

PENNSTATE



C O L L E G E O F

Agricultural Sciences

Strategic Plan 2008–2013



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EXECUTIVE SUMMARY

Penn State's 2008–2013 planning cycle encompasses a momentous occasion: the sesquicentennial of the 1862 Morrill Act, the federal legislation that created the land-grant university ideal and reality. This daring concept has led to a nationwide system of colleges and universities that create new knowledge, translate that knowledge into solutions to practical problems, and educate citizens for today and tomorrow while remaining relevant 150 years later. The world has not stood still in the interim, however, so we must build from the strengths of our history while embracing new challenges and opportunities to sustain our relevance into the next 150 years.

The College of Agricultural Sciences at Penn State has an international reputation for providing leading research and resident and extension education programs. We continue to be a leader for change and a place for students, faculty, and staff to be innovators for the future as part of our land-grant university in the twenty-first century. Building from this reputation, our planning recognizes several key issues.

As the food, fiber, fuel, and natural resources systems continue to become more complex and more global, providing Pennsylvania residents with access to world-class information is not a luxury but a necessity. While fewer than 2 percent of Americans farm for a living, every individual is a consumer of our agricultural systems' products. We have held a production-based focus for much of our history; now we must embrace a consumer-driven perspective to complement our expertise in production.

The agricultural system is challenged to enhance the production of food, fiber and fuel while contributing to the protection and enhancement of our natural resources and improving the quality of life for citizens everywhere. These are complex goals that are best addressed through systems thinking. The systems that provided the foundation for our college's 2005–2008 strategic plan (food and fiber, ecosystems, and socioeconomic systems) remain highly relevant as organizing principles for our decisions.

The operational decisions we make, the knowledge we generate, and the education we conduct based on that knowledge must be sustainable. Our internal system must continue



to support research and education in the face of financial resources that are not keeping pace with costs. Our focus on applying research results to the classroom, the Commonwealth, and beyond must embrace the need for sustainable solutions that unite the best science with informed policy, economic realities, a global perspective, and the ethical use of natural resources.

Our 2008–2013 plan identifies five strategic initiatives: entrepreneurship; pest prediction and response; water; energy; and food, diet, and health. These initiatives, identified through a highly participatory process that drew on internal and external stakeholder input, were chosen especially for their congruence with the systems approach at the heart of our 2005–2008 plan and the four goals we established therein: increase student enrollment and enhance student success; enhance knowledge discovery and translation; strengthen communication with and education of stakeholders; and lead and manage the college as a system.

These new strategic initiatives further our aim to implement our current goals and represent critical topics at the intersection of our three systems. Of greatest importance is that failure to progress in these initiatives could have a negative impact on the sustainability of our agricultural systems, our

natural resources base, and citizens' socioeconomic well-being. Four new challenges emerged from the discussions that generated this plan.

First is the need to prioritize. The identified strategic initiatives represent topics at the intersection of our expertise and key stakeholder needs. However, investment in new opportunities necessarily requires the reallocation of resources from other areas.

Second is the recognition that excellence will emerge from interdisciplinary and multifunctional approaches to problem solving. While nothing in our history precludes working in teams, we must continue to build a culture of collaboration. Considering the complex nature of the initiatives we have identified and that systems thinking is required, sustainable solutions will emerge from the contributions of many.

Third, we must continue to establish networks to be successful. A network is more than interdisciplinary and multifunctional collaboration—it is the identification of meaningful interactions, both at home and abroad, with the private sector; consumers of products, services, and natural resources; and policymakers. Such global networks will lead to identification of the most critical questions, the availability of resources to address those questions, and the communication of sustainable, science-based solutions to our stakeholders.

Fourth, we must embrace public education. We do an excellent job of educating the next generation through our classrooms, and our established stakeholders recognize the excellence of our extension programming. Our college speaks to all sectors of society through their food and the environment they experience, but most citizens have a decreasing understanding of the source of those products and services. To implement sustainable solutions, we must focus on educating society about the relevance of agriculture to their daily lives.

This strategic plan provides a framework that can guide our thinking as we seek sustainable solutions to some of society's most pressing problems. Our thinking is complex enough that it provides a rich context for creative solutions to both research and educational challenges. It is also sufficiently

simple to allow nimble reaction to a changing world while serving as a tool for operational decisions that facilitate success in achieving our goals.

The guiding philosophy behind the Morrill Act and additional legislation that subsequently extended the reach of the land-grant colleges and universities still remains vibrant today. Moreover, in today's multicultural and global world, the need for appropriately translating and extending new knowledge to citizens everywhere is the key to sustaining our quality of life and addressing how we can help those who aspire to improve their current situations.

Our focus on the food and fiber system, the ecosystems in which those products are produced, and the socioeconomic systems that give value to all these elements defines our unique niche and reinforces the relevance of our mission as we enter the next 150 years. Our research will discover solutions that sustain food and energy supplies, protect and enhance natural resources, and revitalize economies and communities in Pennsylvania and beyond. Our educational programs—resident education at both the undergraduate and graduate levels and extension education for our diverse audiences—will produce leaders who demonstrate not only scientific and technical excellence but also skills in critical thinking, and communication, all packaged within an entrepreneurial spirit. With this vision, we can be a transforming force in society.



STRATEGIC CHALLENGES AND STRATEGIC ADVANTAGES

Historically, agriculture played an important role in the development and identity of the land-grant university system. Today, according to USDA CSREES, fewer than 2 percent of Americans farm for a living. Because our food system is characterized by complex interactions among public and private sectors, small and large agricultural businesses, and local and global food markets, questions about the future of food safety and quality; plant, animal, and human health protection; sustainable environments and renewable energy; nutrition and wellness; and community and economic development present both challenges and opportunities for land-grant colleges of agriculture.

Driven by the land-grant based mission to create, analyze, and share knowledge that improves the lives of people in Pennsylvania, the nation, and the world, the College of Agricultural Sciences is committed to public scholarship and community engagement. Acknowledging that social, economic, and political changes necessitate a reexamination of how we engage with and serve our stakeholders, our approach to teaching, research, and extension/outreach is organized around three interrelated systems: food and fiber system, ecosystem, and socioeconomic system. The relationships among these three systems provide both challenges and opportunities for land-grant institutions that have identified primarily with production agriculture. We believe that the College of Agricultural Sciences occupies a unique niche to identify science-based solutions to continue to carry out the mission of land-grant colleges and ensure the future vitality of the food system.

Through benchmarking, constituent feedback, market analysis and other assessment data, we have identified current internal and external challenges and opportunities that cut across programs. These challenges and opportunities can be broadly classified as four action themes: identifying priorities, promoting interdisciplinary and multifunctional work, developing networks, and educating the public. The themes are interrelated to the extent that success in one area will enhance success in another. Our primary strategic advantage is our tradition of engagement with stakeholders, which we intend to further during the 2008–2013 planning cycle.



Identifying Priorities

Because the base support funding for research and educational programming continues to shrink, the college needs to identify areas for strategic investment that build on current strengths or enable the development of a critical mass of expertise in new areas. The identification of priorities for the college should consider the needs of our public stakeholders and the ethics of the food and fiber system, ecosystem, and socioeconomic system. As a part of the 2008–2013 strategic plan, the college has identified five programmatic priorities on which we will focus resource allocation and implementation efforts.

Achieving Excellence Through an Interdisciplinary and Multifunctional Approach

The complexity of the food and fiber system requires that we enhance collaboration within and outside the college. The success of enhanced collaboration will be realized as we become more cognizant of research, extension/outreach, and teaching being conducted by colleagues within and outside the college. Such awareness will help the college recognize priorities to assign resources where enhancement is likely to occur.

MISSION, CORE VALUES, AND VISION

To encourage interdisciplinary approaches to problem solving, we are creating an environment that promotes working across disciplinary boundaries and fostering a culture that recognizes individuals and teams for interdisciplinary approaches to problem solving. The promotion of interdisciplinary approaches to problem solving will be enhanced through the development of new educational programs and research centers that emphasize systems thinking through a global lens across a wide range of disciplines.

Network Development

To help ensure the security and health of our food and fiber system, ecosystem, and socioeconomic system, the college will continue to generate and provide science- and evidence-based information. Our faculty and staff will engage with key stakeholders to understand their issues and provide solutions. Because solutions to a number of key issues require state and federal policy changes, our faculty and staff will provide expertise when requested. To effectively inform policymaking, the college will focus efforts on building stronger networks and partnerships among stakeholders, researchers, and extension faculty and educators. The development of effective networks and partnerships with industry, nonprofit, and governmental organizations could also help leverage funds. Such networks and partnerships, however, should take into account the different needs of stakeholder groups such as consumers and agricultural businesses of all sizes.

Public Education

The changing nature and diversity of the agricultural industry demands the development of new agricultural literacy programs that highlight the continued relevance of agriculture in daily life. Such programs should provide multiple perspectives about issues associated with the food system, thereby allowing consumers to make informed decisions.

Mission

The mission of Penn State's College of Agricultural Sciences is to discover, integrate, translate, and disseminate knowledge to enhance the food and agricultural system, natural resources and environmental stewardship, and economic and social well-being, thereby improving the lives of people in Pennsylvania, the nation, and the world.

Core Values

- Excellence and productivity in the scholarship of resident education, research, and extension/outreach
- Creativity, innovation, and openness to change
- Stakeholder engagement and responsiveness to emerging issues
- Access to information and knowledge to facilitate lifelong learning for all Pennsylvania residents
- Interdisciplinary, cross-functional collaboration and communication to solve complex problems for the common good
- Dedication to diversity, multicultural understanding, and cross-cultural competence
- An atmosphere of mutual respect that promotes listening, openly sharing ideas and viewpoints, and debating issues and concerns
- The highest standards of integrity, honesty, shared responsibility, and mutual accountability
- Commitment to our employees and an environment that nurtures personal and professional growth and development

Vision

Penn State's College of Agricultural Sciences aspires to be the regional, national, and international leader in understanding the natural and human systems underlying agricultural sciences, translating that understanding to enhance quality of life, and educating the leaders of today and the future. We will organize our approach to teaching, research, and extension/



outreach around three interrelated systems: food and fiber system, ecosystem, and socioeconomic system.

To achieve our vision we recognize and validate that the college must move toward an approach where resident education, research, and extension/outreach activities are organized around three dominant and interrelated systems. Capitalizing on this approach requires a thoughtful balance between fundamental and applied science and disciplinary and interdisciplinary excellence.

Each of the three systems described in our vision statement is unique to the college's mission wherein teaching, research, and extension/outreach are truly integrated; our work, including the most fundamental research, seeks relevance and practical application; and these systems are interrelated. At the interface of these systems we see exceptional opportunity to collaborate, discover, and advance the frontiers of our disciplines. We will discover how the systems interact to develop products, communities, and economies and transform this knowledge into management tools that will support our stakeholders in achieving economic success, quality of life, and environmental sustainability.

Food and Fiber System

Historically, the college has had considerable strength in teaching, research, and extension programming in the production and processing of food and wood products. Over time, U.S. agriculture has evolved from a producer-driven system to a decidedly consumer-driven system. We will continue to provide science-based research and educational materials to the producers and consumers of agricultural and food commodities. However, we recognize significant opportunities to serve our long-standing stakeholders by better serving the consumers of agricultural products—whether through providing nutrition education, assisting local governments with land-use decisions, or helping producers develop and find new markets for value-added products. The need to better integrate activities through a food and fiber systems approach is best illustrated by the fact that Pennsylvania's food processing and manufacturing segment represents nearly five times (\$22.3 billion) the value of farm-gate production (\$4.7 billion) of agricultural goods. Likewise, the wood products and paper industries of the Commonwealth account for \$13.4 billion in sales annually (*source*: Economic Census for Pennsylvania and Pennsylvania Agricultural Statistics). Pennsylvania remains strategically situated relative to consumer markets and remains the leading food processing and manufacturing state in the region and one of the leading states in the nation. Similar competitive opportunities exist for wood products.

The food and fiber system includes five broad components: (1) agricultural and forest production, (2) processing and manufacturing, (3) wholesaling and distribution, (4) retailing and food service, and (5) consumers. Each component of the system serves to add value to the materials acted upon. Rather than solely viewing the system as something with a directional flow of materials, we may also view the system as a means for the consumer to exercise control of that flow.

A significant opportunity for our college—the potential for developing and accepting biobased resources—exists at the interface of the food and fiber system, ecosystem, and socioeconomic system. Biobased resources are renewable and can be used to produce a variety of value-added materials in



addition to their well-recognized importance as alternative energy sources. The agricultural industry has been identified as a key source of biobased resources. Our college can be a catalyst in expanding Penn State's educational and research opportunities in biobased systems. In our vision for biobased products, we can contribute in areas such as novel uses for wood and other plant-based materials; development of new products for human, animal, and plant health and nutrition; biobased fuels and lubricants; and a variety of biomimetic (materials designed to mimic biological characteristics) products and devices. A biobased economy also provides new opportunities for rural communities and will require science-based policy decisions, both of which we are well positioned to lead. We will endeavor to enhance linkages with the Materials Research Institute and campuswide energy initiatives while taking a strong role in regional and national efforts within the land-grant community.

Ecosystem

The interactions of humans with the environment—from agricultural production to natural resources utilization to response by local communities to increased suburbanization—are best characterized and studied at the level of the landscape and ecosystem. Ecosystems, which are subdivisions of landscapes, can be areas as large as a forest or the Chesapeake Bay Watershed or as small as a single farm or even the rhizosphere of a single plant. The college has decades of experi-

ence in team-based approaches to addressing complex problems at these various scales. A systems focus on ecosystems employs this longstanding capacity and provides a framework for identifying the challenges and opportunities that face us in the future. It further recognizes that much of our work is in ecosystems and landscapes where the presence of human activity has had a significant effect on the natural interactions of the biological and physical world.

Pennsylvania possesses substantial natural and agricultural resources. Our ability to sustainably and profitably manage these resources into the future dictates that we continue to seek and disseminate solutions to both existing and emerging challenges. For example, despite years of research on water resources, nutrient issues, and wildlife management, additional answers are still needed. The growth of Pennsylvania's human population, accompanied by a change in how that population is distributed, has created new challenges in land use that necessitate the distribution of new information. The college will focus on assembling interdisciplinary teams to solve these problems.

We will use our expertise to help citizens of the Commonwealth, nation, and world balance biodiversity and ecological sustainability with production and economic viability. The college's strengths in plant and animal production; natural resources issues involving forests, watersheds, and wildlife; invasive species; geospatial analysis; environmental microbiology; and community vitality enable us to address critical questions as diverse as preserving air and water quality and making informed land-use decisions. Our teams will unite biology and chemistry with sociology and economics in search of answers to practical problems in resource (e.g., food, fiber, open space) management and preservation. Underlying our practical solutions will be the science that derives from research ranging from the molecular to organismic to ecosystem to landscape levels. We expect that our efforts will contribute to advancing science, solving real-world problems, and crafting policies to guide future decisions.

Socioeconomic System

Humans form socioeconomic systems that are outgrowths of and dependent on the environment in which they live. Their consumption choices (food, clothing, housing, etc.), health, education, employment, quality of life, and ability to cope economically vary depending on their sociodemographic characteristics and are affected by the communities in which they live. Communities in turn are strongly affected by socioeconomic forces that play out at the local, regional, and global levels. A socioeconomic system has three levels: (1) individual and household, (2) local community and regional economy, and (3) the various levels of government where policies related to food, land use, and economic and social development affect human outcomes.

Many major issues faced by society today are social or economic in nature. The national and international energy situation and need for alternative energy sources, rising food prices and impacts on food security and public health, and human population growth and impacts on the natural environment represent three examples. Solutions to each of these societal problems require an understanding of the economic and social behaviors that compose the socioeconomic system. Further, the major issues that we face in Pennsylvania, the Northeast, nationally, and internationally will in almost all cases require integration between the socioeconomic system and the natural and physical sciences. The problems are complex, as are the systems that must deal with them.

Since the last round of strategic planning, the college's socioeconomic system has been strengthened through expansion of engagement in multidisciplinary work: the building of teams within the college and across colleges to solve larger-scale problems relevant to our college's mission. This has occurred through greater engagement with Penn State's institutes, consortia, and schools [Social Science Research Institute (SSRI), the Huck Institutes of the Life Sciences, Penn State Institutes of Energy and the Environment (PSIEE), Population Research Institute (PRI), Children, Youth, and Families Consortium (CYFC), and School of International Affairs (SIA)], PSIEE and CYFC cohire positions, and continued partnering among the college's faculty and those in



other colleges—principally, Health and Human Development, Earth and Mineral Sciences, Liberal Arts, Engineering, and, more recently, Eberly and Arts and Architecture.

The socioeconomic system and food and fiber systems intersect—for example, the social and economic systems are integral to behaviors of agricultural producers, the design of farm policy, international trade, supply chains and market organization, and consumer behaviors. The college now has a significant opportunity to focus on entrepreneurship, expanding efforts targeted to value-added, niche markets, specialty crops, and biobased energy alternatives. Our faculty are already building strength in this area, particularly through the college's value-added, forestry, and economic and community development initiatives. Over the next twenty years, many Pennsylvania farms and forests will be transferred to the next generation; our expertise will be used to ensure that the next generation and those starting new enterprises to support Pennsylvania's communities are well trained in known successful frontier approaches.

The ecosystem, previously considered a system primarily composed of the natural sciences, is now also integrated to a much greater degree with the socioeconomic system. This integration represents the college's efforts to strengthen the human–environment interaction component of the ecosystem. In this arena as well, significant opportunities now

exist for world-class, integrated science–social science research involving ecologists, biologists, mathematicians, engineers, economists, sociologists, demographers, geographers, planners, historians, and landscape architects within Penn State and at partnering universities worldwide. Questions of landscape change and ecosystem impacts (including water resources) from suburbanization, development of biobased energy systems, development of environmentally compatible food production systems to enhance worldwide food security, landscape management and biodiversity, and new methods of controlling human disease impacts of insect pests represent examples of potential arenas in which the college can have impact. Efforts will benefit our constituencies, including graduate and undergraduate students in the social sciences and sciences that will learn to collaborate as members of scientific teams across the college’s systems. The potential for large impact through integrated systems—socioeconomic, food and fiber, and ecosystems—is great.



STRATEGIC INITIATIVES

The three systems described above, as developed in our last plan, will continue to be the organizing concepts of our college over the next five years. The following strategic initiatives have been identified within the context of these systems and based on extensive stakeholder input, faculty and staff strategic initiative team input, and leadership team discussions over the last year (http://strategicplanning.cas.psu.edu/2008_2013/).

Overall, these five initiatives build on programs we have already been emphasizing as priorities; some programs where we have critical mass; programs that cut across resident teaching, research, and extension; and areas that articulate with other colleges and University institutes. Therefore, these initiatives are built on a solid base. Yet, they represent refinement and programmatic focus and will be a guide for decisions on future investments, which will enhance present efforts, fill some voids, and increase our competitiveness for attracting additional external funding. As we refine these initiatives to begin implementation, we will further engage faculty, staff, and student leadership; administrative team leadership; and external stakeholders. The mission, core values, vision, goals, and strategic directions will form the basis for subsequent development of detailed implementation, management, and operational plans.

Energy

The college’s energy initiative supports Penn State’s goal of national leadership in building a sustainable biobased economy. Our college’s initial commitment is six cofunded faculty hires with the Penn State Institutes of Energy and the Environment. Areas of emphasis for two approved searches and discussion for anticipated future hires include sustainable biomass cropping production systems, renewable biomass energy/synthetic biology, biobased materials, spatial modeling or economic and environmental interactions via land use and landscape planning and analysis, microbial genomics related to cellulose-based biofuels, and social impact assessment of alternative energy technologies. As part of this initiative, we will also encourage new, emerging areas of excellence such as biopolymers, integrated biorefineries, and sustainable bioproduction systems.

These cofunded faculty positions will not only enhance our research capacity but will also contribute to filling educational needs in resident programs and, to some extent, in extension and outreach programs. Course revision, new course development, and possibly even a new minor are being considered to fill the present void in our undergraduate programs in energy and biorenewable systems. Graduate training will also benefit from this initiative.

We will develop a coordinated strategy to transfer technology to the public and private sectors, including youth education and public education, to facilitate job creation, energy independence, and agricultural profitability. A key program emphasis will be to support the needs of the Commonwealth related to natural gas drilling.

Finally, we will actively seek ways within our college and in collaboration with the Office of Physical Plant and University Environmental Stewardship Initiative to conserve energy and improve efficiency of energy use. Students can be involved in evaluating trends, identifying alternatives, and implementing practices. We will continue evaluating the college's greenhouse gas footprint within the University inventory. Among the areas we can pursue are recyclables at the Berkey Creamery and from catered events, reusable water bottles, offsets on air travel for greenhouse gases, hybrid vehicles, and new cogeneration strategies with the Office of Physical Plant.

Entrepreneurship (Initiative for University Enhancement Funding)

Establishment of an Entrepreneurship Center will engage members of the college who have entrepreneurial expertise and/or interest and provide a focal point for innovative entrepreneurship training through resident education and extension/outreach. Training students to be job creators, not just job seekers, and helping faculty, extension educators, and extension clientele take advantage of changing conditions are important dimensions of this initiative. Through this initiative we will enhance efforts to move the knowledge we are gaining from current research strengths into technology, products, and processes that can lead to new businesses. Further, faculty



will consider new ways to incorporate more entrepreneurship into our resident education and extension/outreach programs. For resident education, enhancements may occur through revised courses/majors, new courses, or even a new major or minor. Certificate programs will also be considered, with some components of distance education possible. The center will function as a champion for applied research on competitiveness for environmentally sustainable enterprises and the delivery of resulting educational programs through cooperative extension.

A global mindset is a critical consideration to entrepreneurial success. With widespread use of communication technology and transportation, the changing of governments' protectionist policies, and the resulting decrease in the number of geographically protected market niches, it is possible, if not necessary, for many of today's entrepreneurs to view their domain as global. Our new Entrepreneurship Center can play an important role in helping government and business leaders of Pennsylvania realize broad and ambitious goals that enhance Pennsylvania's global competitiveness. Engaging our faculty to consider creative approaches that introduce students to innovation policies and practices in other countries will be part of this initiative and will provide students with further opportunity to travel to key emerging markets such as India, China, and Latin America.

An important ingredient for the above endeavors will be to significantly ramp up our efforts to bring established,

successful entrepreneurs to campus to engage our faculty, students, and staff through informal means as well as formal classroom teaching and interaction. Many members of our college have the scientific expertise and technical knowledge related to entrepreneurship but seek help in bringing practical, real-world experiences to them and our students—whether undergraduate and graduate students or those in nonformal extension educational settings. We will consider both bringing in “experts in residence” and hiring selected new faculty or staff with entrepreneurial, business, and leadership experience.

We envision collaborations as essential to the success of our Entrepreneurship Center. Key collaborations would occur with the College of Engineering, the Smeal College of Business, the Dickinson School of Law and its Agricultural Law Center, and the School of International Affairs.

Several examples of present entrepreneurial program activities in our college will underscore that we have a solid base upon which to build our new Entrepreneurship Center. Courses in horticulture include dimensions of entrepreneurship and business development in the landscape contracting and nursery industries. Food science faculty offer “PA Food Ventures,” which is an extension/outreach program that provides food entrepreneurs in Pennsylvania with resources they need to start a new business. Agricultural economics faculty and extension educators offer workshops on “food for profit” and “income opportunities for agriculture” to provide entrepreneurial skill development for the state’s agricultural and food sectors. In forest resources, faculty that we recruited from industry conduct applied research and extension education programs, including collaboration with the Smeal College of Business on supply chain management, for wood-processing industries in order to stimulate entrepreneurial practices that increase profitability for existing and new businesses. A youth/4-H program focuses on entrepreneurship and leadership development. Coursework in agricultural and extension education related to leadership and interpersonal skill development, along with effectively working with small groups and teams, can provide students with the opportunity to develop as leaders and support and retain employees.

Undergraduate courses in community and economic development include sections on entrepreneurship. Agricultural economists are conducting research on value-added aspects of entrepreneurship as well as the impact of local, state, and federal policies on rural and community economic revitalization. A team of cooperative extension faculty, staff, and educators are working closely with small- and medium-sized farmers to develop value-added products from their raw products and to connect farmers with urban and suburban markets. Extension also provides education that responds to workforce needs in the areas of child care, nutrition education, food safety, and basic workforce skills.

A theme throughout our college’s three organizing systems, as well as our five strategic initiatives, is economic sustainability. Factors such as farm profitability, changes in farm structure, transitions in land use at the rural/urban interface, public science education, workforce development, and connections between agricultural and food production and urban and local markets are among the many factors in economic sustainability. Entrepreneurial programs can assist individuals in developing skills that can become valuable commodities with profit-earning potential. Therefore, families benefit directly from added income; businesses benefit from growth; and communities benefit from economically and socially valuable contributions. Entrepreneurship is an important ingredient of sustainability.

Food, Diet, and Health

Expanding efforts to support a food system that improves people’s quality of life is the key goal of this initiative. Our efforts will include support for food production and processing but will increasingly look at the upstream and downstream consequences for the environment and at consumer health and well-being. This consumer-focused approach is complementary to our existing efforts. Identification of new dietary options, including foods that are healthier, can inform producers, processors, distributors, and retailers. The net result is an increased array of choices of high-quality foods for the consumer. Food safety, long a focus in the college, will remain an important component of providing a healthful diet to consumers. There is need to guide small food processors and new



food entrepreneurs about regulatory practices, nutrition labeling, marketing, workforce development, energy conservation, food safety practices, purchasing of equipment, and business development. Support for the development of a broader understanding of the food system within resident education can be achieved through cross-college seminars and online courses. We will work to educate people in making better choices to live healthier lives by providing evidence-based community nutrition education programs. Educational and research efforts, as part of the emerging University-wide health sciences initiative, will be important for us. For example, with our cooperative extension network across the state and our research capacity in the biological and social sciences, we have a unique role to play in areas such as childhood obesity and disease prevention in collaboration with other colleges, nongovernmental organizations, and appropriate government agencies. The infrastructural support of extension educators is a major asset for conducting prevention-based nutrition and health programs. To reach limited-resource audiences, the Nutrition Links program, which includes the Expanded Food and Nutrition Program and the PA TRACKS program, employs community-based nutrition paraprofessionals who teach families with young children.

Pest Prediction and Response

This initiative also builds on considerable strengths in the college and across the University and will place special emphasis on enhancement, coordination, and facilitation of team efforts across research, teaching, and extension toward the protection of plant, animal, and human health.

The priorities of this initiative include prediction and response to pests, pathogens, and infectious disease; proactive and cost-effective approaches to anticipate, isolate, and eradicate outbreaks, including potential bioterrorist threats affecting crop, livestock, and forest production; alternative production practices; and prevention and control of the growth of invasive species to limit economic damage.

Leveraging our strengths in modeling and plant disease biology, for example, to support present teams and build new teams of faculty can enhance overall University initiatives and result in scientific and educational innovation. We can also be more competitive in securing external funding for these efforts.

The strengths upon which we will build are considerable. For example, our college is an international leader in pest-forecasting-model research, which has resulted in models that combine meteorology, biology, and information technology to provide proactive and cost-saving approaches to dealing with pests, pathogens, and infectious diseases. Another strength is our role in, support of, and contribution to four existing centers—Infectious Disease Dynamics; Molecular Immunology and Infectious Disease; Molecular Toxicology and Carcinogenesis; and Chemical Ecology—and the Population Research Institute. Though significant progress has been made over the last several years on these and other collaborations within and outside the college, this initiative seeks to integrate further individual faculty efforts into teams and collaborative networks.

Water Quality and Quantity (Initiative for University Enhancement Funding)

Another aspect of the sustainability theme that runs through our plan is that of sustainable environments wherein water is a common denominator. We have identified water as a key focus of our efforts over the next five years. Further investments will build upon existing strengths as well as stimulate new areas of additional opportunity across resident education, research, and extension.



Our students need more exposure to systems thinking and analysis as defined in the three systems forming the organizational foundations of this plan. A perfect example is this water initiative. Issues of water quality and quantity involve a myriad of connections among such factors as local and global forces; land use; food and energy policies; and economic, social, and political interactions. With heightened capacity to explore issues such as water as part of a large and complex system, our graduates will be more effective contributors to necessary solutions.

Interdisciplinary research, education, and extension in areas such as soil/forest water dynamics, hydrology and engineering, nutrient balance and reduction strategies, land use and water, climate change and water, energy and water, policies for managing and protecting water, and integrative systems modeling are all part of this initiative. Extension educators conduct programs on water conservation, household water quality, and drinking water protection.

We are well positioned to make further significant contributions to the Commonwealth through this initiative. The college's Environment and Natural Resources Institute and the Agriculture and Environment Science and Policy Center work at harmonizing food and fiber production and processing with environmental goals. This solution-oriented, science-based center brings diverse players to the discussion of environmental issues and solutions, of which water quantity and quality are central.

Collaborative Approach to Implementation of Strategic Initiatives

Each of the strategic initiatives will be sponsored by a member of the college's leadership team and will be aligned with existing extension program teams. We envision opportunities for substantial stakeholder involvement as well. This approach will bring together the best talents to address complex problems facing society; provide opportunities for students to become more engaged with real-world problems that affect people's lives; and provide a mechanism of global thinking to bridge fundamental and translational research with educational programming.

This renewed vision for our college, as part of our last plan, was derived from the findings of those earlier six faculty/extension educator study groups. The present plan moves this vision, with emphasis on collaboration, to even higher levels. Their work emphasized that continuing and expanded collaborations within our college and with other colleges, consortia, institutes, and units of the University are an essential component to realizing our vision for the college. Crucial to this effort will be cross-disciplinary teams that speak and understand one another's languages and can work together to develop new approaches to maximizing system productivity, economic development, and sustainability. These teams include disciplines both within our college and across the University such as biology, computer science, chemistry, engineering, mathematics, sociology, economics, and education. Due to our successful record in developing collaborative initiatives within our college, with the University at large, and with external agencies, we are in a strong position to achieve our vision. As our college continues to pursue excellence in this kind of teamwork, we will train future agricultural scientists and practitioners so that a new generation will find these team interactions to be second nature.

GOALS, MEASURABLE TARGETS, STRATEGIES, AND ACTIONS

Goal A: Increase Enrollment and Enhance Student Success

Increasing enrollment and ensuring retention and placement of our students is of prime importance to the success of our college. To do this we will need to enhance programs making them more attractive to potential students. The student population in the College of Agricultural Sciences includes undergraduate and graduate students, as well as lifelong learners. Additional beneficiaries of improvements that help ensure student success include employers that hire college graduates and graduate schools that enroll our graduates.

Performance Indicators

Increase Overall Undergraduate Enrollment

Total undergraduate enrollment for fall 2007 was 2,128 students (1,533 enrolled at the University Park campus; 595 enrolled at other Penn State campuses). Total undergraduate student enrollment increased by 5.8 percent since fall 2002 when enrollment was 2,011 students. Projected total undergraduate enrollment for fall 2012 is 2,700 students. Increased enrollment will be variable across majors; areas for special emphasis include the plant sciences.

Increase Overall Graduate Enrollment

Total graduate enrollment for fall 2007 was 467 students (379 enrolled in College of Agricultural Sciences programs; 88 enrolled in intercollege programs). Total graduate enrollment increased 16 percent since fall 2002. Projected total graduate enrollment for fall 2012 is 600 students. This is based on our intent to increase the number of students funded on grants and contracts above the present (2006–07) college-wide average of 37 percent. Areas of special emphasis for enrollment growth include animal sciences and agricultural biosecurity.

Increase Funding for Scholarships

Funding for scholarships increased by approximately 15 percent from \$1,606,850 in fall 2003 to \$1,851,460 in fall 2007. An increase in scholarship funding to \$2 million by fall 2012 would be approximately an 8 percent increase and would enable funding for a higher proportion of our students.

Increase Student Achievement of Program Learning Objectives

Penn State's College of Agricultural Sciences is considered one of the premiere undergraduate educational institutions in agricultural and renewable natural resources. Historically, our graduates have been highly sought after regardless of strength of economy, and all indicators and predictions suggest continued strong and successful placement of our graduates through 2012. Our students believe that they are obtaining a quality, world-class education at Penn State—and, in particular, in the college—that will prepare them for successful careers.

Fall 2007 and spring 2008 graduating seniors surveyed (196 of 412, or 47.6 percent survey completion rate) reported “high satisfaction” in their “level of preparedness for team and group work,” (4.4 on a 5.0 scale), “level of preparedness to lead or supervise a group” (4.3 on a 5.0 scale), and in their “level of preparedness to solve problems in the workplace” (4.3 on a 5.0 scale). Our students are increasingly becoming more global and multicultural in their educational preparedness as demonstrated by an increase in the number of students reporting a semester- or summer-abroad educational experience (16.4 versus 12.3 percent and 19.1 versus 11.5 percent) of graduating students surveyed in fall 2007 and spring 2008 compared with fall 2003 and spring 2004 graduates). Approximately one-third of students surveyed reported having at least one



official major-related internship during their undergraduate tenure (an average of 1.3 internships per respondent).

In keeping with our college's tradition of being a hands-on college emphasizing the application of basic and fundamental principles to real-world issues and problems, approximately one-third of students reported participating in some form of undergraduate supervised research project.

Detailed assessment of learning outcomes will continue to be carried out for all undergraduate academic programs offered by the college, learning and professional development objectives expected from our accreditation boards, and professional organizations and associations dependent on our alumni.

Increase Student, Employer, and Alumni Satisfaction Measures

Self-reported measures of "overall satisfaction" (based on a 5.0 scale) with their Penn State education (4.17 versus 4.05), their education within their major (4.31 versus 4.05), and college advising (3.61 versus 3.56) all improved from the fall 2007 and spring 2008 graduates (196 of 412, or 47.6 percent survey completion rate) as compared with the fall 2003 and spring 2004 graduates (148 of 373, or 39.7 percent survey completion rate). Overall, our students indicate a strong satisfaction in their interactions with faculty (4.2), fellow students (4.3), and learning facilities (4.2). Award-winning faculty and a renewed commitment to undergraduate teaching and learning with each new faculty hire should continue this favorable and encouraging trend in undergraduate education. Moreover, the addition of new teaching and laboratory facilities within the new School of Forest Resources and the Food Science buildings and the newly renovated facilities holding the Department of Agricultural and Extension Education will continue to afford Penn State Agricultural Sciences students to the most modern, up-to-date facilities in the state, the Northeastern and North Atlantic regions, and possibly the entire country.

In March 2007, the Office of Research and Graduate Education administered the first College of Agricultural Sciences Graduate Student Survey. The average score for the scaled measure of overall student satisfaction was 3.95 out of 5.0.

Data from the Graduate Student Survey, which will be administered biannually, will be used to identify priorities for improving student satisfaction on a variety of issues including, but not limited to, program quality, advising, and student climate.

Increase SAT and GRE Scores of Incoming Undergraduate and Graduate Students

For this past planning period, the SAT scores of incoming undergraduates have maintained their strength. First-year baccalaureate students had an average SAT score of 1065 in fall 2004 (1172 at University Park). The average SAT score for fall 2007 was 1061 (1159 at University Park).

Combined verbal and quantitative GRE scores of incoming graduate students have increased steadily from 1160 in fall 2004 to 1181 in fall 2007. By fall 2012, we anticipate that combined verbal and quantitative GRE scores of incoming graduate students will be above 1200.

Increase Enrollment in Extension Programs

Statewide enrollment in extension programs increased by nearly 40 percent from approximately 615,000 participants in 2006 to more than one million participants, or approximately 8 percent of the total population of Pennsylvania, in 2007. By 2013, we anticipate enrolling 10 percent of Pennsylvania residents in lifelong learning programs organized by the College of Agricultural Sciences.

Strategies for 2008–2013

1. Increase efforts to recruit and retain a high-quality and diverse pool of undergraduate and graduate students
 - Expand efforts to promote equity and increase diversity through programs such as the Summer Research Opportunities Program (SROP), the Penn State–Philadelphia School District Annual Awards Convocation Program, Annual Achievement Conference, and the Achievers Visitation Program
 - Ease student acclimation by focusing on student life and development skills
 - Reach out to wider/nontraditional student audiences, including 1890 land-grant institutions

- Integrate county extension offices into the recruitment process
 - Intensify college marketing efforts to increase awareness of program relevance
 - Aim new scholarships at first-year students
 - Sponsor precollege activities in diverse locations for increased visibility
2. Revitalize undergraduate curricula, starting with study group recommendations
 - Assess and accordingly revise curricula for relevance to market needs
 - Drop courses that are consistently underenrolled
 - Ensure that all undergraduates have enriched education and professional development experiences through placement in at least one internship or international experience
 - Enhance emphasis on topics such as entrepreneurship, leadership development, and working in a global society
 3. Assess student learning outcomes
 - Evaluate student E-portfolios and capstone projects
 - Assess other student achievement measures, such as performance and evaluation in selected required major-related capstone courses, with particular care taken to meet Penn State and Middle States Commission on Higher Education Accreditation guidelines and expectations, as well as measures of educational cocurricular activities (e.g., undergraduate research and supervised projects, international and national study-abroad experiences, organizational participation and leadership opportunities, internship and externship participation, enhanced networking opportunities, development of communication, entrepreneurial, and leadership skills) critical to the education of ag sciences students in the twenty-first century
 - Monitor extension program impact
 4. Plan and implement actions to enhance graduate programs
 - Administer the Graduate Student Survey every two years
 - Form a Graduate Student Advisory Council (GSAC) to provide input to the college's leadership on all issues of student concern
 - Provide new programs of study, such as the master's degree of homeland security in agricultural biosecurity
 - Offer professional development opportunities such as the Doctoral Student Competitive Grants program
 - Drop courses that are consistently underenrolled
 5. Provide relevant programs to increase enrollment in extension
 - Provide opportunities for youth to demonstrate their knowledge in science, engineering, and technology
 - Redefine 4-H club programs to be more relevant
 - Enhance program appeal to urban and suburban audiences
 - Increase the number and quality of conferences and short courses offered
 - Increase collaborative programming with campus colleges
 - Engage volunteers as leaders, which will assist extension in reaching more clientele



6. Devise new ways of reaching resident, distance, and extension students through technology and alternative scheduling
 - Continue to redirect available resources to enable the expansion of eLearning initiatives
 - Continue the use of a student-reviewed request for proposal (RFP) process, initiated in 2007, to award part of the annual allocation of Student Technology Fees to faculty proposals that enhance student learning

Goal B: Enhance Knowledge Discovery and Translation

The pace of change in our society and the imperatives of our land-grant mission demand that the college anticipate and identify emerging issues important to Pennsylvanians and the world so we can use our expertise and intellectual resources to address them. At the same time, we need to be an international leader in interdisciplinary, fundamental research that in the longer term may provide answers to complex problems. Examples of the college's role in translating world-class research to local solutions include our engagement with the Eberly College of Science, Huck Institutes of the Life Sciences, and Institutes of Energy and the Environment in disease modeling, which blends biology, meteorology, and information science to turn fundamental science into predictive tools that help farmers at both the national and local levels make pest management decisions; with other U.S. and foreign institutions in USAID-sponsored efforts to deliver environmentally and economically sound pest management solutions to agricultural producers in developing nations; and with the Colleges of Engineering and Earth and Mineral Sciences, the Institutes of Energy and the Environment, the Office of the Physical Plant, and Environmental Health and Safety to examine renewable energy systems and provide science-based advice on crop production and engineering solutions. We feel that many opportunities remain for the college to continue along this trajectory.

Performance Indicators

Increase Our Extramural Funding Totals

From FY2001–02 through FY2007–08, the dollar value of awards received for grants and contracts increased from \$48,558,000 in FY2001–02 to \$52,132,000 in FY2007–08. The value of submitted proposals increased from \$149,579,000 to \$204,519,000 during that same period. With a focus on increasing proposals and awards per investigator, the goal is to emphasize the responsibility of each individual to support programmatic efforts.

Total facilities and administrative (F&A) overhead generated by the college increased from \$2,716,687 in 2001–02 to \$4,006,822 in 2006–07. For the same period F&A returns to the college increased from \$326,000 to \$496,825.

Return on investment from the college Seed Grant Program will be evaluated using a tracking system that was implemented in 2008.

Increase the Number of Publications

For calendar year 2007, the total number of publications reported on the annual experiment station report was 966. This number includes both research and extension publications.

Increase the Number of College-Initiated Invention Disclosures to Ten to Fifteen Per Year

From federal FY2001–02 through federal FY2006–07, an average of nine invention disclosures per year were submitted by faculty. Six invention disclosures were submitted by faculty in federal FY2006–07.

Strategies for 2008–2013

1. Reallocate resources to facilitate a focus on emerging areas of excellence
 - Increase translational research by assembling and rewarding productive teams of research and extension professionals
 - Increase undergraduate and graduate student experiences in research programs and extension/outreach activities through initiatives such as Penn State Public Scholars in Action

2. Enhance linkages with other colleges, institutes and consortia, agencies, and universities nationally and internationally
 - Complement gaps in our systems approaches through collaboration
 - Continue to aggressively participate in cofunded positions and programs
 - Establish and build on existing partnerships with government agencies
 - Assess our networking relationships to identify barriers and opportunities for improved communication flow
 - Encourage our social science researchers to provide research- and evidence-based input to improve knowledge, translation of research, and technology transfer systems
3. Continue to broaden our funding portfolio in grants and contracts
 - Target specific funding opportunities such as National Science Foundation (NSF), USDA competitive grants (Agriculture and Food Research Initiative), and Farm Bill opportunities such as specialty crop and biomass integrated research and extension programs
 - Provide increased opportunities for training in effective grantsmanship, including workshops, connections with granting agencies, and Web-based materials
 - Encourage interdisciplinary research teams composed of researchers within and outside the college to submit collaborative proposals for funding

Goal C: Strengthen Meaningful Communication and Mutual Education with Current and New Stakeholders

Anticipating and responding to changing state, national, and international trends are crucial to the success of our stakeholders and therefore to the long-term vitality and sustainability of the college. We need to continuously improve the way in which we translate the knowledge we have generated into accessible and useful formats for agricultural producers, consumers, legislators, citizens, employers, public officials,

and other current and new stakeholders. We should provide our stakeholders with regular updates on state, regional, and international trends, including demographic and economic trends. We need to listen to current and new stakeholders to determine their perceptions, needs, and expectations. Open, meaningful communication and mutual education will facilitate the collaborative development of responsive research portfolios. This will in turn help ensure effective dissemination and marketing of solutions and the development of public policies that are informed by science.

The demographic profile of Pennsylvania residents has changed, and we see new opportunities to meet the needs of suburban and urban residents whom we previously may not have reached. A newly funded metro research and outreach center located in Pittsburgh will provide a focus for the college to unite our educational, research, and extension and outreach programs with synergistic resources available within Penn State campuses and the Colleges of Health and Human Development, Medicine, Education, and Engineering to better meet the needs of our suburban and urban residents. Reaching suburban and urban residents will also facilitate the college's efforts to educate the nonfarming public about agricultural issues, such as food and fiber production, farmland preservation, and land-use considerations that are vital to everyone's future.

Performance Indicators

Increase Stakeholder Satisfaction Measures

In 2007 a survey of Pennsylvania county commissioners was conducted to identify which programs they value most from Penn State Cooperative Extension and their level of satisfaction. Respondents had a strong perception of extension as knowledgeable (67 percent), friendly (59 percent), and accessible (54 percent). There is a strong perception among respondents that extension provides useful education to individuals (59 percent), has a positive impact on the county (57 percent), provides useful education to farm and nonfarm businesses (56 percent), provides programs that have a positive impact on families (53 percent), and serves as an important and accessible resource in the county (53 percent).

Areas on which a significant proportion of respondents indi-

cate that extension could improve are marketing itself to the community (22 percent), seeking input from diverse audiences when developing programs (20 percent), and marketing itself to commissioners (20 percent). Eighty-one percent of the respondents reported they have never scheduled a meeting with a professor or staff person based in State College (University Park) and 62 percent would like to do so annually. Of the 240 county commissioners and county clerks invited to participate in the survey, 69 responded for a response rate of 29 percent. The respondents represented 60 percent of the Commonwealth's counties.

The Pennsylvania Council of Cooperative Extension Association (PCCEA) is an organization made up of local county extension board members, regional representatives, and state representatives. PCCEA membership was surveyed to determine their views on the importance of advocacy for Penn State Cooperative Extension and the College of Agricultural Sciences. On a scale of 1.0 to 5.0, the average response to the importance of advocating for Penn State Cooperative Extension's budget was a 4.2. The average response to the importance of advocating to secure funding for local extension functions was 3.96. The average response to supporting the development of the college's strategic plan was 3.66. The continued support of the PCCEA membership as strong advocates for cooperative extension and the college is a measure of stakeholder satisfaction.

Increase the Number of Venues Through Which Stakeholders Can Engage with the College

The College of Agricultural Sciences and Penn State Cooperative Extension have provided a number of opportunities through which stakeholders can provide feedback to the college. Among these opportunities are the Fall 2004 Ag Council Survey, the March 2005 Nutrient Management Summit, the July 2007 Ag Council Focus Groups, the 2007 Penn State Cooperative Extension survey of Pennsylvania County Commissioners, and the 2007 Penn State Cooperative Extension survey of the Pennsylvania Council of Cooperative Extension

Association (PCCEA) membership. Each of these surveys provided a forum through which stakeholders were engaged in the identification of priorities. Additionally, county extension associations sponsor annual meetings in which the public is invited to participate and interact with extension educators and college representatives. During the next five years, we intend to increase these opportunities through a series of venues focused on issues of strategic importance to our stakeholders.

Strategies for 2008–2013

1. Expand opportunities for current and new stakeholders to provide strategic advice
 - Involve researchers in interaction with current and new stakeholders through outreach programs and professional and public service activities
 - Expand community-based and participant-driven research and educational opportunities
2. Improve the college's dissemination of research results
 - Enhance Web-based materials to ensure that resources are more readily available
 - Encourage opportunities for extension educators to be meaningfully involved in appropriate applied research activities that are located throughout the state
 - Create opportunities to cross-fertilize departmental and University-wide interests
3. Enhance public education
 - Expand the college's contribution to agricultural literacy initiatives, which include the ecosystem, socioeconomic system, and food and fiber system
 - Provide multiple perspectives about issues associated with the food system to enable consumers to make informed decisions
4. Enhance recognition, reporting, and distribution of our programming's impact
 - Survey program recipients to assess impact of extension recommendations

- Encourage research faculty to submit multi-investigator, multidisciplinary ag experiment station project proposals to more accurately reflect the systems approach they are taking to research problems
- Identify new venues and mechanisms for disseminating success stories documenting program impact

Goal D: Lead and Manage the College as a System

As we work toward achieving our vision, we must place emphasis on leading and managing the college as a system. Viewing the college as a system means that we all understand the interdependencies that exist among our faculty, staff, students, extension educators, and stakeholders and we recognize that the system is responsive to stakeholder needs and expectations. Improvement is accomplished through designing and redesigning processes and other key parts of the system, and to achieve improvement we must ensure effective planning and stakeholder communication. As a system, Penn State Cooperative Extension is redefining its program structure to more effectively align all components of program development, implementation, and evaluation with staff and organizational resources and services. This change will enhance programming out across Pennsylvania counties and communities and will allow for more effective integration and specialization across teaching, research, and extension.

We recognize that our college leaders must reinforce systems thinking and interdependencies on a daily basis. We will strive to ensure that decision making and resource allocations optimize the system as a whole to strengthen our collective ability to meet stakeholder needs and expectations.

Another critical element in leading and managing the college as a system is our extensive effort to make progress in diversity-related issues across all areas of the college. In December 2006 the college completed a midpoint assessment of our Strategic Framework for Diversity 2004–2009. Information is posted at <http://diversity.cas.psu.edu/>.

Performance Indicators

Enhance Cost Savings and Cost Avoidance, and Generate Alternative Revenue (January 1, 2005 to Present)

College-wide Examples (see Appendix B)

A total of \$1,893,000 has been saved or recovered through changes in mailing and printing procedures, implementing participant fees, offering new water tests, sharing core equipment with Huck, providing testing for other universities, switching to biodiesel fuels for tractors, using GPS equipment to reduce fertilizer and pesticide use, converting used cooking oil from Penn State dining facilities to diesel fuel, generating compost, and implementing discounted buy-back options for equipment.

Academic Unit Examples

Six units reported savings related to replacing equipment with more efficient and effective alternatives. Yearly savings of \$22,400 were reported, though many examples given mentioned many thousands of additional savings not tabulated in detail. Examples include purchase of new energy-efficient corn dryers, reduction in copying costs by using more PDF electronic communication, purchase of all-in-one copier and fax, special vehicle purchase/maintenance arrangement with Fleet Operations, and reduction of equipment maintenance contracts.

Seven units reported savings related to restructuring operations to gain efficiency and to generate savings of \$33,000 annually. Examples include travel coordination and carpooling of fleet vehicles to save costs, reorganizing staffing to gain more efficiency in unit budget management and reporting, use of more electronic newsletters, and revamping meeting formats and offerings to save money.

Three units enhanced their vendor relationships to increase efficiency and to save costs. Documented costs saved annually was \$15,000. Additional large savings were cited in the thousands of dollars per year. Examples include reducing the number of separate ingredient vendors and purchasing more bulk materials at the Berkey Creamery. Another unit has negotiated deep discounts for egg handling products to save several thousand dollars annually.

By utilizing newer and standardized technology, five units have saved or generated new revenue of \$815,000 annually. World Campus turf program revenue returns, video-conferencing for state-wide Master Gardener training and other conferencing needs, and standardizing data bases/reporting procedures in several units are examples.

Enhance Nonappropriated Funds

Since January 1, 2005, the college has established 65 new endowments.

The book value of college endowments has grown more than 17 percent from less than \$40 million to more than \$47 million (market value to \$77 million).

Spendable earnings from endowments have grown from \$3.8 million to \$4.3 million.

Departmental sales income has increased 55 percent from \$5.6 million to \$8.7 million.

County commissioner funding for cooperative extension has continued steady growth; 18 percent from FY05 \$11.4 million to FY08 \$13.5 million.

County in-kind support (office space, utilities, services, etc.) levels have been sustained at more than \$2 million dollars per year.

County-level giving and fund-raising efforts (e.g., local 4-H programs, 4-H Campaign, 4-H Keystone Society) have generated over \$6.6 million during this period.

Increase the Percent of Funding Allocated to Strategic Initiatives

Based on the college's 2005–2008 college plan and after further input from members of the college and stakeholders, a list of strategic investments for the college totaling \$1.95 million were announced by the dean in October 2006. The list included nine faculty full-time equivalents (FTEs) in biobased energy, pest and pathogen management, air/land/water, and food/nutrition. These FTEs include teaching, research, and extension components and some involved co-funding with University institutes. The commitment to refill faculty FTEs lost through the tenure process was reinforced.

Additional extension investments were a biobased energy extension associate, three half-time extension program leaders, six FTEs for extension educators in air/water quality, energy, youth, entrepreneurship, agriculture, and natural resources with county cost share of FTE. Additional support included two FTEs for marketing, communications, and recruiting, further investment in information technology, development, grad student support, facilities, and infrastructure including people, startups, retentions, and spousal hires, and launching the metro research and outreach center. Most of these announced strategic investments from reallocations in the college are now in place and represent a major step in meeting the goals of the 2005–2008 plan.

In each year more than \$300,000 was awarded through the college seed grant program. The grants are intended to stimulate collaboration across teaching, research, and extension functions and generate results to make individuals and groups more successful in attracting significant external grants. The process is competitive across the college. Substantial effort goes into peer review of proposals and subsequent feedback to those who submitted proposals.

\$75,000 was allocated to the development of the PA-PIPE System (a pest-forecasting system).

We have directed significant resources into agriculture and the environment to address air and water issues.

We have reallocated faculty and extension educator efforts to address issues in alternative and renewable energy.

Approximately \$35,000 annually was provided to extension program teams as seed grants to facilitate programming on key issues.

The time of about 45 educators and faculty was redirected to address the growing educational program needs associated with gas leasing and potential environmental, economic, and community development issues in the state.

In making these shifts, we continue to provide high-quality programming to our traditional stakeholders and address issues that are important to their current and future needs. The col-

lege has also made new investments in the establishment of a metro research and outreach center in Pittsburgh to reach out to a more diverse audience.

Increase Faculty/Staff Satisfaction with the College Climate

More than 300 faculty and staff participated in a “Faculty and Staff: Partnering for Excellence” seminar delivered in 2006–2007, and recommendations generated during the seminars are now being implemented by academic unit leaders.

Between December 2004 and June 2008 a total of two positions have been developed and successfully filled via the Professional Entry program for entry-level minority extension educators.

Strategies for 2008–2013

1. Continue reallocating resources toward strategic priorities
 - Ensure transparency in decision making
2. Use stakeholder information on needs, expectations, and satisfaction to plan and improve programs and develop new opportunities
 - Use stakeholder data to determine requirements, needs, and changing expectations
3. Continue streamlining administrative processes to achieve time and cost savings
 - Measure, analyze, and improve organizational performance
 - Emphasize opportunities for efficiencies while moving forward on college-wide computing and information systems management, especially those related to security
4. Enhance employee engagement within the college
 - Implement systematic internal communication
 - Continue to ensure that all employees have equitable access to professional development opportunities
 - Enhance orientation and mentoring for all employees
 - Implement, in units of the college, ways to broaden input into annual performance evaluations, including



- reciprocal evaluations of staff by supervisors and of supervisors by staff
 - Revitalize faculty governance structures
5. Increase efforts to ensure a diverse, inclusive, and supportive work environment for all
 - Continue targeted hiring of minority extension educators via the Professional Entry program for entry level extension educators
 - Continue strengthening faculty and staff working relationships
 - Provide professional development addressing work climate issues
 6. Reduce the environmental footprint of the college
 - Assess the greenhouse gas production attributable to college operations and set a target for reduction
 - Adopt environmentally friendly packaging and consumables at the Berkey Creamery
 - Engage undergraduate student population in working with college faculty and staff to identify and implement sustainable environmental practices for college operations
 - Cooperate with the Office of the Physical Plant to identify opportunities for research and demonstration of bioenergy alternatives to meet college energy needs

FACILITIES AND LAND— PROGRESS AND FURTHER PLANNING

Since the college's 2005–2008 strategic plan was completed, several major accomplishments have been achieved.

- The new Forest Resources Building and Food Science Building and Berkey Creamery have been completed and are now occupied. Both are major assets that will greatly enhance our teaching, research, and extension and outreach programs.
- Renovation of Ferguson Building was also completed, with the Department of Agricultural and Extension Education moving into the building fall 2007. Space was also provided in Ferguson for the Pesticide Education program.
- Space made available in the Agricultural Administration Building from the move of the Department of Agricultural and Extension Education to Ferguson Building has been reallocated to meet needs of remaining groups in Agricultural Administration and to help alleviate some space needs of the Departments of Entomology, Veterinary and Biomedical Sciences, and Crop and Soil Sciences.
- The University Arboretum is now launched with a major gift to establish the H. O. Smith Botanic Gardens in the Arboretum at Penn State. Construction began summer of 2008.
- Planning is nearly complete for the Life Sciences II/ Materials Research Building. This building, as well as the completed Life Sciences I Building, will be of major significance to our college. A number of our faculty will have space in these buildings and the opportunities for collaborations and multidisciplinary work are greatly expanded.
- Progress has been made in some renovations of selected greenhouses of the Tyson Building complex.
- A multipurpose educational and storage building was constructed at the Southeast Ag Research and Extension Center in Lancaster County.
- Private funding was secured, and construction is underway, for a major addition to the Pasto Agricultural Museum at Rock Springs.
- Significant renovations to Merkle Lab and the Agricultural

Engineering Building are planned or underway in order to accommodate new faculty hires in energy, infectious disease, and chemical ecology. Renovations in the Henning Building were completed for several new faculty as part of the Reproductive Biology Initiative.

- A new University biosafety level-3 facility will be constructed, with funding from the Commonwealth and several university sources including our college. This is a major step in meeting a critical University need. Longer-term planning for adding more extensive level-3 facility capacity is actively being pursued.

Additional facility planning priorities for the college:

- Renovation of Henning Building and addition to Henning/Agricultural Sciences and Industries Complex
- Further renovation of Chemical Ecology Laboratory and affiliated, adjacent structures
- Construction of new greenhouses as part of a University-wide initiative, and renovation of some existing greenhouses adjacent to Tyson
- Renovation of Agricultural Engineering Building
- Construction of new Meats Laboratory

Agricultural and forestlands continue to be essential to carrying out our missions of research and education. Location of our facilities near these lands, wherever possible, is a great advantage in terms of easy access to our students, staff, and faculty and in terms of efficiency of operation. Some college lands have been needed for other University uses such as athletic facilities, parking, medical facilities, road construction, airport expansion, and well-head protection. In the context of the University Master Plan, the University and college work closely together in considering future needs of agricultural and forestlands. Additional lands north of University Park Airport, some contiguous to present Penn State lands, are of strategic interest to the college. These lands are needed to meet long-term needs for education and research in such areas as the animal sciences, plant sciences, forestry and wildlife sciences, environmental and water stewardship sciences, and biomass energy science. Lands adjacent to our Fruit Research and Extension Center in Biglerville are also of strategic importance to the college.

FIVE-YEAR RECYCLING PLAN AND PROGRAM ENHANCEMENT FUNDING REQUEST

Recycling Plan

Two recycling efforts impact our college. First is the University-imposed recycle, this time a 1 percent recycle back to the University. Second are the several recycles the college has imposed on itself to manage the shortfall from state and federal appropriations for research and cooperative extension programs. Unlike other colleges, we receive no tuition dollars to support these programs, nor do we receive University funds for salary increases and fringe benefits on salaries supported on these appropriated funds.

The University recycle for 2008–2013 is \$153,501 per year for five years for a total of \$767,505. This amount is 1 percent of our net operating budget for teaching. The college will recycle this amount from the teaching portion of anticipated faculty position vacancies.

Three college recycles (2001, 2002, and 2003) addressing appropriation shortfalls for research and extension have been very burdensome. They totaled \$10,844,000. From 2004 to the present, and as part of our strategic plan, all vacated positions have been reverted to the dean. This was necessary because the appropriation shortfalls have continued. In these last four years alone, mandated salary increases and fringe benefit increases have exceeded appropriations by \$6,555,919. Any funding left after covering the salary and fringe costs has been reallocated and reinvested (see Goal D for detailed examples) into high-priority strategic initiatives of our plan. These reinvestments of college funds have been leveraged to gain significant matching funds to hire faculty and county educators. For educators, matching funds have been gained from county governments and other partners to cost-share reinvestment in county educator positions of strategic importance. Likewise, funds have been gained for co-funded faculty hires from the Penn State Institutes for Energy and the Environment; Children, Youth, and Families Consortium; the Huck Institutes for the Life Sciences; the Provost's Opportunity Fund; and Special Initiative Funds.

Program Enhancement Requests

Our total request is for \$1,530,000, which is composed of our recycled amount plus 5 percent of our base budget. We have chosen two of our strategic initiatives for this enhancement. Though University funding is requested for these two special initiatives, our intent is to consider investment of available college resources not only for these two initiatives but across our other three strategic initiatives as well.

Entrepreneurship—\$765,000

The funds would be used for a combination of program support, staff support positions, graduate assistants, visiting entrepreneurs in residence, and non-tenure-track and tenure-track faculty (some cofunded with collaborating colleges/schools). The University resources requested would be allocated through a competitive process, as part of our implementation phase, and could be in any unit of our college where the investment has the best potential for significant contributions to the overall components we have described for this initiative.

Water Quality and Quantity—\$765,000

The funds would be used for faculty hires and startups, especially those where we can secure cofunding. Additionally, we will consider special support to enhance existing efforts and those program needs that are particularly related to input from our stakeholders. As with the entrepreneurship initiative funding, the specific allocation of the funds would come as a detailed implementation strategy is developed.



Appendix A: College of Agricultural Sciences Strategic Plan 2008–2013

Mission

The mission of Penn State’s College of Agricultural Sciences is to discover, integrate, translate, and disseminate knowledge to enhance the food and agricultural system, natural resources and environmental stewardship, and economic and social well-being, thereby improving the lives of people in Pennsylvania, the nation, and the world.

Core Values

- Excellence and productivity in the scholarship of resident education, research, and extension/outreach
- Creativity, innovation, and openness to change
- Stakeholder engagement and responsiveness to emerging issues
- Access to information and knowledge to facilitate lifelong learning for all Pennsylvania residents
- Interdisciplinary, cross-functional collaboration and communication to solve complex problems for the common good
- Dedication to diversity, multicultural understanding, and cross-cultural competence
- An atmosphere of mutual respect that promotes listening, openly sharing ideas and viewpoints, and debating issues and concerns
- The highest standards of integrity, honesty, shared responsibility, and mutual accountability
- Commitment to our employees and an environment that nurtures personal and professional growth and development

Strategic Initiatives

- Energy
- Entrepreneurship
- Food, Diet, and Health
- Pest Prediction and Response
- Water Quality and Quantity

Vision

Penn State’s College of Agricultural Sciences aspires to be the regional, national, and international leader in understanding the natural and human systems underlying agricultural sciences, translating that understanding to enhance quality of life, and educating the leaders of today and the future. We will organize our approach to teaching, research, and extension/outreach around three interrelated systems: food and fiber system, ecosystem, and socioeconomic system.

Goal A: Increase Enrollment and Enhance Student Success

Performance Indicators

- Increase overall undergraduate enrollment
- Increase overall graduate enrollment
- Increase funding for scholarships
- Increase student achievement of program learning objectives
- Increase student, employer, and alumni satisfaction measures
- Increase SAT and GRE scores of incoming undergraduate and graduate students

Strategies

1. Increase efforts to recruit and retain a high-quality and diverse pool of undergraduate and graduate students
2. Revitalize undergraduate curricula, starting with study group recommendations
3. Assess student learning outcomes
4. Plan and implement actions to enhance graduate programs
5. Provide relevant programs to increase enrollment in extension
6. Devise new ways of reaching resident, distance, and extension students through technology and alternative scheduling

Goal B: Enhance Knowledge Discovery and Translation

Performance Indicators

- Increase our extramural funding totals
- Increase the number of publications
- Increase the number of college-initiated invention disclosures to 10–15 per year

Strategies

1. Reallocate resources to facilitate a focus on emerging areas of excellence
2. Enhance linkages with other colleges, institutes and consortia, agencies, and universities nationally and internationally
3. Continue to broaden our funding portfolio in grants and contracts

Goal C: Strengthen Meaningful Communication and Mutual Education with Current and New Stakeholders

Performance Indicators

- Increase stakeholder satisfaction measures
- Increase the number of venues through which stakeholders can engage with the college

Strategies

1. Expand opportunities for current and new stakeholders to provide strategic advice
2. Improve the college’s dissemination of research results
3. Enhance public education
4. Enhance recognition, reporting, and distribution of the impact of our programming

Goal D: Lead and Manage the College as a System

Performance Indicators

- Enhance cost savings and cost avoidance, and generate alternative revenue
- Enhance nonappropriated funds
- Increase the percent of funding allocated to strategic initiatives
- Increase faculty/staff satisfaction with the college climate

Strategies

1. Continue reallocating resources to strategic priorities
2. Use stakeholder information on needs, expectations, and satisfaction to plan and improve programs and develop new opportunities
3. Continue streamlining administrative processes to achieve time and cost savings
4. Enhance employee engagement within the college
5. Increase efforts to ensure a diverse, inclusive, and supportive work environment for all
6. Reduce the environmental footprint of the college

Appendix B: Cost Savings

College-wide Examples

- College publications policy implemented to require printing cost recovery on bulk orders of non-4-H, tax-supported titles. Recovery was over \$20,000 during this period.
- The 4-H educational materials fee of \$10 per member and bulk cost-recovery orders have generated more than \$870,000 to support the printing and purchase of project activity books and other printed curricular materials.
- The college will implement a 4-H horse program fee of \$25 per member in fall 2008. The fee will support two new horse program extension associates and their operating costs. \$5 of the fee will also be directed to a new 4-H horse program endowment. On the basis of the 2006–07 horse project headcounts (6,633), this would generate about \$165,000.
- The Publications Distribution Center (PDC) negotiated a unique UPS pick-up site at Ag Administration Building. Cost savings will be obtained by eliminating daily package transport across campus to University Mailing Services. Efficiency will be gained by reducing multiple handling of the same packages by both the PDC and Mailing Services staff. Estimated annual savings is \$8,000.
- Business partnerships have been formed between the PDC and Analytical Services Lab to consolidate weekly bulk mailings to county extension offices. Annual savings: \$20,000.
- Expanded analytical services to include water testing and green roof media testing. Annual revenues: \$100,000.
- Cost share on major equipment with Huck core facilities provides more efficient service for faculty. Sharing of major equipment within and across college units saves money on startup packages.
- Expanded role as nationally recognized laboratory offering testing services to faculty and staff whose universities or research institutes do not have comparable analytical capabilities. Routinely perform analyses for more than 25 outside universities and research institutes with annual revenues approaching \$75,000.
- Purchase of robotic instrumentation and analyzers for preparation of environmental samples, mercury analysis, and multi-element analysis of sample extracts to reduce hazardous waste generation/disposal as well as reduce labor costs. Annual cost savings of approximately \$50,000.
- New Holland collaboration provided free use of four new tractors, reducing operating costs by \$180,000. The collaboration involved the exchange of documented experience data associated with the use of 100 percent biodiesel. An additional \$140,000 savings was generated with two new additional tractors involved a similar collaboration using 100 percent vegetable oil.
- Continued John Deere and Fendt buy-back purchase agreements have generated savings of \$45,000.
- Incorporated GPS equipment and site-specific information technologies to improve cropping efficiency by reducing fertilizer and pesticide use without reducing yields. Savings generated \$6,000.



- University-based collaboration between Farm Operations and Penn State dining facilities will utilize 20,000 gallons of used cooking oil to convert to diesel fuel for use in farm machinery. Estimated annual savings of \$80,000. This initiative is in the initial planning stages.
- University-based collaboration between Farm Operations, Office of Physical Plant, and Penn State Food Services has reduced landfill tipping fees by \$25,500 while generating \$109,000 worth of landscape compost/mulch, about half of which is sold to landscape contractors.

Academic Unit Examples

1. Replace equipment with more efficient and effective alternatives

- Veterinary and Biomedical Sciences has reduced paper and copying and mailing expenses by increased use of electronic PDF documents. Annual savings are \$8,923.
- Crop and Soil Sciences replaced electric forage sample dryers with a corn furnace, saving about \$1,500 per year.
- Food Science purchased an all-in-one copier that handles scanning and faxing to help reduce faxing/copying costs.
- Ag and Extension Education has invested in a lease agreement for a Xerox Work Center machine that performs multiple functions to include scanning, faxing, e-mailing, color copying, and some basic printing jobs. This approach has saved printing and copying costs as well as reduced physical storage space requirements as documents can be stored electronically.
- Poultry Science purchased a van from Fleet Services for pooled department use. Estimated savings over renting a vehicle for every trip was \$5,000 per year.
- Poultry Science has chosen to eliminate some annual instrument maintenance contracts, saving \$7,000 annually.

2. Restructure operations to gain efficiency and generate savings

- Food Science eliminated a reception position, resulting in \$17,500 savings.
- Plant Pathology reallocated graduate assistantship resources and required faculty to pay for summer wages, thereby enabling the department to increase stipend levels and add four semesters of tuition grant-in-aid to the departmental pool.
- Plant Pathology has migrated to the college-supported master budget reporting tool, which builds on IBIS and has increased efficiency of accounting staff.
- Crop and Soil Sciences has merged smaller regional/commodity meetings into larger and more comprehensive statewide meetings, resulting in greatly improved efficiency. For example, the Professional Crop Producers Conference drew an attendance of 284 participants at a registration fee of \$180 per participant. Cost savings were realized and increased revenue was generated.
- Horticulture has migrated to electronic newsletter distribution, saving about \$3,000 per year.
- Veterinary and Biomedical Sciences has reduced use of Fleet vehicles by 15 percent through coordinating trips and carpooling. Annual savings are \$2,871.
- Agricultural and Biological Engineering has required travelers to claim only actual out-of-pocket meal costs, resulting in estimated annual savings of \$9,500. Past practice had been to allow the full meal per diem.
- Ag Economics and Rural Sociology redistributed IBIS financial forms creation to more staff across the department. This eliminated a common backlog of forms to be processed and created IBIS knowledge depth within the department. This depth has positioned the department to better react to other new central systems that have been implemented, such as ERS.

3. Enhance vendor relationships to increase efficiency and cost savings

- The Berkey Creamery has reduced the overall number of separate ingredient vendors to save thousands of dollars in freight costs.
- The Berkey Creamery has purchased in bulk from vendors, resulting in savings of nearly \$15,000.
- Poultry Science has negotiated with vendors to obtain deep discounts for items such as paper products for egg handling and in some cases has been able to get the items at vendor cost. It is estimated that savings are several thousands of dollars annually.

4. Utilize newer and standardized technology to maximize efficiency and revenue generation

- Crop and Soil Sciences' Turfgrass World Campus program enrollments have exceeded 600. Total annual program revenue exceeds \$800,000. The establishment of the College eLearning Office will allow for more revenue to stay in the college and be reinvested back to the program.
- Horticulture has begun to utilize video conferencing to conduct Master Gardener training, which has generated an estimated savings of \$5,500 in travel related costs. This approach has also created increased program participation and training quality has greatly improved. The Master Gardener Coordinators Conference was also administered; using this technology and generated an estimated savings of \$10,000 in travel, lodging, meals, and registration.
- Ag and Extension Education has also invested in video conferencing technology that has been used by faculty and staff to save thousands of dollars on travel.
- Ag and Extension Education has gone exclusively with college EN computer systems and purchased "gold card" services from the college IT unit. This approach has eliminated the need to hire departmental technology staff and created a stable and reliable environment that faculty and staff can depend on when accomplishing their tasks.
- Ag Economics and Rural Sociology has centralized management and standardization of information technology within the department, resulting in improved service and reliability, reduced funding for part-time assistants, and a streamlined, scheduled offsite backup.
- Ag Economics and Rural Sociology developed and implemented consistent report formats understandable to all financial decision makers in the department. The department utilized existing systems in place to access the data warehouse and populate standardized reports. This approach has greatly improved efficiency and has made "on-demand" reporting a much easier task. Standardized report formats will also allow the department to better compare and analyze archived information.
- Ag Economics and Rural Sociology developed and implemented a database application to collect uniform and standardized graduate student information. This application eliminated the need for graduate program coordinators across the college to develop their own data-collection tools.

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