

NEPAL

RECENT DEVELOPMENTS IN PUBLIC AGRICULTURAL RESEARCH

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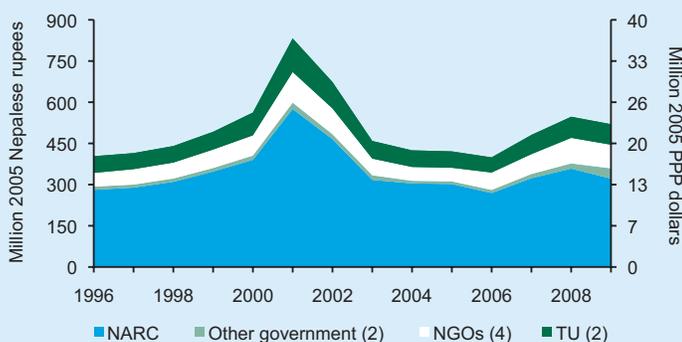
LONG-TERM INVESTMENT AND CAPACITY PATTERNS IN PUBLIC AGRICULTURAL R&D

The vast majority of Nepal's population—80 percent of whom live in rural areas—derives their livelihood from agriculture. Despite a decrease in recent years, agriculture's contribution to gross domestic product (GDP) still amounts to one-third. The national government stresses the importance of agriculture to the national economy and food security; however, several decades of uneven institutional development has resulted in an inefficient agricultural research system that suffers from instability and uncertainty (NARC 2010). The completion of the World Bank-financed Agricultural Research and Extension Project (AREP) in 2002 prompted an overall decline in agricultural research and development (R&D) expenditures in Nepal. Levels rebounded somewhat after the 2006 signing of the Comprehensive Peace Accord, but they remain below the levels recorded around the turn of the millennium. In 2009, Nepal invested 520 million Nepalese rupees or 23 million purchasing power parity (PPP) dollars in agricultural R&D (both in constant 2005 prices) (Figure 1; Table 1). Note that, unless otherwise stated, all dollar values in this note are based on PPP exchange rates, which reflect the purchasing power of currencies more effectively than do standard exchange rates because they compare the prices of a

Key Trends Since 2003

- The Nepal Agricultural Research Council (NARC) is the country's main agricultural research and development (R&D) agency, accounting for almost three-quarters of total research capacity and more than 60 percent of agricultural R&D expenditures in 2009.
- The 2002 completion of the World Bank-financed Agricultural Research and Extension Project (AREP) prompted declines in agricultural research spending, but levels slowly began to recover after 2006 based on increased national government support.
- With the cessation of a five-year hiring freeze, agricultural R&D capacity at NARC substantially increased during 2010.
- In contrast with many developing countries worldwide, nongovernmental organizations (NGOs) play a relatively important role in agricultural R&D in Nepal.

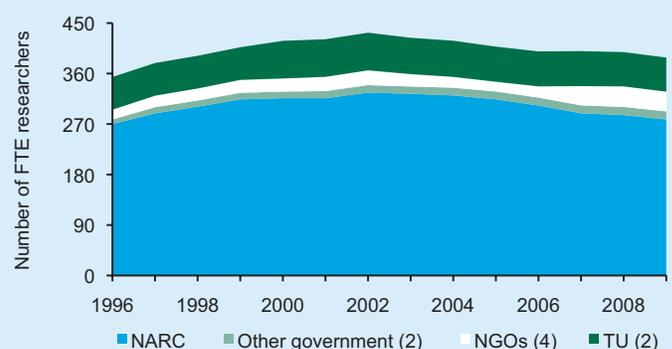
Figure 1—Public agricultural R&D spending adjusted for inflation, 1996–2009



Sources: ASTI–NARC 2010–11; Stads and Shrestha 2006.

Notes: Figures in parentheses indicate the number of agencies in each category. The agency sample includes one nonprofit agency, New Era, which discontinued its agricultural research activities in 2006. For more information on coverage and estimation procedures, see the Nepal country page on ASTI's website at asti.cgiar.org/nepal.

Figure 2—Public agricultural research staffing in full-time equivalents, 1996–2009



Sources: ASTI–NARC 2010–11; Stads and Shrestha 2006.

Notes: Figures in parentheses indicate the number of agencies in each category. The agency sample includes one nonprofit agency, New Era, which discontinued its agricultural research activities in 2006.

Table 1—Overview of public agricultural R&D spending and research staffing levels, 2009

Type of agency	Total spending			Total staffing	
	Nepalese rupees (million 2005 prices)	PPP dollars	Shares (%)	Number (FTEs)	Shares (%)
NARC	321.8	14.2	61.9	278.0	71.5
Other government (2)	37.4	1.7	7.2	14.5	3.7
NGOs (3)	86.2	3.8	16.6	35.3	9.1
TU (2)	74.6	3.3	14.4	60.8	15.6
Total (8)	520.0	23.0	100	388.6	100

Sources: ASTI–NARC 2010–11; Stads and Shrestha 2006.

Note: Figures in parentheses indicate the number of agencies in each category.

broader range of local—as opposed to internationally traded—goods and services.¹

In terms of human resource capacity, the number of agricultural researchers employed in Nepal peaked at 433 full-time equivalents (FTEs) in 2002, contracting somewhat to 389 FTEs in 2009 (Figure 2; Table 1). This overall decline was largely a response to the country’s unstable political situation, which prompted both a hiring freeze and the loss of scientists seeking better opportunities abroad. Researcher numbers grew substantially in 2010 after the hiring freeze was lifted.

The Nepal Agricultural Research Council (NARC) is the principal agricultural R&D agency, accounting for more than 60 percent of the country’s total agricultural research expenditures and more than 70 percent of agricultural research capacity in 2009. NARC was established in 1991 under the Ministry of Agriculture and Cooperatives (MoAC). It conducts research related to crops, livestock, aquaculture, natural resources, postharvest, climate change, agro economics and marketing, and it assists the national government in formulating agricultural policies (NARC 2010 and 2011). NARC is headquartered in Kathmandu and operates 4 regional agricultural research stations, 13 agricultural research stations, and 15 commodity research programs distributed across the country’s various agroecological zones. NARC operates two research institutes—the National Agriculture Research Institute (NARI) and the National Animal Science Research Institute (NASRI)—both located just outside Kathmandu in Lalitpur and comprising 17 research divisions, 3 research units, and a gene bank. Under the aforementioned World Bank project AREP (1998–2002), NARC benefited from a large influx of funding, but expenditure levels dropped sharply thereafter and have only rebounded modestly since 2006. In 2009, NARC spent 322 million Nepalese rupees or 14 million PPP dollars on agricultural R&D (both in constant 2005 prices). With the cessation of the long-term hiring freeze, NARC recruited 70 new scientists in 2010, most of whom were recent university graduates. The recruitment drive is expected to continue for the next five years. Preliminary data indicate that, along with the increase in agricultural research staffing at NARC, expenditures also rose during 2010. NARC also employs a large number of degree-qualified technicians who are not officially classified as researchers. Of the 101 FTE technicians employed by NARC in 2009 (down from 127 FTEs in 2003), 2 held PhD degrees, 16 held MSc degrees, and 83 held BSc degrees.

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 More details on institutional developments in agricultural research in Nepal are available in the 2003 country brief at asti.cgiar.org/pdf/NEPAL_CB37.pdf.

 Underlying datasets can be downloaded using ASTI’s data tool at asti.cgiar.org/data.

 A list of the 3 government, 4 nonprofit, and 2 higher education agencies included in this brief is available at asti.cgiar.org/nepal/agencies.

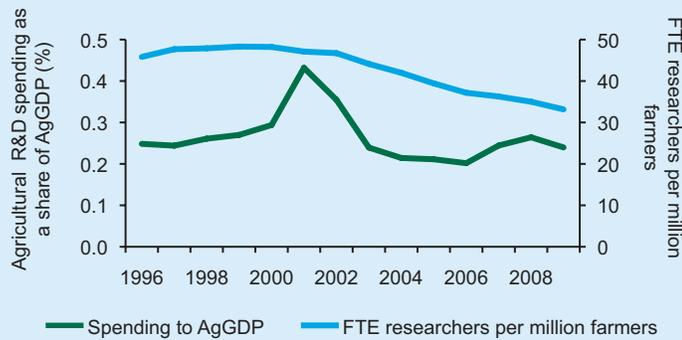
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Two other government agencies, the Nepal Academy of Science and Technology (NAST), previously known as the Royal Nepal Academy of Science and Technology (RONAST), and the Department of Forest Research and Survey (DFRS) undertake agricultural R&D in Nepal, accounting for a combined share of 4 percent of agricultural R&D capacity and 7 percent of agricultural R&D spending in 2009. NAST is administered by the Ministry Science and Technology (MOST) and employed 13 FTE agricultural researchers in 2009. NAST maintains close linkages with NARC, and the two agencies share some facilities. NAST’s involvement in agricultural research is confined to areas in which NARC has limited expertise. Most of its research focuses on areas such as biofertilizers, biopesticides, and molecular studies. DFRS, under the Ministry of Forest and Soil Conservation (MFSC), comprises two divisions. The Forest Research Division is heavily engaged in forestry research and management, while the Forest Survey Division generates statistics and data inputs for national, regional, and district-level planning of forestry development (DFRS 2011). DFRS employed 2 FTE agricultural researchers in 2009.

Compared with many other countries in South Asia, nongovernmental organizations (NGOs) play a relatively important role in Nepalese agricultural R&D, and their role has expanded in recent years. In 2009, NGOs accounted for 17 percent of Nepal’s agricultural R&D spending, up from 12 percent in the late-1990s. The largest of the three NGOs involved in agricultural R&D in Nepal is the Local Initiatives for Biodiversity, Research and Development (LI-BIRD). Based in Pokhara, LI-BIRD employed 32 FTE agricultural researchers. LI-BIRD’s goal is to reduce poverty and improve social justice through participatory approaches to R&D. It conducts agricultural R&D in three areas: natural resources, biodiversity, and ecosystem services. One way in which LI-BIRD has promoted innovative participatory approaches is by creating four awards for exceptional performance in agricultural R&D by farmers or farmer groups (LI-BIRD 2011).

The other two NGOs operating in Nepal are the Forum for Rural Welfare and Agricultural Reform for Development (FORWARD), which employed 2 FTE researchers in 2009, and the Center for Environmental and Agricultural Policy Research and Development (CEAPRED), which employed 1 FTE. Established in 1996 and

Figure 3—Intensity of agricultural research spending and capacity, 1996–2009



Sources: Calculated by authors from ASTI–NARC 2010–11, Stads and Shrestha 2006, FAO 2011, and World Bank 2011.

Note: Farmers are defined as economically active agricultural population according to FAO.

based in Chitwan, FORWARD is committed to helping the rural poor and addressing social inequity. FORWARD’s agricultural R&D component utilizes a participatory approach and includes R&D related to crops and technology dissemination (FORWARD 2011). CEAPRED conducts research on climate change, sustainable livelihoods, and environmental policy. The center’s policy research serves as an important input into the government’s decisionmaking processes. One additional NGO, New Era, ran strong agricultural R&D programs in the 1980s and 1990s, but shortly after the turn of the millennium its focus shifted to education, health, nutrition, and socioeconomic (New Era 2009).

Tribhuvan University (TU) is the only higher education agency involved in agricultural R&D in Nepal. In 2009, the university’s Institute of Agriculture and Animal Science (IAAS) and Institute of Forestry (IOF) employed a combined total of 61 agricultural researchers in FTEs, accounting for 16 percent of all agricultural researchers in Nepal. Research at IAAS focuses on crops, livestock, and fisheries, whereas IOF, unsurprisingly, focuses on forestry.

The only private company identified as performing agricultural R&D is a livestock feed company, Probiotech Industries Pvt. Ltd. Its R&D activities are said to be minimal, however, and due to a lack of data the company is excluded from the analysis in this country note.

In 2009, Nepal’s agricultural research intensity—that is, R&D spending as a ratio of agricultural output (AgGDP), which is a useful indicator of comparative investment in agricultural research across countries—was \$0.26 for every \$100 of AgGDP. AREP was responsible for a slight increase in the ratio in 2001 (to \$0.43), but with its completion the ratio returned to levels similar to those recorded in the late-1990s (Stads and Shrestha 2006) (Figure 3). The number of FTE researchers per farmer, another comparative indicator of R&D intensity, followed a declining trend. In 2009, for every one million farmers, the country employed 33 agricultural researchers in FTEs, down from almost 50 FTEs in the late-1990s.

INSTITUTIONAL STRUCTURE AND POLICY ENVIRONMENT

The structure and institutional composition of Nepal’s agricultural research system has changed little since the turn of the millennium. Nevertheless, the Maoist insurgency, which lasted from 1996 to

2006, had a significant impact on research activities in the country’s more remote areas. Some of the destroyed research stations in these areas have only recently begun to be rehabilitated.

The Government of Nepal recognizes the importance of agricultural R&D to its development goals and strategies. The policy foundation for investment in public agricultural R&D is well documented in the Agricultural Perspective Plan, Nepal Agriculture Policy, and Three-Year Interim Plan. Despite the government’s commitment to the development of a strong national agricultural research system, instability at the ministerial level has been a major challenge (NARC 2010). Although various relevant policies have been put in place over the years, their implementation has often been weak. One major impediment is the fact that over the past few years the country has had a different Minister of Agriculture every few months, making long-term planning extremely difficult and decisionmaking processes unclear. Additionally, MOST, established in 1999/2000, remains weak in power and influence. Although the government has approved the NAST recommendation that 1 percent of Nepal’s GDP be invested in science and technology (S&T), whether this goal will actually be achieved in the near future remains to be seen.

According to its Strategic Vision for Agricultural Research (2011–2030), NARC is rationalizing its research program under five broad-based thematic areas: crops and horticulture; livestock and fisheries; natural resources management and climate change; biotechnology; and outreach, technology dissemination, and extension. Along with this consolidation, NARC is proposing a host of internal reforms including structural reorganization and the strengthening of coordination with the national government and donors (NARC 2010). MoAC has suggested a few revisions to NARC’s Strategic Vision based on recent changes within the country; it will then be submitted for final approval by the national government.

HUMAN RESOURCE TRENDS

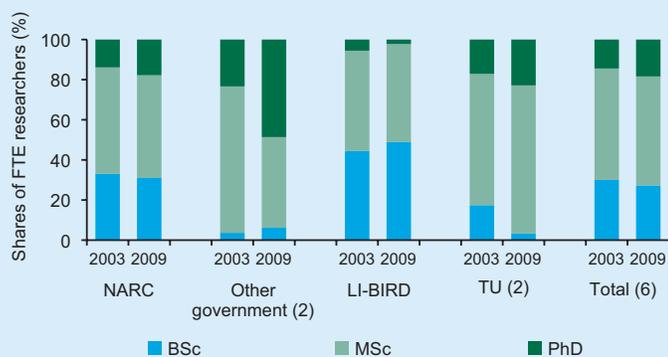
Despite a decline in the number of FTE researchers employed in Nepal during 2003–09, qualification levels improved somewhat during this timeframe. Of the researchers employed in 2009,

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-  Detailed definitions of PPPs, FTEs, and other methodologies employed by ASTI are available at asti.cgiar.org/methodology.
-  The data in this brief are predominantly derived from surveys. Some data were estimated. More information on data coverage is available at asti.cgiar.org/nepal/datacoverage.
-  More relevant resources on agricultural R&D in Nepal are available at asti.cgiar.org/nepal.

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Figure 4—Degree qualifications of researchers by institutional category, 2003 and 2009



Sources: ASTI–NARC 2010–11; Stads and Shrestha 2006.

Notes: Figures in parentheses indicate the number of agencies in each category. Data are for researchers only and therefore exclude 2 PhD-qualified, 16 MSc-qualified, and 83 BSc-qualified technicians employed at NARC and 1 BSc-qualified technician employed at TU in 2009; 2003 data exclude 25 MSc-qualified and 102 BSc-qualified technicians employed at NARC.

18 percent were PhD-qualified, compared with 14 percent in 2003. Offsetting this shift, the share of MSc-qualified researchers declined slightly, from 56 percent in 2003 to 54 percent in 2009 (Figure 4).

Age data by degree indicate that 68 percent of PhD-qualified Nepalese researchers are over the age of 50 and thus approaching retirement (ASTI–NARC 2010–11). As previously mentioned, since the 2010 cessation of the recruitment freeze, NARC has recruited 70 scientists who recently graduated with BSc degrees. This large influx of junior researchers combined with the existing pool of aging senior scientists has left NARC with a distinct age gap in its research capacity. As of 2009, 44 percent of NARC’s scientists were 50 years or older and due to retire within the next 10 years. Given this reality, training and mentoring of the junior scientists is an urgent priority. TU faces an even more pressing problem given that, as of 2009, two-thirds of its agricultural researchers were 50 years or older. A slightly higher retirement age (63 years compared with 60 years at NARC) provides a mitigating factor, but the situation remains serious.

Official training opportunities at NARC are limited. The Nepalese government offers around 10 scholarships for postgraduate (MSc and PhD) training at TU per year. Since 2007, TU has provided PhD training in most of the agricultural sciences, so Nepalese scientists no longer need to travel abroad to obtain PhD degrees. Nevertheless, the relatively recent establishment of TU’s PhD programs means that the quality of some falls below international standards. In addition to receiving official, government-sponsored training, about 20 scientists at NARC per year secure independent grants for degree-level training abroad. Most of these opportunities are at universities in Australia, China, Germany, Israel, the Netherlands, the United Kingdom, and the United States. The International Rice Research Institute (IRRI) has been a major supporter of PhD training in recent years. Seven NARC scientists received IRRI grants to pursue a PhD at TU in 2010.

As of 2011, NARC has more than 400 vacancies for scientists and technical officers. Filling vacancies in areas such as plant pathology and soil science has proven to be particularly difficult because many applicants have failed to pass NARC’s mandatory entrance examination.

The situation at NAST is similar. The academy has many vacancies and finds it particularly difficult to attract qualified personnel in the areas of disease control, postharvest technology, and biopesticides. Part of this challenge stems from the fact that, unlike the universities and NGOs, as government agencies NAST and NARC are unable to offer competitive salary packages and have consequently lost scientists who have sought more lucrative opportunities abroad. Salaries at CEAPRED, for instance, were reportedly much higher than those offered by NARC in 2009, and attempts by NARC to improve its salary levels and incentives were rejected by the Ministry of Finance.

Average degree levels at the NGOs were much lower than those at the government agencies and TU. Scientists employed at the NGOs only have access to short-term training and rarely receive higher degrees. Most of the research staff at NGOs work in the field and are qualified to the BSc or equivalent level only. Furthermore, scientists employed at the NGOs were much younger than at the government and higher education agencies. In 2009, only 28 and 24 percent of the agricultural researchers employed at LI-BIRD and FORWARD, respectively, were 50 years or older.

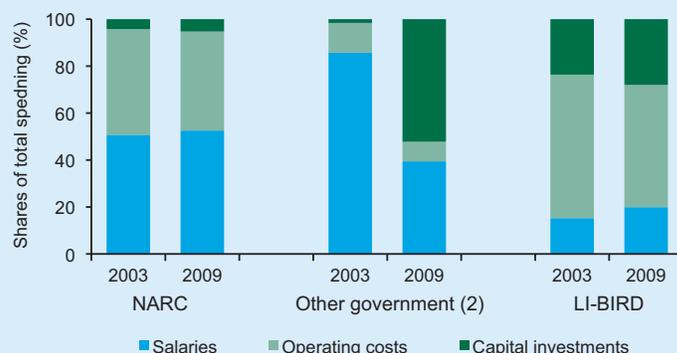
Women remain severely underrepresented in Nepalese agricultural R&D. In 2009, of the agricultural researchers for which gender data were available, only 10 percent were female (ASTI–NARC 2010–11), which represents only a slight increase over the 2003 level of 9 percent (Stads and Shrestha 2006). The 2009 support-staff-to-researcher ratio averaged 3.1, comprising 1.9 technical support staff; 0.6 administrative support staff; and 0.5 other staff members, including laborers, guards, drivers, and so on. This overall ratio represents a slight decrease from the ratio of 3.8 recorded in 2003 (ASTI–NARC 2010–11).

INVESTMENT TRENDS

Cost Categories

The allocation of research budgets across salaries, operating costs, and capital investments affects the efficiency of agricultural R&D, so detailed cost category data were collected from the government agencies and NGOs as part of this study (Figure 5). Large differences were recorded across agencies, however. While NARC allocated 53 percent of its research budget to salaries in 2009 and 5 percent to capital expenditures, LI-BIRD allocated just 20 percent of its research budget to salaries and 28

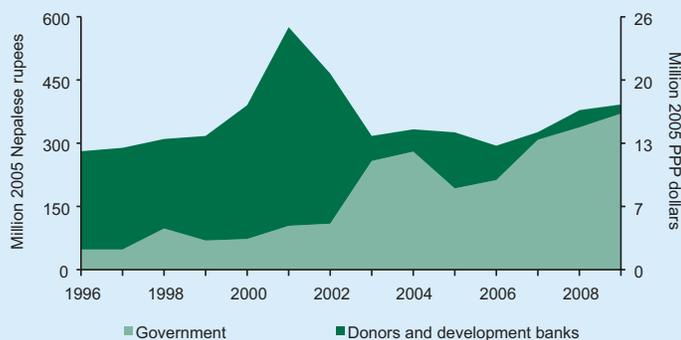
Figure 5—Cost-category shares across agencies, 2003 and 2009



Source: ASTI–NARC 2010–11.

Note: Cost-category data were not available for FORWARD and CEAPRED.

Figure 6—Funding sources of NARC, 1996–2009



Sources: ASTI–NARC 2010–11; Stads and Shrestha 2006.

percent to capital expenditures. In 2009, a sharp increase in capital expenditures occurred at other government agencies as a result of the construction of a new laboratory at NAST.

Funding Sources

During 1996–2002, NARC was heavily dependent on donor and development bank funding, mostly through the World Bank–financed AREP (1998–2002). The primary goal of this project was to strengthen Nepal’s agricultural research agencies by improving information systems management, priority setting, monitoring, and evaluation; developing human resources through training and the introduction of a reward system based on results and performance; and expanding on-farm adaptive research in response to farmers’ needs. The research component also supplied capital upgrades to facilities equipment and working capital (Stads and Shrestha 2006). With the conclusion of AREP in 2002, the national government increased its contributions to NARC. As a result, 83 percent of NARC’s funding during 2003–06 was derived from the government, and donors and development banks only contributed 17 percent (Figure 6). The Nepalese government has committed to continue to support NARC with yearly funding increases of 10 to 20 percent; however, these increases do not always keep pace with inflation. Furthermore, the Nepalese government only funds the salaries of NARC researchers and a small percentage of capital expenditures. The same is true at NAST, where the majority of funding was provided by the national government during 2003–09. Consequently, researchers at these agencies are compelled to seek support for their research activities from outside donors.

The NGOs’ funding portfolios were more diverse compared with those of the government agencies. LI-BIRD receives the majority of its funding from donors but also generates some internal funding by selling seed. LI-BIRD often funds its current research activities using internal or core funds that are subsequently reimbursed by donors. Some of the agency’s major donors include the UK Department for International Development (DFID), the International Fund for Agricultural Development (IFAD), the International Plant Genetics Research Institute (IPGRI), and the government of the Netherlands. CEAPRED and FORWARD are also almost exclusively donor-funded, but CEAPRED generates some funds internally by selling seed and conducting contract-based research. CEAPRED

reported funding from the United States Agency for International Development (USAID), the Swiss Development Cooperation (SDC), DFID, the Bill and Melinda Gates Foundation, German Development Cooperation (GTZ), and the Danish International Development Agency (Danida).

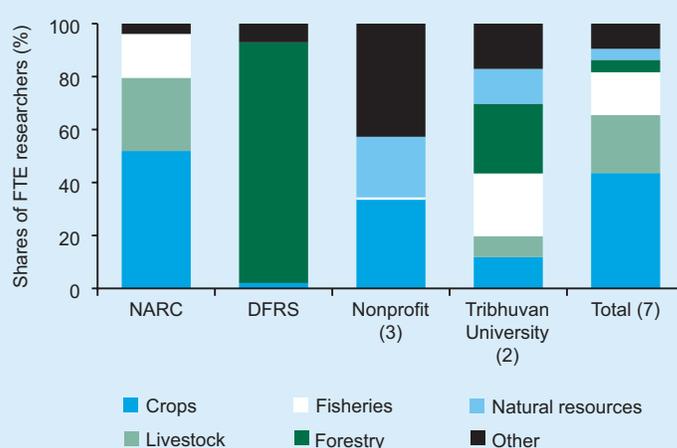
The National Agricultural Development Fund (NARDF) under MoAC is a competitive grant scheme for agricultural R&D that was founded in 2001. During 2001–09, NARDF was funded by DFID and the Asian Development Bank (ADB) to a total value of 10 million Nepalese rupees per year (in current prices). Since 2009, NARDF has been funded solely by the government, but its overall budget has fallen to around 6 to 7 million rupees per year. NARDF accepts proposals from government agencies, NGOs, and the private sector; funds between 20 to 25 projects per year; and prioritizes collaborative proposals. Project proposals can be in the amount of 1, 2, or 3 million Nepalese rupees, and projects must be completed within three years. NARDF only funds research activities and some small capital expenses.

ALLOCATION OF RESEARCH ACROSS COMMODITIES

Given that the allocation of resources across various lines of research is a significant policy decision, detailed information was collected on the number of researchers working in specific commodity and thematic areas (in FTEs). In 2009, 44 percent of the country’s agricultural researchers focused on crops, 22 percent focused on livestock, 16 percent focused on fisheries, and 5 percent focused on forestry (Figure 7).

Vegetables are the most heavily researched crops at NARC, accounting for 15 percent of the FTE researchers involved in crop and livestock research in 2009 (ASTI–NARC 2010–11). Other important crops at NARC include rice (11 percent), wheat and maize (8 percent each), and fruits (7 percent). Beef is the most researched livestock item in Nepal, accounting for 15 percent of FTE researchers at NARC that were involved in crop and livestock research in 2009, followed by sheep and goats (8 percent), and poultry (6 percent).

Figure 7—Research focus by major commodity area, 2009



Source: ASTI–NARC 2010–11.

Notes: Figures in parentheses indicate the number of agencies in each category. Data were not available for NAST.

CONCLUSION

The 2002 completion of AREP, a World Bank–financed project, led to a sharp decline in Nepal’s agricultural R&D investment levels. Although spending rebounded somewhat during 2003–09, total agricultural R&D expenditures remain below the levels recorded around the turn of the millennium. In 2009, the country invested 520 million Nepalese rupees or 23 million PPP dollars in agricultural R&D (both in constant 2005 prices), or just 0.24 percent of its AgGDP that year. The country’s total number of agricultural researchers has also declined over time, largely due to the combined effect of a long-term hiring freeze and the loss of scientists seeking better opportunities abroad. Years of no recruitment have left NARC with a rapidly aging pool of scientists and numerous vacant positions.

Despite past and present challenges, the Government of Nepal recognizes the importance of agricultural R&D for the nation’s development, as highlighted in a number of important policy documents, but instability at the ministerial level continues to pose a major challenge. The government has prioritized agricultural R&D by committing to increase its contributions to NARC by 10 to 20 percent per year, and preliminary data indicate progress in this regard. In addition, NARC has recruited 70 BSc-level scientists since 2010, easing some of its acute capacity challenges. Training and mentoring of these newly recruited scientists will be a major priority in the coming years, as a significant proportion of NARC’s senior scientists are approaching retirement age.

Five years after the signing of the Comprehensive Peace Accord, Nepal’s political climate remains fragile. Both MoAC and MOST lack the power, capacity, and continuity to set the country’s long-term agricultural R&D agenda and to ensure that sufficient resources are available for research. The country needs to put effective and efficient policy implementing bodies and instruments for agricultural R&D in place if it is to succeed in enhancing smallholder production, cutting (rural) poverty, and competing in a global market.

NOTE

¹ Financial data in current local currencies or constant 2005 U.S. dollars are also accessible via ASTI’s data tool, available at <<http://www.asti.cgiar.org/data>>.

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IFPRI-ROME

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IFPRI is one of 15 agricultural research centers that receive their principal funding from governments, private foundations, and international and regional organizations, most of which are members of the Consultative Group on International Agricultural Research (www.cgiar.org).

NARC is the apex body for guidance and coordination of agricultural research activities in Nepal. The organization was established in 1991 and falls under the administrative coordination of the country’s Ministry of Agriculture and Cooperatives. The organization holds a broad mandate covering crop, livestock, aquaculture, natural resources, postharvest, climate change, and agro economics research. To learn more about NARC visit <http://narc.gov.np>.

The Agricultural Science and Technology Indicators (ASTI) initiative compiles, analyzes, and publishes data on institutional developments, investments, and human resources in agricultural R&D in low- and middle-income countries. The ASTI initiative is managed by the International Food Policy Research Institute (IFPRI) and involves collaborative alliances with many national and regional R&D agencies, as well as international institutions. The initiative, which is funded by the Bill & Melinda Gates Foundation with additional support from IFPRI, is widely recognized as the most authoritative source of information on the support for and structure of agricultural R&D worldwide. To learn more about the ASTI initiative visit www.asti.cgiar.org.

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