AGRICULTURAL SCIENCE AND TECHNOLOGY INDICATORS

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GUINEA

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This brief reviews the major investment and institutional trends in Guinean public agricultural research since the early 1990s using new data collected under the Agricultural Science and Technology Indicators (ASTI) initiative (IFPRI-ISNAR-CORAF/WECARD 2002-2003).[1]

INSTITUTIONAL DEVELOPMENTS

After independence and the establishment of the first republic (1958–84), Guinea was governed by a totalitarian socialist regime, with severe negative economic impacts. During this time, the agricultural sector was overlooked, leaving it weak and with a negative trade balance. The regime change and resulting economic liberalization of the mid-1980s created a renewed interest in agriculture, and numerous old agricultural research stations were rehabilitated and reopened (World Bank 1996). Currently, 84 percent of the active population of Guinea is dependent on agriculture, the majority being small-scale farmers (FAO 2003). In 2001, 12 agencies were involved in agricultural research and development (R&D) in Guinea.[2] Combined, these agencies employed 269 full-time equivalent (fte) researchers and spent approximately 3 billion 1999 Guinean francs on agricultural R&D—equivalent to 7 million 1993 international dollars (Table 1).[3]

The principal agricultural research agency, the Agricultural Research Institute of Guinea (IRAG), accounted for nearly two-thirds of the country's agricultural researchers and expenditures in 2001.[4] IRAG was founded in 1989 under the Ministry of Agriculture and Livestock (MAE) (See *A Short History of Government-Based Agricultural Research* on page 2). The institute is headquartered in Conakry and has four regional centers: Foulaya in Basse Guinée, Bareng in Moyenne Guinée, Bordo in Haute Guinée, and Sérédou in Guinée Forestière. In addition to these regional centers, IRAG also has a center in Koba (specializing in aquatic production systems in coastal basins and mangroves) and one in Kilissi (specializing in plant

Table 1—Composition of agricultural R&D expenditures and researchers, 2001

Type of agency	Spending		Total researchers[a]	Share		Agencies in sample[b]
	1999 Guinean francs	1993 international dollars		Spending	Researchers	
	(*millions*)		(*fte's*)	(*percent*)		(*number*)
IRAG	1,704.8	4.4	172.4	63.2	64.0	1
Other government[c]	717.4	1.9	69.3	26.6	25.7	4
Higher education[d,e]	277.0	0.7	27.6	10.3	10.2	7
Total	**2,699.1**	**7.0**	**269.3**	**100**	**100**	**12**

Source: Compiled by authors from survey data (IFPRI-ISNAR-CORAF/WECARD 2002-03).
[a] Includes national and expatriate staff.
[b] See note 2 for details on all agencies.
[c] The expenditures for LNPVDS are estimates based on the expenditures per researcher for IRAG.
[d] The expenditures for the higher-education sector are estimates based on average expenditures per researcher for the government sector.
[e] The 168 staff at the 7 higher-education agencies spent between 10 and 40 percent of their time on research, resulting in 27.6 fte researchers.

KEY TRENDS

- Total agricultural researcher numbers in Guinea increased gradually throughout the 1990s, while agricultural R&D expenditures declined, showing a more erratic trend.
- The main agricultural R&D agency is the Agricultural Research Institute of Guinea (IRAG), accounting for nearly two-thirds of the country's agricultural researchers and expenditures in 2001.
- In addition to bilateral donor contributions, IRAG was largely dependent in the 1990s on two consecutive projects that were funded by World Bank loans.
- The future of IRAG's funding remains uncertain with the completion of projects funded by the World Bank and cessation of funding from the French government. Two-thirds of IRAG's research programs have recently been dramatically cut, and the vast majority of IRAG's support staff has been retrenched.

ABOUT ASTI

The Agricultural Science and Technology Indicators (ASTI) Initiative consists of a network of national, regional, and international agricultural R&D agencies managed by IFPRI and ISNAR. The initiative compiles, processes, and makes available internationally comparable data on institutional developments and investments in public and private agricultural R&D worldwide, and analyses and reports on these trends in the form of occasional policy digests for research policy formulation and priority setting purposes.

Primary funding for the ASTI initiative was provided by the CGIAR Finance Committee/World Bank with additional support from the Australian Center for International Agricultural Research (ACIAR), the European Union, and the U.S. Agency for International Development (USAID).

breeding and seed technology). In 2001, these six centers comprised 32 research programs; each was running one research station and various test sites, experiment villages, and farmer test units. IRAG carries out all kinds of agricultural R&D, including crop, livestock, forestry, and socioeconomic research. In 1999, IRAG's livestock research program was extended with the incorporation of the R&D wing of the National Livestock Department (DNE) (IRAG n.d.). IRAG was restructured during the 1990s under the Agricultural Services Project (PSA-1) and the National Agricultural Services Project (PNSA), primarily financed through World Bank loans.

In 2001, the four other government R&D agencies in our sample together accounted for about a quarter of the country's total R&D expenditures and fte researchers. The National Center of Fisheries Sciences of Boussoura (CNSHB), under the Ministry of Fisheries and Aquaculture (MPA), is charged with fisheries development in Guinea. With a team of 45 fte researchers, CNSHB's activities are organized under five research units (CNSHB 2003). The three other government agencies involved in agricultural research are the Pasteur Institute of Guinea (IPG), the Research and Extension Institute of Cane Rat in Guinea (IRVAG)—both under the Ministry of Higher Education and Scientific Research (MESRS)—and the National Laboratory of Plant Protection and Stored Food Products (LNPVDS), under the supervision of MAE.[5] IPG is responsible for the promotion and development of research activities in medical biology but also conducts some agricultural research. IRVAG, founded in 2000 with Japanese donor funding, carries out research to increase the productivity of cane rats in livestock in order to meet the increased demand for cane rat meat, whereas LNPVDS undertakes research related to agricultural zoology, phytopathology, weed control, phytopharmacology, and small vertebrates.

We identified seven higher-education agencies involved in agricultural R&D, representing 10 percent of Guinea's fte researchers in 2001. These activities were carried out by 28 fte researchers (168 individuals), employed across five departments the Higher Agricultural and Veterinary Institute Valéry Giscard d'Estaing of Faranah (ISAV) and in the Biology Department of the Faculty of Sciences and the Environmental Study and Research Center (CERE), both attached to the Gamal Abdel Nasser University of Conakry (UC). Both ISAV and IC play a significant role in agricultural research in Guinea, conducting research related to crops, livestock, natural resources, and forestry.

We did not identify any private-sector companies, profit or nonprofit, that conducted their own agricultural R&D in Guinea. IRAG, however, works in close cooperation with a number of producer organizations, nongovernmental organizations (NGOs), and private-for-profit enterprises (IRAG n.d.). Important relationships exist between IRAG and the coffee, onion, potato, and pineapple producer associations, which are represented on the councils of IRAG's centers and participate in the programming of research activities (IRAG 2000).

Collaborative arrangements also exist among IRAG, CERE, and ISAV, on research topics of common interest. IRAG maintains fruitful relationships with agricultural research institutes in other West African countries, in particular the Senegalese Agricultural Research Institute (ISRA), the National Agricultural Research Center (CNRA) of Côte d'Ivoire, and the Institute of Rural Economics (IER) of Mali. Close collaboration also exists between IRAG and numerous international organizations and agencies such as the West Africa Rice Development Association (WARDA), the International Institute of Tropical Agriculture (IITA), the Institute of Research for Development (IRD), the Food and Agriculture Organization of the United Nations (FAO), the International Crops Research Institute for the Semi-Arid Tropics (ICRISAT), and the International Agricultural Research Center for Development (CIRAD). IRAG has a special agreement with CIRAD to undertake joint research programs. IRAG also cooperates with many universities in Europe and the United States (IRAG 1999, 2000).

HUMAN AND FINANCIAL RESOURCES IN AGRICULTURAL R&D

Overall Trends

The total number of agricultural researchers in Guinea increased by an average of 2 percent per year during 1991–2001 (Figure 1a).[6] IRAG's total fte researcher numbers increased from 154 in 1991 to 172 in 2001 with the recruitment of new staff through the World Bank supported PSA-1 and PNSA projects and, since 2000, the French supported training/insertion program for young researchers through the Fund of Aid and Cooperation (FAC).

A Short History of Government-Based Agricultural Research

Guinea's first significant agricultural research agency was the food crops research station in Kankan, created in 1930 under French rule. In 1942, the French Colonial Fruit and Citrus Institute (IFAC) established its first and most important African research center in Guinea. After independence in 1958 and the cessation of relations between Guinea and France, Guinea's research centers were nationalized, and a national agricultural research institute was created. The political environment, however, meant that the country was cut off from outside developments and had extremely limited resources. IFAC was disbanded in 1969, at which time the government introduced a network of 300 regional crops and livestock farms—the inception of modern agriculture and farming—along with 30 crop and animal science faculties. Political shifts away from socialism beginning in the mid-1980s opened the country to foreign investment and knowledge, once again allowing the development of the agricultural sector.

In 1989, the Agricultural Research Institute of Guinea (IRAG) was founded; incorporating numerous agricultural R&D centers and stations from across the country's various agroecological zones. IRAG's mission was to implement Guinea's newly established national agricultural research policy under the Ministry of Agriculture and Animal Resources (MARA)—renamed the Ministry of Agriculture, Livestock, and Forestry (MAEF) in 1997, and then the Ministry of Agriculture and Livestock (MAE) in 1999. The National Center of Fisheries Sciences of Boussoura (CNSHB) was founded in 1985 by the government of Guinea with support from the French Institute of Research for Development (IRD, formerly ORSTOM).

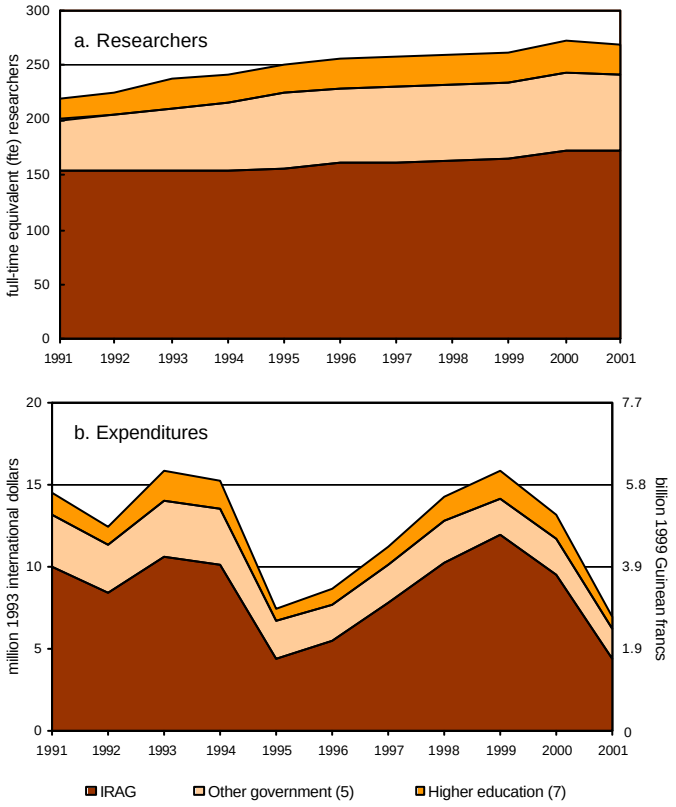
Sources: FAO (1993), IRAG (n.d.), and CNSHB (2003).

Eighty percent of IRAG's research and support staff are scheduled to retire around 2010–12, making recruitment and training of younger researchers an important priority.

Although it has declined recently, the share of expatriate researchers in Guinea is relatively high compared with other African countries. In 2001, the 22 fte expatriate researchers (13 from North Korea, 8 from France, and 1 from Egypt) accounted for 13 percent of the researchers at IRAG. The North Korean total has remained constant since 1990 because this contingent is replaced every two years under joint agreements. Two other government agencies employed expatriate staff in 2001—CNSHB with three fte researchers and IPG with two. The higher-education agencies together employed less than one fte expatriate researcher.

Total agricultural R&D expenditures in Guinea followed an overall erratic trend, declining by an average of 2.8 percent per year during 1991–2001 (Figure 1b). In 2001, total research expenditures amounted to $7 million, which was about half the level ten years prior ($15 million). In the 1990s, IRAG was largely dependent on two World Bank financed projects, PSA-1 from 1990 to 1994, and PNSA from 1996 to 2000. The completion of the two projects in 1994 and 2000, respectively, explains the sharp expenditure declines in 1995 and 2001.

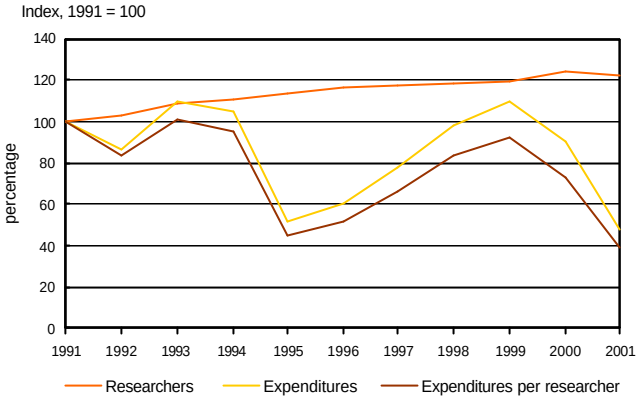
Figure 1¾ Agricultural R&D trends, 1991-2001



Sources: Compiled by authors from ASTI survey data (IFPRI–ISNAR-CORAF/WECARD 2002–03).
Notes: Figures in parentheses indicate the number of agencies in each category. Other government includes DNE, which was transferred to IRAG in 2000. Expenditures for DNE and LNPVDS are estimates based on the average expenditures per researcher for IRAG. Expenditures for the higher-education agencies are estimates based on the average expenditures per researcher for the government agencies combined. Underlying data are available at the ASTI website (http://www.asti.cgiar.org).

The overall rise in researcher numbers and reduction in expenditures caused a fall in expenditures per researcher to $26,000 dollars in 2001—far lower than the $66,000 1991 total (Figure 2) or the totals of neighboring countries such as Côte d'Ivoire (Stads and Beintema 2003).

Figure 2¾ Trends in public expenditures, researchers, and expenditures per researcher, 1991-2001

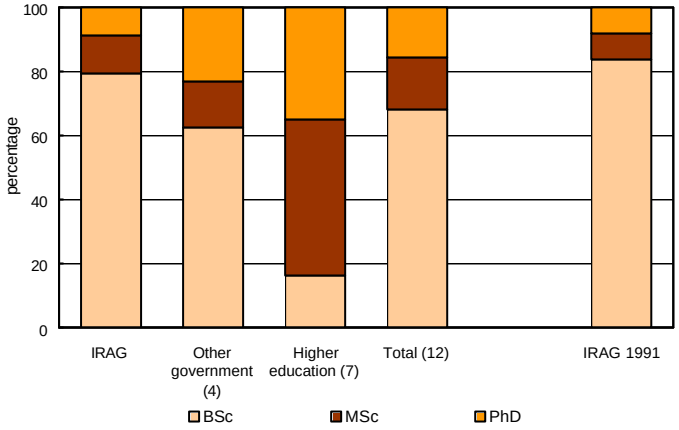


Source: Figure 1.

Human Resources

In 2001, 32 percent of the 244 fte researchers in our sample had postgraduate level training, with 15 percent holding PhD degrees (Figure 3). Research staff at the higher-education agencies were more highly qualified compared with staff at the government agencies, which is consistent with findings for other African countries (Beintema 2003). Only about 20 percent of researchers at IRAG and CNSHB held qualifications over the BSc level. This low share compared with researcher qualifications in neighboring countries can be explained both by the lack of agricultural development and overall isolation of the country prior to the mid-1980s. The Colonial Fruit and Citrus Institute (IFAC) and the Agricultural and Medical Research Center of Sérédou were closed with independence in 1958, and agricultural research did not seriously recommence until 1989 with the first World Bank project. There were virtually no national researchers at that time, so civil servants—mainly former teachers—were recruited to form a research team without formal training. PSA-1 included short-term researcher training courses to quickly generate skills, which was considered more valuable than expensive postgraduate training. Consequently, the share of IRAG researchers with postgraduate degrees has only grown to 20 percent in 2001 from 16 percent ten years earlier. Steps have been taken, however, to recruit and train younger researchers to the doctoral level through PNSA and FAC. Four BSc researchers are currently undertaking training as part of this FAC program. IPG and IRVAG employed more postgraduate researchers relative to IRAG and CNSHB; this is because IPG and IRVAG fall under MESRS, which offers greater postgraduate grant opportunities. The majority of those researchers with doctorate degrees in Guinea were trained in the ex-communist countries of Central and Eastern Europe.

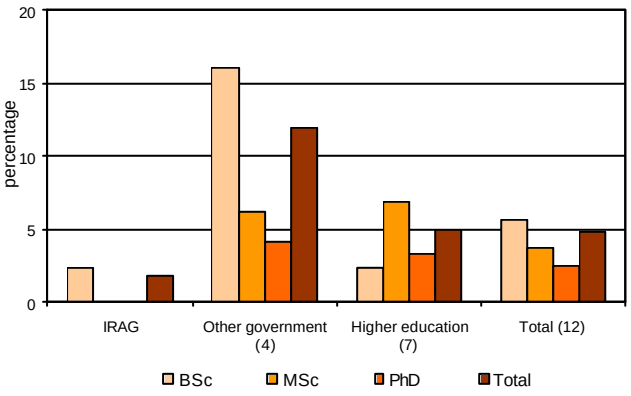
Figure 3¾ Educational attainment of researchers, 2001



Source: Compiled by authors from ASTI survey data (IFPRI–ISNAR–CORAF/WECARD 2002–03).
Note: Figures in parentheses indicate the number of agencies in each category. Data exclude expatriate staff.

Based on a 12-agency sample for 2001, 5 percent of all researchers were women (Figure 4). Half the agencies employed no female researchers (IRVAG, LNPVDS, and four departments of ISAV), while 20 and 23 percent of researchers at CERE and IPG, respectively, were female. IRAG employed three female researchers in 2001, 2 percent of the institute's total, all of whom held BSc degrees. CNSHB employed five women in 2001, also trained to the BSc level and representing 12 percent of the center's total. The female share of researchers in Guinea is very low compared with other African countries where averages range between 15 and 25 percent (Beintema 2003). Similar to the low qualification levels, the low share of female researchers can be explained in part by Guinea's late agricultural development and limiting opportunities.

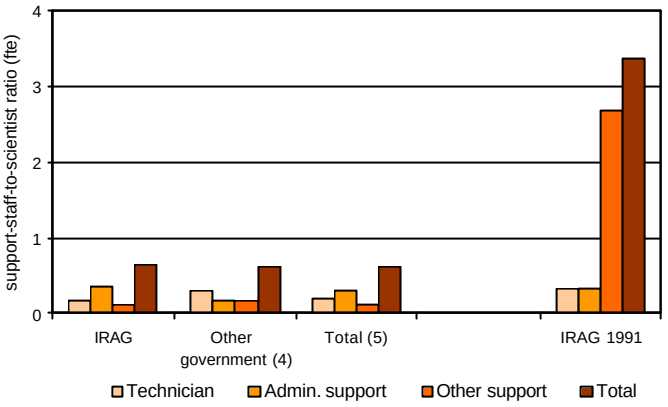
Figure 4¾ Share of female researchers, 2001



Source: Compiled by authors from ASTI survey data (IFPRI–ISNAR–CORAF/WECARD 2002–03).
Note: Figures in parentheses indicate the number of agencies in each category. Data exclude expatriate staff.

In 2001, the number of support staff per researcher at IRAG was 0.62, consisting of 0.16 technicians, 0.36 administrative support staff, and 0.10 other support staff such as laborers, guards, drivers, and so on (Figure 5). The corresponding numbers for the four other government agencies in our sample were closely comparable. Ten years earlier, 3.36 support staff per researcher were employed at IRAG, consisting of 0.32 technicians, 0.35 administrative support staff and 2.69 other support staff. The decline in the other support staff category from 1991 to 2001 is the result of the termination of World Bank funding in 2000, when all contractual support staff paid by the national development budget (BND) were retrenched. Only 18 support staff remained, and then in June 2003—with the completion of FAC funding—more support staff were laid off. Many field trials ceased as a direct result of these cutbacks. Total support staff per researcher is likely to fall even further in the future because of a freeze on the recruitment of technicians introduced several years ago. Many existing technicians will retire in the next three to five years.

Figure 5¾ Support-staff-to-researcher ratios, 2001

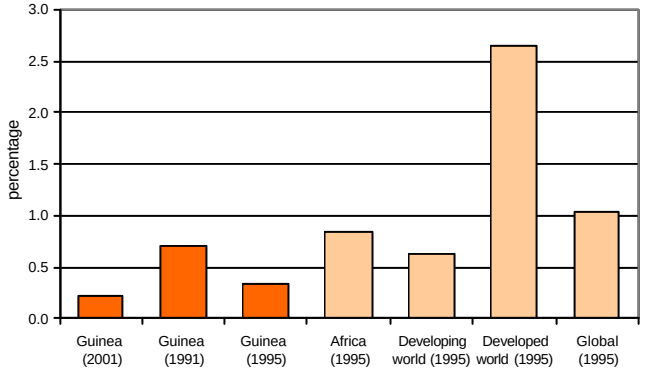


Source: Compiled by authors from ASTI survey data (IFPRI –ISNAR–CORAF/WECARD 2002–03).
Note: Figures in parentheses indicate the number of agencies in each category. Data exclude expatriate staff.

Spending

Total public spending as a percentage of agricultural output (AgGDP) is a common research investment indicator that helps to place a country's agricultural R&D spending in an internationally comparable context. In 2001, Guinea invested $0.23 for each $100 of agricultural output (Figure 6). The intensity ratio varied year to year, but declined overall during 1991–2001, once again with the termination of the World Bank projects. Not surprisingly, the Guinean ratio of 0.35 percent for 1995 was much lower than the corresponding ratios for Africa and the developing world (0.85 and 0.62 percent, respectively).

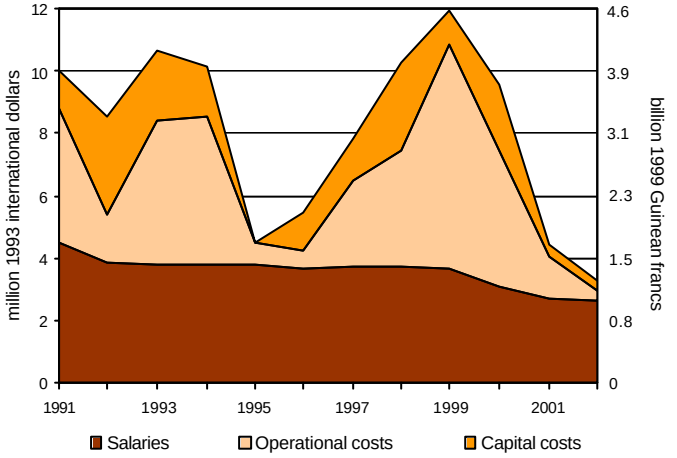
Figure 6¾ Guinea's agricultural research intensity compared regionally and globally



Sources: Guinea compiled from Figure 1b; AgGDP from World Bank 2002; other intensity ratios from Pardey and Beintema 2001.

From 1991 to 2002, wages represented 45 percent of IRAG's total expenditures on average, while operating and capital costs represented 38 and 18 percent, respectively, (Figure 7). Important fluctuations occurred throughout this period, however, largely coinciding with the completion of World Bank funding in 1995–96 and 2001–02, at which time the government assumed the payment of wages and a small share of the operating costs. PNSA financed a significant share of IRAG's operating costs along with a small share of salaries (World Bank 1996). Hence, when the World Bank funding ceased in 2000, 21 of IRAG's 32 research programs were seriously affected. France continued to finance those programs involving FAC expatriates until June 2003. Funding from other donors, however, has only made it possible for the remaining programs to continue minimal activities (fonio, banana, rice, cassava, corn, and so on). Not surprisingly, the share of operating and capital costs in IRAG's total expenditures has seriously weakened.

Figure 7¾ Cost category shares in IRAG's expenditures, 1991-2002



Source: Compiled by authors from ASTI survey data (IFPRI-ISNAR-CORAF/WECARD 2002-03).
Notes: Data include estimated salaries for expatriate staff. The salaries of the French expatriate researchers were estimated based on the method described in *Methodology* on page 8. The salaries of the North Korean and Egyptian expatriates were estimated based on the assumption that their salary levels were half those of the French expatriate staff.

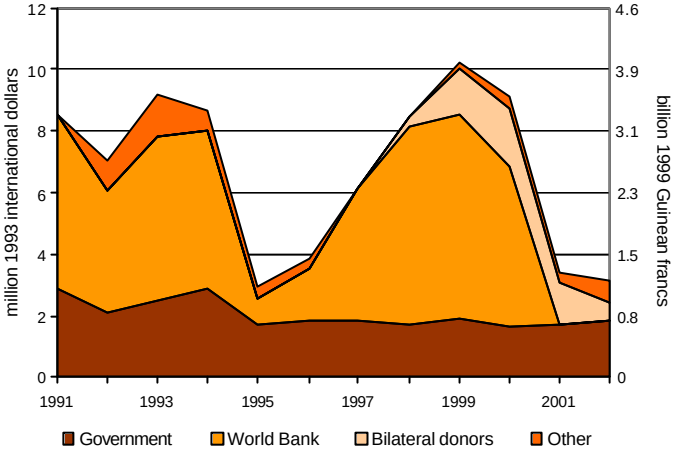
FINANCING AGRICULTURAL R&D

As already discussed, Guinean agricultural R&D was financed by the World Bank, the Government of Guinea, and FAC in the 1990s, along with a few other donors. World Bank loans accounted for 56 percent of IRAG's total funding between 1991 and 2002, with contributions from the government and other donors providing the remaining 44 percent. In addition to contributions from the Guinean government, CNSHB depended on funding from FAC, IRD, and the European Union; IPG was primarily funded by the government, although it did raise a small share of its funding internally; and LNPVDS received funding from the German Technical Cooperation (GTZ) and the Danish International Development Agency (DANIDA). IRVAG was founded in 2000 with a donation from the Government of Japan. This allowed for the construction of initial infrastructure, the purchase of breeding stock (cane rats), and basic staff training. The Guinean government now pays IRVAG's salary expenditures along with a portion of its operating costs; the balance must be self-financed. Agricultural research at Guinea's higher-education agencies is largely financed by the government, with a small share provided by European universities.

The Agricultural Research Institute of Guinea

Between 1991 and 2002, IRAG's financing was highly erratic. As mentioned earlier, total 1995 and 2001 funding levels fell by two-thirds compared with the respective preceding years because of the cessation of PSA-1 and PNSA, funded by World Bank loans (Figure 8). During the early 1990s, annual government contributions in real terms (adjusted for inflation) fluctuated considerably in the 1990s, ranging from $2.1 to $2.9 million. Since 1995, government contributions have stabilized, but at a lower level of around $1.7 million per year.

Figure 8¾ IRAG's funding sources, 1991-2002



Source: Compiled by authors from ASTI survey data (IFPRI-ISNAR-CORAF/WECARD 2002-03).

PSA-1 ran from 1990 to 1994, focusing on IRAG's infrastructure, human resources, and research activities and on agricultural extension services. The project's budget totaled US$30.9 million, co-financed by the Government of Guinea, the European Development Fund (EDF), FAC, and the International Fund for Agricultural Development (IFAD). PSA-1 allocated funding for recruitment and training of research staff as well as finance and accounting experts, and for the strengthening of links between agricultural research and extension. PSA-1 funding also supported capital expenditures such as vehicles, operating costs of research programs, and the organization of expert support missions to IRAG (World Bank 1988; Bosso 1994). The project had only limited success, largely because of significant delays in the disbursement of counterpart funding by the government. These counterpart funds represented 60 percent of the operating expenditures under PSA-1's research component during 1993–94. The holdups caused the suspension of donor funding, which seriously constrained the success of the project (World Bank et al. 1996).

PNSA began in 1996 and ran until 2000. Its principal objectives were to enhance agricultural productivity, increase farmer productivity and incomes, and create food security. PNSA's budget totaled US$90.5 million, USS$35.0 million of which was the second World Bank loan; US$26.7 million, government contributions; and US$28.8 million, assistance from

donors, including the European Union and France. PNSA comprised four components—institutional capacity building at MAE, agricultural extension, agricultural research, and animal health. The principal objective of the agricultural research component—at a base cost of US$20.4 million—was the development of a sustainable agricultural research capacity at IRAG. This capacity would be directed toward the needs of farmers through the development of appropriate technologies. This included an on-the-job training program for IRAG's researchers, with the assistance of the French development corporation (World Bank 1996). Four young researchers were given national and international training under the project. PNSA was constrained by similar funding disbursement problems as PSA-1, and IRAG received only 54 percent of its expected government counterpart funding during the 1996–2000 length of the project (World Bank 2001). The relative share of bilateral donor funding—especially from France—increased in importance after 1998. Other IRAG donors in the 1990s included the European Union, the United Nations Common Fund for Commodities (CFC), WARDA, IITA, the International Plant Genetic Resources Institute (IPGRI), and the North Korean Government.[7] IRAG received limited funds from other sources, including contributions from producer organizations or commodity sales from field produce, research findings, and plant material, but actual funding shares are unknown, though assumed to be comparatively small.[8]

IRAG's financial future remains uncertain. Since the cessation of World Bank funding on December 31, 2000, FAC became IRAG's primary donor after the Guinean government; but FAC's funding also ceased at the end of June 2003. Currently, IRAG and France are negotiating the continuation of FAC support to IRAG within the framework of the Priority Solidarity Fund (FSP). The continuation of World Bank support within the PNSA framework is also being discussed. In the interim, further funding of agricultural research is being considered in the form of two new World Bank projects—the Village Community Support Project (PACV) and the Institutional Capacity Strengthening Project (PRCI). Until details are finalized and new funding is released, IRAG's immediate future operations are seriously threatened.

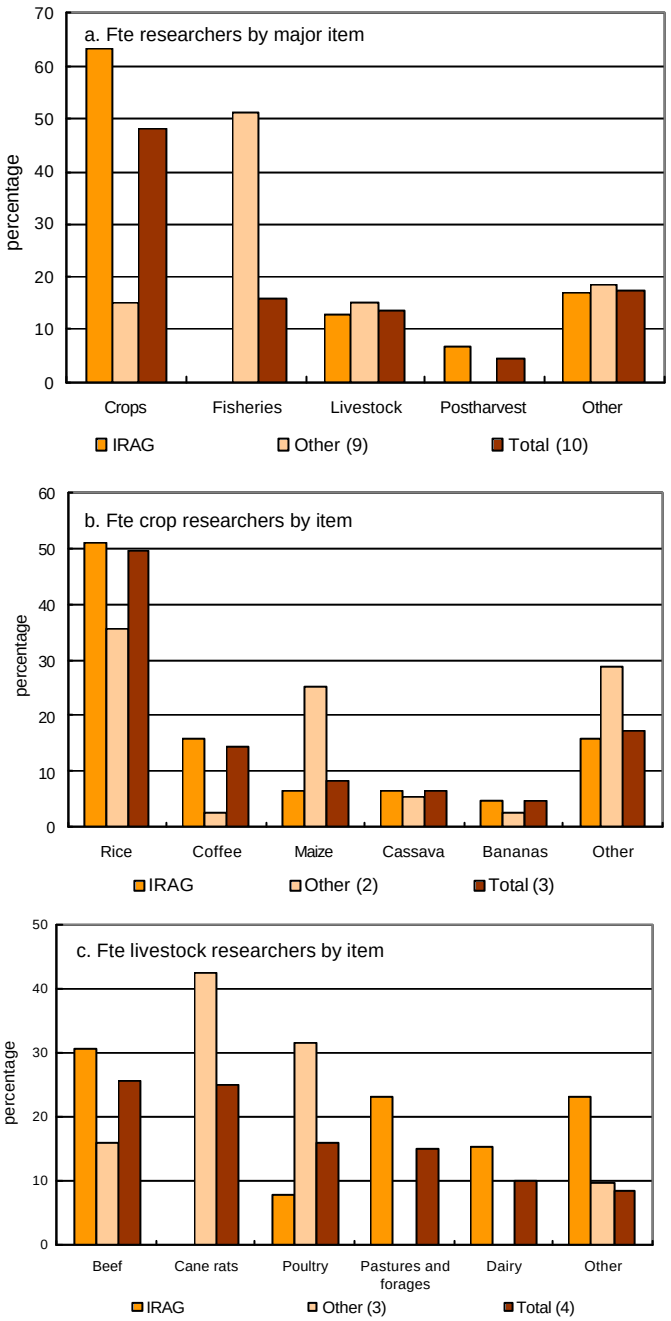
RESEARCH ORIENTATION

Commodity Focus

The allocation of resources across various lines of research is a significant policy decision; hence detailed survey information was collected on the number of fte researchers working in specific commodity and thematic areas. In 2001, close to half of the 251 fte researchers in a 10-agency sample conducted crop research (Figure 9a). Fisheries research accounted for 16 percent, livestock research for 14 percent, and postharvest research for 5 percent. IRAG's researchers spent relatively more time on crop research than their counterparts of other agencies in our sample (63 percent). CNSHB's 45 fte researchers spent approximately 90 percent of their time on research relating to fisheries, while the remaining 10 percent of their time was spent on socioeconomic research. The researchers of the 6 higher-education agencies in our sample spent relatively more time on livestock and forestry research than their counterparts at IRAG.

In 2001, half of the 121 fte crop researchers focused their research time on Guinea's principle staple food—rice (Figure 9b). Coffee, the second main crop, was the focus of 15 percent of all fte crop researchers. Other important crops included maize, cassava, bananas, and cotton, each accounting for 4 to 8 percent of total crops research. IRAG's fte livestock researchers mainly focused their efforts on beef, followed by pastures and forages, and dairy. The fte livestock researchers at the three other agencies focused on a combination of cane rats, poultry, and beef (Figure 9c).

Figure 9¾ Commodity Focus, 2001



Source: Compiled by authors from ASTI survey data (IFPRI-ISNAR-CORAF/WECARD 2002-03).
Notes: Figure 9 excludes IPG and one higher-education agency. Figures in parentheses indicate the number of agencies in each category. Figure 9b only includes agencies involved in crop research; Figure 9c only includes agencies involved in livestock research.

Thematic focus

In 2001, 47 percent of IRAG's researchers focused their activities on crop genetic improvement, 7 percent on postharvest research, and 6 percent on crop pest and disease control (Table 2). The remainder of IRAG's researchers concentrated largely on other crops, livestock, and natural resources. More than 40 percent of the fte researchers employed at the other seven agencies in our sample could not be allocated to specific research themes.

Table 2¾ Thematic focus, 2001

	Numbers of researchers		Shares	
	IRAG	Other (7)	IRAG	Other (7)
	(*in fte's*)		(*percent*)	
Crop genetic improvement	81.0	0.6	47.0	1.5
Crop pest and disease control	10.3	8.0	6.0	20.3
Other crop	24.1	3.0	14.0	7.5
Livestock genetic improvement	3.4	0.3	2.0	0.7
Livestock pest and disease control	5.2	1.3	3.0	3.4
Other livestock	10.3	8.0	6.0	20.2
Soil	1.7	0.7	1.0	1.7
Water	1.7	0.7	1.0	1.7
Other natural resources	1.7	—	1.0	—
Postharvest	12.1	—	7.0	—
Other	20.7	17.0	12.0	43.1
Total	**172.4**	**39.5**	**100**	**100**

Source: Compiled by authors from ASTI survey data (IFPRI-ISNAR-CORAF/WECARD 2002-03).
Notes: Figures in parentheses indicate the number of agencies in each category. "Other" excludes CNSHB and the two agencies under UC.

CONCLUSION

Compared with neighboring countries, agricultural R&D in Guinea is characterized by a low level of highly qualified (masters- and doctoral-level) research staff, by much lower expenditures per researcher, and by a very low support-staff-to-researcher ratio. Since the beginning of the 1990s, agricultural researcher numbers have gradually increased in Guinea, but agricultural research budgets have been erratic and strongly dependent on two consecutive projects—PSA-1 and PNSA—funded by World Bank loans, counterpart funding from the government of Guinea, and donor funding from France and the European Union. The completion of PNSA in December 2000 and of FAC funding in June 2003 has left a bleak financial situation, particularly for IRAG, which has been forced to dramatically cut research activities of 21 out of its 32 research programs. Without new donor projects or funding from producer organizations or private enterprises, the Guinean government will have to substantially increase its funding to IRAG if it wants IRAG to survive this severe financial crisis.

NOTES

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2. The 12-agency sample consisted of:
   - Five government agencies/units: *Institut de Recherche Agronomique* (IRAG), *Centre National des Sciences Halieutiques de Boussoura* (CNSHB), *Institut de Recherche et Vulgarisation de l'Aulacodiculture en Guinée* (IRVAG), *Institut Pasteur de Guinée* (IPG), and the *Laboratoire National de Protection des Végétaux et des Denrées Stockées* (LNPVDS); and
   - Seven higher-education agencies: *Département des Eaux, Forêts et Environnement*, *Département d'Agriculture*, *Département d'Économie Rurale*, *Département de Génie Rural*, and *Département d'Élevage-Médecine Vétérinaire*, all of which are part of *Institut Supérieur Agronomique et Vétérinaire Valéry Giscard d'Estaing* (ISAV), *Centre d'Étude et de Recherche en Environnement* (CERE) and *Département de Biologie* of *the Faculté des Sciences*, both part of *Université Gamal Abdel Nasser de Conakry* (UC).
3. Unless otherwise stated, all data on research expenditures are reported in 1999 Guinean francs or in 1993 international dollars.
4. English translations of institute names have been used throughout the brief except in footnote 2, where the original French is provided.
5. Researchers at these three government agencies spent between 30 and 60 percent of their time on agricultural research.
6. Data are calculated as least square growth rates.
7. North Korea completely financed the construction of offices and residences for its researchers, their laboratory equipment, the installation of hydro-agricultural works, a hydroelectric dam, and agricultural machinery. The total cost of these in-kind investments is unknown.
8. A future publication on IRAG's own revenue management will provide more specific details on these contributions.

METHODOLOGY

- Most of the data in this brief are taken from unpublished surveys (IFPRI, ISNAR, and CORAF/WECARD 2002-03).
- The data were compiled using internationally accepted statistical procedures and definitions developed by the OECD and UNESCO for compiling R&D statistics (OECD 1994; UNESCO 1984). We grouped estimates using three major institutional categories—government agencies, higher-education agencies, and business enterprises, the latter comprising the subcategories private enterprises and nonprofit institutions. We defined public agricultural research to include government agencies, higher-education agencies, and nonprofit institutions, thereby excluding private enterprises. Private research includes research performed by private-for-profit enterprises developing pre, on, and postfarm technologies related to agriculture.
- Agricultural research includes crops, livestock, forestry, and fisheries research plus agriculturally related natural resources research, all measured on a performer basis.
- Financial data were converted to 1993 international dollars by deflating current local currency units with a Guinean GDP deflator of base year 1993 and then converting to U.S. dollars with a 1993 purchasing power parity (PPP) index, both taken from World Bank (2003). PPPs are synthetic exchange rates used to reflect the purchasing power of currencies, typically comparing prices among a broader range of goods and services than conventional exchange rates.
- The salaries and living expenses of many expatriate researchers working on donor-supported projects are paid directly by the donor agency and are often excluded in the financial reports of the agricultural R&D agencies. These *implicit* costs have been estimated using the average cost per researcher in 1985 to be $160,000 1993 international dollars and backcast this figure using the rate of change in real personnel costs per fte researcher in the US state agricultural experiment station system. This extrapolation procedure has the assumption that the personnel-cost trend for US researchers is a reasonable proxy of the trend in real costs of internationally recruited staff in the agricultural R&D agencies.

See the ASTI website (http://www.ASTI.cgiar.org) for more details on methodology.

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