	220	213	214	223	208	197	200	204	198	196	207	36.0
	Female	73	71	77	87	77	69	68	92	89	87	79	16.0
	Subtotal	**293**	**284**	**291**	**310**	**285**	**266**	**268**	**296**	**287**	**283**	**286**	**51.9**
PhD	Male	92	81	72	67	60	57	59	107	104	100	80	18.3
	Female	10	10	10	11	11	12	16	25	24	20	15	3.7
	Subtotal	**102**	**91**	**82**	**78**	**71**	**69**	**75**	**132**	**128**	**120**	**95**	**22.0**
Total	Male	387	427	417	429	418	399	403	399	389	383	405	70.3
	Female	118	151	159	176	179	172	174	172	168	162	163	29.7
	All	**505**	**578**	**576**	**605**	**597**	**571**	**577**	**571**	**557**	**545**	**568**	**100**
Share of total (%)	**Male**	**76.6**	**73.9**	**72.4**	**70.9**	**70.0**	**69.9**	**69.8**	**69.9**	**69.8**	**70.3**	**71.4**	
	Female	**23.4**	**26.1**	**27.6**	**29.1**	**30.0**	**30.1**	**30.2**	**30.1**	**30.2**	**29.7**	**28.6**	

Source: Compiled by authors.

Overall, the number of scientists with MSc and PhD degrees increased over the review period because the Institute encourages staff to undertake higher degree training, and until recently—with the introduction of a performance-based appraisal process—this was the only avenue through which scientists could secure a promotion. Most scientists therefore took advantage of opportunities provided by the Institute and various donor projects to pursue higher degree training. As a result KARI accumulated a higher proportion of well-trained agricultural scientists compared with the country's other agencies (with the exception of the combined pool of the country's university lecturers).

Unsurprisingly, highly trained scientists (that is, those with MSc or PhD degrees) are generally older (Table 3). Of all the scientists with BSc degrees in 2010, close to 40 percent were younger than 40 years old. This is different in the other degree categories: 21 percent of scientists with MSc degrees, and 3 percent of those with PhD degrees fell into the same age bracket. It is important to note that, in relation to the problem of staff aging, 71 percent of the PhD-qualified researchers were 50 years or older in 2010, and a majority of these (40 percent of all researchers qualified to the PhD level) fell into the 50–54 age bracket. It should also be noted that raising of the retirement age has only forestalled the succession problem rather than solving it. This is an issue that should be of great concern, and demands the formulation of an urgent and detailed training and succession plan.

Table 3. Number of scientists by age and highest qualification as of December 31, 2010

Age (years)	Highest qualification in current appointment			Total	Share of total (%)	Cumulative share (%)
	BSc	MSc	PhD			
26	1			1	0.18	100
28	2	1		3	0.55	99.82
29	1	1		2	0.37	99.27
30	3	1		4	0.73	98.90
31	4	2		6	1.10	98.17
32	10	5		15	2.75	97.06
33	6	3		9	1.65	94.31
34	7	7		14	2.57	92.66
35	6	7		13	2.39	90.09
36	6	9	2	17	3.12	87.71
37	4	8		12	2.20	84.59
38	1	9		10	1.83	82.39
39	4	5	1	10	1.83	80.55
40	2	6	1	9	1.65	78.72
41	3	6		9	1.65	77.06
42	4	5		9	1.65	75.41
43	3	6	3	12	2.20	73.76
44	3	5	3	11	2.02	71.56
45	7	10	2	19	3.49	69.54
46	5	9	6	20	3.67	66.06
47	5	12	4	21	3.85	62.39
48	5	15	6	26	4.77	58.53
49	8	5	7	20	3.67	53.76
50	6	18	5	29	5.32	50.09
51	7	15	5	27	4.95	44.77
52	6	13	9	28	5.14	39.82
53	8	17	14	39	7.16	34.68
54		23	15	38	6.97	27.52
55	4	10	6	20	3.67	20.55
56	3	18	10	31	5.69	16.88
57		5	8	13	2.39	11.19
58	3	11	3	17	3.12	8.81
59	1	3	5	9	1.65	5.69
60	3	6	2	11	2.02	4.04
61	1	4	2	7	1.28	2.02
62		2	1	3	0.55	0.73
63		1		1	0.18	0.18
Total	**142**	**283**	**120**	**545**	**100.00**	

Source: Compiled by authors.

Length of Service of Scientists

The mean period of time scientists were employed at KARI rose from 16.2 years in 2001, to 21 years in 2010, by which time over 64 percent of scientists had worked for KARI for over 20 years (Table 4). This implies that relatively few scientists left the KARI or few new ones were recruited during the review period.

Table 4. Number of scientists in different categories of service by gender, 2001–10

Years employed at KARI	Gender	Year										Share of 2010 total (%)
		2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	
Less than 1	Male	14	18	10	12	3	0	11	10	0	0	–
	Female	6	11	8	9	4	1	4	5	0	0	–
	Subtotal	**20**	**29**	**18**	**21**	**7**	**1**	**15**	**15**	**0**	**0**	**–**
1–5	Male	28	39	51	56	62	60	47	40	36	24	4.4
	Female	19	25	32	39	41	38	35	27	23	14	2.6
	Subtotal	**47**	**64**	**83**	**95**	**103**	**98**	**82**	**67**	**59**	**38**	**7.0**
6–10	Male	15	15	15	25	26	26	34	46	51	56	10.3
	Female	9	10	13	16	21	22	23	29	32	35	6.4
	Subtotal	**24**	**25**	**28**	**41**	**47**	**48**	**57**	**75**	**83**	**91**	**16.7**
11–15	Male	79	77	62	37	21	18	16	14	18	19	3.5
	Female	32	38	31	23	14	12	12	15	16	20	3.7
	Subtotal	**111**	**115**	**93**	**60**	**35**	**30**	**28**	**29**	**34**	**39**	**7.2**
16–20	Male	125	94	99	104	103	78	70	55	32	18	3.3
	Female	28	27	33	39	42	40	36	29	19	10	1.8
	Subtotal	**153**	**121**	**132**	**143**	**145**	**118**	**106**	**84**	**51**	**28**	**5.1**
21–25	Male	85	142	133	127	121	116	75	80	85	88	16.1
	Female	22	37	36	30	33	30	27	28	34	35	6.4
	Subtotal	**107**	**179**	**169**	**157**	**154**	**146**	**102**	**108**	**119**	**123**	**22.6**
26–30	Male	35	34	39	56	64	77	122	114	108	106	19.4
	Female	2	3	5	19	23	27	34	33	25	27	5.0
	Subtotal	**37**	**37**	**44**	**75**	**87**	**104**	**156**	**147**	**133**	**133**	**24.4**
31–35	Male	6	8	8	12	18	24	28	40	59	71	13.0
	Female	0	0	1	1	1	2	3	6	19	21	3.9
	Subtotal	**6**	**8**	**9**	**13**	**19**	**26**	**31**	**46**	**78**	**92**	**16.9**
Over 35	Male	0	0	0	0	0	0	0	0	0	1	0.2
	Female	0	0	0	0	0	0	0	0	0	0	–
	Subtotal	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**0.2**
Total		**505**	**578**	**576**	**605**	**597**	**571**	**577**	**571**	**557**	**545**	**100**
Mean years of service		16.4	16.3	16.5	16.5	17.2	18.2	18.6	19.1	20.0	21.0	

Source: Compiled by authors.

The number of newly recruited scientists fluctuated from 29 in 2002, to zero in 2009 and 2010 (Table 4). Prior to 1989, KARI directly recruited university students before they completed their undergraduate degrees. Currently, any new vacancies are advertized and competitively filled.

Academic Disciplines of Scientists

The pool of KARI scientists comprises several agriculture-related academic disciplines covering crops, livestock, natural resources, economics, and social sciences (Table 5). As expected, more scientists focus on crop research and related disciplines (agronomy, breeding, health, postharvest for food crops and horticulture crops), followed by livestock research (nutrition, management, breeding, veterinary) and natural resource management. KARI also has a large pool of socioeconomists and statisticians (agricultural economists, sociologists, anthropologists, biometricians) compared with other institutes in

the region. It should also be noted that some KARI scientists change their disciplines as they pursue higher degrees.

Table 5. Number of scientists by discipline, 2001–10

Discipline	Year										Share of 2010 total (%)
	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	
Food crop agronomy (cereals, pulses, root and tubers)	64	69	66	64	61	60	61	59	59	59	10.8
Forage agronomy	7	7	9	7	7	7	7	8	7	7	1.3
Crop breeding (food crops, horticulture and industrial crops)	49	55	59	60	66	61	61	64	63	61	11.2
Seed technology	3	3	2	3	3	2	2	2	2	2	0.4
Crop health (weed science, pathology, entomology)	58	65	66	66	61	58	56	56	55	54	9.9
Horticulture and industrial crops agronomy (flowers, fruits, vege-tables, nuts, pyrethrum, fiber)	26	36	39	34	33	32	33	34	32	30	5.5
Animal nutrition and management	48	48	46	49	50	47	47	47	43	43	7.9
Animal breeding	4	6	6	7	8	8	9	9	9	9	1.7
Veterinary sciences	41	45	42	59	56	56	59	56	54	53	9.7
Food science and postharvest technology	17	22	22	22	20	20	21	20	20	20	3.7
Agricultural economics	40	47	46	49	51	48	47	47	45	43	7.9
Sociology and gender	6	8	9	11	10	10	10	9	9	9	1.7
Anthropology	6	6	7	8	7	7	7	7	7	7	1.3
Extension	7	7	7	7	7	8	8	8	8	7	1.3
Biometrics and research methods	12	15	15	15	15	15	15	14	14	14	2.6
Natural resources management (soil science, water management, land use planning)	66	71	73	72	73	69	69	68	67	65	11.9
Environment science and agroclimatology	7	9	9	8	8	7	7	7	7	6	1.1
Agricultural engineering	3	4	4	4	3	3	3	3	3	3	0.6
Range ecology and management	12	15	13	15	13	13	13	12	12	12	2.2
Biotechnology(crop and livestock)	9	14	15	16	15	13	15	17	17	17	3.1
Chemistry/ biological sciences/ biochemistry	7	10	8	15	15	13	13	11	11	11	2.0
General agriculture	9	10	6	7	8	7	7	7	7	7	1.3
Geographic information systems	2	3	4	4	4	4	4	4	4	4	0.7
Information sciences	2	3	3	3	3	3	3	2	2	2	0.4
Total	**505**	**578**	**576**	**605**	**597**	**571**	**577**	**571**	**557**	**545**	**100**

Source: Compiled by authors.

Scientist Departures and Reasons for Leaving

A total of 168 scientists left KARI over the review period (Table 6). Various reasons were given for these departures. Some scientists were dismissed for disciplinary reasons; others retired, resigned, or died; and others were transferred to other government departments or took leave of absence. The table shows clearly that retirements have decreased over the years, which is mainly due to the 2004 increase in the official retirement age.

Table 6. Number of departing scientists by reason for departing, 2001–10

Reasons for leaving KARI	Year										Subtotal	Share of total that departed (%)
	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010		
Retired	7	8	4	–	2	1	3	4	1	1	31	18.5
Were dismissed	3	1		5	12	1	4	1	1	2	30	17.9
Transferred to another government departments	5	2	4	–	–	3	2	1	3	2	22	13.1
Resigned	2	2	2	3	7	1	4	1	–	1	23	13.7
Obtained a leave of absence to work elsewhere for a given period without pay	3	1	4	2	1		3	3	6	8	31	18.5
Died	5	6	2	4	4	3	3	3	1	–	31	18.5
Total	**25**	**20**	**16**	**14**	**26**	**9**	**19**	**13**	**12**	**14**	**168**	**100**
Share of total who departed (%)	**14.9**	**11.9**	**9.5**	**8.3**	**15.5**	**5.4**	**11.3**	**7.7**	**7.1**	**8.3**	**100**	

Source: Compiled by authors.

It was not considered culturally appropriate to pursue individuals who departed the Institute to ascertain why they left or what salary package they were offered—all of which is considered highly personal information. Nevertheless, scientists who leave KARI commonly do so to undertake higher education at American or European universities, often pursuing improved job opportunities abroad thereafter rather than returning home. Others leave KARI to join the local universities where basic salaries are comparable to those at KARI, but the working environment is more flexible. For example, aside from scheduled lectures, faculty members can manage their own time, which gives them the opportunity to engage in research outside the university campus, conduct consultancies, or even teach at other universities (such as the country's many private universities). In contrast, KARI scientists are expected to maintain regular office hours (8:00am to 5:00pm daily) unless on official travel or leave. Universities are also able to offer better housing, medical, commuter, and other allowances. Unlike KARI, the universities also have an academic staff union capable of negotiating improved terms of service and remuneration.

In the past, scientists have left KARI to accept positions at CGIAR institutes, with regional networks such as the Association of Strengthening Agricultural Research in Eastern and Central Africa (ASARECA), or with nongovernmental organizations or the private sector. Given the understandable confidentiality of these employment agreements, it was difficult to ascertain more specific information.

Support Staff

The number of support staff—technicians, administrative staff, and other support staff (such as drivers)—have gradually declined over time, from a high of 3,594 in 2001 to 2,455 in 2010. The mean number of support staff over the 10 year period is 3,079 (Table 7). The majority of staff joined the Institute when it was consolidated with the then Scientific Research Division of the Ministry of Agriculture and Livestock in the late-1980s (Beintema, Murithi, and Mwangi 2003). Over the years the

KARI has adopted a policy of reducing the ratio of support staff to scientists to meet international best practice guidelines of 1:5 as recommended by the International Labor Organization and ISNAR (Kiragu, Ondatto, and Kimani 2004). As a result, the ratio has contracted from 1:7 to 1:5, which has been achieved through a support staff recruitment freeze and a policy of non-replacement of support staff in non-critical positions.

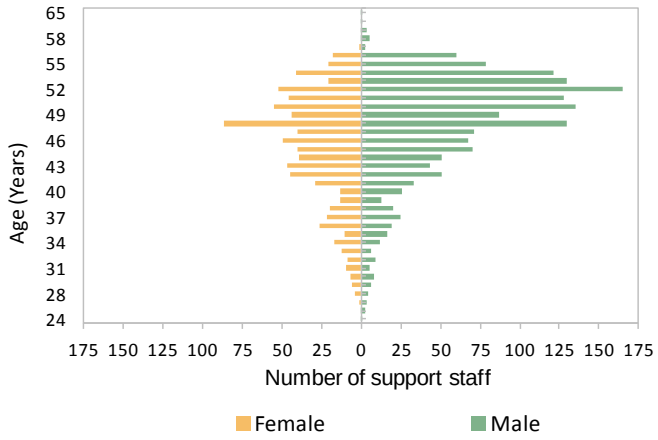
Table 7. Number of support staff by highest level of education and gender, 2001–10

Highest level of education	Gender	Year										Yearly mean	Share of 2010 total (%)
		2001	2002	2003	2004	2005	2006	2007	2008	2009	2010		
Certificate	Male	2,131	1,997	1,946	1,852	1,767	1,690	1,612	1,505	1,405	1,285	1,719	52.3
	Female	863	861	858	852	832	814	792	772	746	703	809	28.6
	Subtotal	**2,994**	**2,858**	**2,804**	**2,704**	**2,599**	**2,504**	**2,404**	**2,277**	**2,151**	**1,988**	**2,528**	**81.0**
Diploma	Male	298	286	280	269	258	240	239	229	213	194	251	7.9
	Female	93	95	101	102	100	96	101	100	92	89	97	3.6
	Subtotal	**391**	**381**	**381**	**371**	**358**	**336**	**340**	**329**	**305**	**283**	**348**	**11.5**
BSc	Male	72	72	76	73	71	70	70	68	64	60	70	2.4
	Female	29	30	32	33	33	33	33	32	31	32	32	1.3
	Subtotal	**101**	**102**	**108**	**106**	**104**	**103**	**103**	**100**	**95**	**92**	**101**	**3.7**
MSc	Male	44	44	45	46	45	38	38	39	38	38	42	1.5
	Female	17	17	17	15	15	15	14	15	14	12	15	0.5
	Total	**61**	**61**	**62**	**61**	**60**	**53**	**52**	**54**	**52**	**50**	**57**	**2.0**
Professional diploma	Male	37	37	37	38	36	34	34	34	32	31	35	1.3
	Female	10	10	10	10	10	10	11	12	12	11	11	0.4
	Subtotal	**47**	**47**	**47**	**48**	**46**	**44**	**45**	**46**	**44**	**42**	**46**	**1.7**
Total	Male	2,582	2,436	2,384	2,278	2,177	2,072	1,993	1,875	1,752	1,608	2,116	65.5
	Female	1,012	1,013	1,018	1,012	990	968	951	931	895	847	964	34.5
	All	**3,594**	**3,449**	**3,402**	**3,290**	**3,167**	**3,040**	**2,944**	**2,806**	**2,647**	**2,455**	**3,079**	**100**
Share of total (%)	**Male**	**71.8**	**70.6**	**70.1**	**69.2**	**68.7**	**68.2**	**67.7**	**66.8**	**66.2**	**65.5**	**68.5**	
	Female	**28.2**	**29.4**	**29.9**	**30.8**	**31.3**	**31.8**	**32.3**	**33.2**	**33.8**	**34.5**	**31.5**	

Source: Compiled by authors

The number of female support staff has risen from 28 percent in 2001 to 35 percent in 2010, indicating efforts by KARI to respond to the goal of gender balance in the work place, despite restricted recruitment opportunities. Figure 2 presents the age profile of all the 2455 KARI support staff as of 31 December 2010.

Figure 2. Age of KARI support staff as of December 31, 2010



Source: Compiled by authors

Performance-Based Evaluation

The first staff-based performance evaluation for scientists at KARI was completed in 2000/01, and scientists who met the minimum required scores were promoted a grade. Thereafter, given the low salaries scientists were receiving at the time, KARI management requested that the government raise salary levels across the board. The government approved this request in 2004, with the result that all staff were promoted to the next-highest ranking within their grade (their grades/job titles remained unchanged). In 2008, scientists were once again evaluated and promoted based on the minimum required scores. This process has now been institutionalized (Box 2) and will be conducted every three years, providing strong motivation for staff to perform at their best. In addition—given the value of degree training—promotion is still possible through the attainment of higher degree qualifications. A yearly appraisal process is also conducted for all staff by their supervisors, requiring that staff members develop, negotiate, and sign a yearly performance contract with clear targets in accordance with guidelines for Kenya's public servants.

Box 2. KARI's current performance-based appraisal process for scientists

The appraisal process, now institutionalized to occur every three years, involved the establishment of a committee to develop pretested evaluation criteria. The resulting evaluation form includes numerous questions to be completed by scientists in a participatory process under which they first evaluate themselves. Thereafter, the evaluation forms and supporting evidence are passed on to an evaluation committee established at each of KARI's 23 centers. The committees check the forms for correctness, provide their own aggregate scores, and submit the forms to headquarters where evaluations are standardized. As part of the process, KARI's management, in accordance with its Board of Directors, determines the number of scientists needed to fill different positions within programs. After establishing the distribution of all scores, the central evaluation committee (based at headquarters) determines the minimum aggregate scores required for promotion to a particular level. At senior levels, promotion also requires that candidates be interviewed by a committee of senior managers and board members. Scientists with borderline evaluation scores are considered for incremental salary increases rather than promotion, and those with poor scores are given a written warning requiring that they improve.

Incentives to Improve Staff Motivation and Retention

KARI has recognized the challenge that motivating and retaining staff poses, and has institutionalized various incentive measures over time in efforts

to address this challenge.

1. During the late-1980s, the staff of the former Scientific Research Division of the Ministry of Agriculture and Livestock was consolidated under KARI, which ensured that nearly half the country's agricultural research scientists were managed by a single entity (hence institutional identity), providing uniform terms and conditions of employment
2. The institute has continued to provide opportunities for scientists to advance their skills by providing government- and donor-supported scholarships and study leave, enabling staff to attain higher degrees and therefore qualify for promotion.
3. The aforementioned performance-based staff evaluation process has been institutionalized to improve opportunities for promotion and increased remuneration
4. The institute succeeded in lobbying the government to raise the retirement age, which ameliorated the immediate succession problem and has provided an incentive for junior staff, including diploma- and certificate-qualified technicians, to pursue higher training, even through self-sponsorship.
5. KARI management also succeeded in lobbying the government to increase staff salary and allowances levels, providing an incentive both in terms of the quality of work outputs and the decision to commit to employment at KARI rather than leaving.
6. In 2010, the Institute began offering employees a commuter allowance to defray travel costs which are quite high and most staff have to travel long distances to the work place.
7. Scientists are being encouraged to accept part-time teaching opportunities at nearby universities and to engage in research consultancies as long as this is officially communicated to management.
8. In 2008, the Institute completed the development of comprehensive human resource documentation (terms and conditions of service, scheme of service), superseding the use of more generic central governmental human resource policies. This significantly improved staff motivation by ensuring consistent, transparent, and predicable processes that previously had been considered ad hoc.
9. In 2010, the Institute carried out a training needs assessment in which staff actively participated. The exercise contributed to the establishment of a training master plan that has raised staff morale. Staff undertaking training are provided with paid study leave and are "bonded" to the Institute upon completing their training for a fixed period of time.
10. Staff also have the opportunity to receive a leave of absence to undertake short-term work with other institutions that conduct work of relevance to KARI.
11. If large projects undertaken by the Institute have the necessary funding, they can now hire temporary staff to fill specific vacant roles.
12. A comprehensive group insurance is provided in the event that staff are involved in an accident while on duty and a comprehensive medical insurance for all staff came into effect in October 2011.

Notwithstanding the incentive measures outlined above, staff still indicate the need for improved remuneration considering the high cost of living.

In 2009, KARI commissioned an external firm of consultants to conduct a survey to assess the satisfaction level of both its external customers and its employees. A representative sample of 498 staff members from different centers was interviewed and asked to assess their satisfaction level—ranging from very satisfied (1) to totally dissatisfied (5)—on a number of attributes encompassing service delivery, career development, communications, employee relations and leadership, remuneration and

benefits, and handling of complaints (Table 8). Overall, the survey indicated that 80 percent of the sampled employees was satisfied, 9 percent was neither satisfied nor dissatisfied, and 11 percent was dissatisfied. One percent of the sample of staff declined to answer the questions (Strategic Public Relations and Research Ltd. 2010). Forty percent of the employee sample indicated that they had complained at one time or another, but only 23 percent of those staff members who complained indicated that they were satisfied with how the complaints were handled (Table 9). Staff also provided feedback on areas for improvement. Out of 842 responses (some sampled staff provided more than one response), 23 percent suggested the need for incremental increases on remuneration and allowances, 13 percent proposed that promotions be based on merit, 11 percent indicated that staff should be given equal opportunity for training (especially at lower levels), and 8 percent indicated the need for more research facilities (Strategic public relation and Research Ltd. 2010). KARI management has responded to the issues raised by staff, which has improved morale.

Table 8. Level of satisfaction/dissatisfaction of KARI employees, various attributes (%)

Attribute assessed by employees	Satisfied	Neither satisfied nor dissatisfied	Dissatisfied
Communication	66.8	17.5	15.6
Focus on customer service	79.2	11.2	9.6
Catalyst of change and innovation	80.9	10.4	9.0
Use of skills and abilities	66.4	13.3	20.2
Training	48.0	15.7	36.4
Improving skills	51.2	17.5	31.4
Generation of new technology	61.6	20.3	18.0
Provision of necessary resources	56.4	19.9	23.6
Supports high quality	66.6	17.5	15.8
Supports high standards	65.0	20.9	14.0
Supports high quality organization	82.9	9.8	7.2
Handling of disciplinary cases	70.0	17.1	13.0
Honors good work	84.5	9.2	6.2
Creates awareness of opportunities	50.4	20.9	28.8
Encourages merit	65.0	18.1	16.8
Job security	79.7	10.4	9.8
Handling of promotions	33.5	16.1	50.4
Acquiring information	70.5	16.7	12.8
Satisfaction with information provided	61.6	19.9	18.5
Job satisfaction	75.9	12.0	12.0
Timely decision-making	60.8	15.7	23.4
Professional development	80.3	9.2	10.4
Adequacy of resources	71.6	19.6	8.8
Employee involvement in decision-making	73.7	13.3	13.2
KARI is a role model	74.3	12.0	13.6
Fair compensation	75.4	13.2	11.1
Fair pay	61.0	23.3	15.5
Fair appraisal system	54.8	22.7	22.2
Annual leave	77.8	14.7	7.2

Source: Strategic public relation and Research Ltd. 2010.
Note: The sample size was 498 employees.

Table 9. Reasons for dissatisfaction among KARI staff members

Reasons for dissatisfaction	Share (%)
Poor remuneration	32.7
Promotion not forthcoming/not on merit	27.3
Discrimination in providing for house allowance	14.5
Complaints not addressed properly	12.7
Discrimination in training opportunities	7.3
Only head office staff are paid over time	3.6
No room for career development	1.8

Source: Strategic public relation and Research Ltd. 2010.
Note: The sample size was 55 employees.

4. CONCLUSION AND RECOMMENDATIONS

KARI is Kenya's primary public agricultural research institution, mandated to conduct nationally relevant research on crops, livestock, natural resource management, and socioeconomics. To deliver its mandate, KARI relies on over 500 research scientists and about 2,500 support staff. Over the years, the Institute has recognized the central role high caliber technical staff; consequently, KARI management has invested a lot of effort in improving staff terms and conditions of service, in ensuring its competitiveness as an employer, and in providing incentives to motivate and retain staff. Key incentives that have been instituted with positive results include (1) extending the retirement age from 55 to 65 years for scientists and 60 years for other staff; (2) developing a master training program for scientists and other staff members; (3) negotiating with the Government of Kenya to secure improved staff salaries and allowances; and (4) institutionalizing a transparent and participatory performance-based evaluation system for scientists and yearly performance appraisals for all staff.

The general recommendations arising from this study include the following:

1. Although the increased retirement age has had numerous positive effects, including providing an excellent incentive for staff to pursue higher degrees and to commit to longer term employment at KARI, has forestalled the critical succession problem rather than solving it. Given that the majority of KARI's staff are over 45 years old, the Institute should request that the government approve the recruitment of a number of junior scientists to be mentored by senior scientists; this could also provide an opportunity to further improve the Institute's gender balance in accordance with the Kenyan Constitution.
2. Despite recent advances, KARI still needs to improve the competitiveness of its remuneration package to enhance its ability to retain its highly trained scientists.
3. Staff need to be further supported in attaining higher degrees, and those who are already trained need short-term refresher courses to enhance their skills and provide exposure to new developments in their areas of specialization, as per the findings of the training needs assessment.
4. KARI should continue its pursuit of effective partnerships with relevant institutions so as to ameliorate the effect of gaps in human resource skills.

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The Agricultural Science and Technology Indicators (ASTI) initiative compiles, analyzes, and publishes data on levels and trends in agricultural R&D investments, capacities, and institutional arrangements in developing countries. ASTI is managed by the International Food Policy Research Institute (IFPRI) and involves collaborative alliances with many national and regional R&D agencies.

Jointly convened by ASTI/IFPRI and the Forum for Agricultural Research in Africa (FARA), the conference, "Agricultural R&D -- Investing in Africa's Future: Analyzing Trends, Challenges, and Opportunities," brought together experts and stakeholders from the region to contribute their expertise for the purpose of distilling new insights and creating synergies to expand the current knowledge base. The themes under focus were (1) Why African governments under invest in agricultural R&D; (2) How human resource capacity in agricultural R&D can be developed and sustained; (3) How institutional structures can be aligned and rationalized to support agricultural R&D; and (4) How the effectiveness of agricultural R&D systems can be measured and improved.

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