STRATEGIC PLAN

For

THE COLLEGE OF AGRICULTURAL SCIENCES

COLORADO STATE UNIVERSITY

In association with

Colorado Agricultural Experiment Station
Colorado Cooperative Extension

December 1, 2005

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COLORADO STATE UNIVERSITY
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COLORADO COOPERATIVE EXTENSION
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Mission Statement: The College of Agricultural Sciences, in association with the Outreach Agencies (Colorado Agricultural Experiment Station and Colorado Cooperative Extension), is committed to excellence, setting the standard for undergraduate and graduate education (resident and distance), basic and applied research, and public education related to agricultural, ornamental, and equine industries on topics of inputs, production, processing, merchandizing, management, finance, policy, food quality, landscape design, environmental impacts, and community development, using plant, animal, soil, ecological, and economic sciences.

Vision Statement: The College and Agencies will be recognized locally and nationally as leaders in developing professionals and generating and disseminating knowledge to keep Colorado agriculture competitive, food safe, the environment clean, Colorado green, and to build food products which contribute to health and prevent disease.

Core Values: The College and Agencies base their activities on the following core values:

1. Develop and apply objective knowledge based upon the scientific process and peer review.
2. Provide open access for all to the university.
3. Provide open and timely communication of results to peers and the public.
4. Encourage and reward teamwork to solve issues.
5. Demonstrate respect for the unique contribution of each person.
6. Employ high standards of academic and scientific integrity.
7. Provide high value added performance in education and research for customers and the public.
8. Demonstrate respect and a collaborative and helpful spirit for people inside and outside of the organization.
9. Promote and reward excellence in teaching, research, outreach, and service.

The Purpose and Result of Planning: Strategic planning in the College and Agencies is guided by the mission, vision, and core values of Colorado State University as established by the Colorado State University System Board of Governors.

> **Mission:** Inspired by its land-grant heritage, Colorado State University is committed to excellence, setting the standard for public research universities in

teaching, research, service and extension for the benefit of the citizens of Colorado, the United States, and the world.

Vision: The Colorado State University system will be the premier system of higher education in the nation.

Core Values: Be accountable
Promote civic responsibility
Employ a customer focus
Promote freedom of expression
Demonstrate inclusiveness and diversity
Encourage and reward innovation
Act with integrity and mutual respect
Provide opportunity and access
Support excellence in teaching and research

The plan for the College and Agencies is intended to guide undergraduate and graduate education, research, outreach, and service programs toward greater effectiveness in fulfilling organizational missions, greater service to Colorado, and greater recognition among peer institutions. The College and Agencies are very small in size and public resource support relative to comparable land grant universities in other states. State and federal public budgetary support is falling in real terms and becoming increasingly uncertain. Thus, the College and Agencies have assessed the probable success in fourteen topical program areas (Goals 15-28) by reviewing the importance of the topic to Colorado, the strengths and weaknesses of Colorado State University to pursue efforts in the topic areas, resources available and organizational effectiveness to build on, and strategic initiatives and critical resource growth needed to successfully compete in providing research, education, and service in these topical program areas. Additionally, overarching goals affecting all topical program areas are established for: undergraduate education; graduate education; research; extension; integration; diversity and inclusiveness; international experience and exposure; culture and community; facilities and information technology; human and financial resources; and accountability. The planning process will continue as a living management tool to set goals, maintain focus, allocate resources and effort, evaluate performance, and reassess and adjust goals for the next period.

RUMINANT PRODUCTION SYSTEMS

Goal: Colorado State University will enhance its focus and depth in undergraduate education, graduate education, research, and outreach in beef production systems and be recognized as the leading university program in beef production systems in the West. This will include experiential learning in the animal sciences BS degree designed to add practical experience in the science, production, and business aspects of the industry to prepare students for leadership positions in ranch, farm, and agribusiness management. Graduate education and research will focus on fundamental and applied research in breeding, nutrition, physiology, behavior, integrated resource management systems, economics, health, and range/forage management. Outreach will span the breadth of the topics of research to assure that industry participants have practical knowledge in modern beef, dairy, and sheep production systems, biosecurity, economic and risk management, and response to policy and consumer changes. Outreach to youth involved in livestock production and judging events will continue as part of experiential learning in 4-H, FFA, and college judging.

Imperative: Animal agriculture is a major economic sector in the United States and the leading agricultural activity in Colorado. In 2003, live meat animal sales in Colorado were valued at $3.252 billion and the value of dairy production was $264 million. Livestock and livestock products accounted for 60% of crop and livestock sales in Colorado. Remaining competitive requires that the industry produce with the most technically sophisticated systems available while considering environmental and animal welfare dimensions to maintain confidence of the consuming public. Ruminant agriculture on range is the only significant agricultural enterprise which is ubiquitous in Colorado. In addition to novel and economic production practices, today's livestock producers must be knowledgeable of alternative supply chains to select a lucrative market, be aware of animal identification and trace-back requirements, understand the effects of emerging animal public health conditions, and understand the international and domestic trade environment and trends and how to respond with risk management strategies. Colorado State has many resources devoted to this broad subject, and it is a fertile field to foster multi-department, multi-college, and multi-county interactions. Young people on or near farms and ranches have opportunities to build maturity by taking responsibility for raising and showing ruminant species; Colorado State support experiential learning opportunities for youth through 4-H, FFA, and college judging contests. Colorado State University is in a strong position to provide undergraduate and graduate education to prepare people for ruminant industry positions, research in the basic animal sciences and production management systems and methods to respond to national and international markets and policy, and outreach to assure transmission of research knowledge to livestock industry practitioners.

Colorado State University's Strengths: The Department of Animal Sciences offers a B.S. degree in Animal Science with 257 majors in fall, 2004. The recently renovated program is balanced between science, agribusiness, and communications, and is a highly experiential learning program educating young people for successful careers in the livestock and meat industry. The department had 55 graduate students across all

disciplines in fall, 2004. Strong judging teams are fielded in livestock, dairy, meat, wool, and horse and extension offers a strong 4-H youth development livestock program across Colorado. Research in beef production management systems and nutrition is conducted on owned facilities at the Agricultural Research, Development, and Education Center (ARDEC), Eastern Colorado Research Center, Southeastern Colorado Research Center, and the Rouse Ranch in Saratoga, Wyoming. An integrated "Beef Alliance" coordinates teaching, research, and outreach in beef across all facilities focused on value-added production systems. Strong relationships exist between animal scientists and agricultural management and marketing economists. ARDEC hosts seedstock herds for Angus and Hereford, as well as a ram test. The Department of Animal Sciences has several significant assets, including a renowned expert in animal behavior and welfare, the Western Center for Integrated Resource Management, the Center for Genetic Evaluation of Livestock, the congressionally sponsored National Beef Cattle Evaluation Consortium and strength in research and graduate programs in beef nutrition and breeding. Livestock industry outreach includes a team of campus specialists in livestock management systems, economics, trade, policy, manure management, meat science, alternative marketing chain participation, and animal identification systems.

Colorado State University's Weaknesses: The main campus Animal Science building facilities for classrooms, laboratories, and offices are in very poor condition. Faculty turnover requires replacement of faculty positions with individuals interested in pursuing teaching, research, and outreach careers in beef system improvement, and outreach careers in other ruminant species. Support for teaching, research, and outreach activities, including staff, operating, and travel support is small. The relationship between animal production sciences and rangeland and forage production sciences is weak.

Organization and Personnel: The CSU Beef Alliance structure for coordinated beef cattle research, teaching, and outreach is essentially effective. The Department of Animal Sciences leads this team effort with contributions from other departments, especially Agricultural and Resource Economics. A closer working relationship with other departments in the Colleges of Agricultural Sciences and Natural Resources will strengthen outcomes, especially working in the Agro-Ecosystems arena.

Strategic Initiatives:

- Renovate the Animal Sciences Building
- Reposition the Integrated Resource Management teaching and research program.
- Replace critical faculty positions: Nutrition, Muscle Biochemistry/Physiology, and Beef Environmental Systems.
- Bring the Southeastern Colorado Research Center on line.

Critical Resource Growth:

- Secure funds to renovate the Animal Sciences Building ($12 million). Align land and field laboratory facilities with future research and teaching directions.
- Significantly increase grant and contract revenue sources to support all programs.

MEAT SCIENCE AND ANIMAL PRODUCT FOOD SAFETY

Goal: Colorado State University will enhance its focus and depth in undergraduate education, graduate education, research and outreach in meat science and animal product food safety and be recognized nationally as one of the top three university programs. This will include experiential learning in the animal science BS degree designed to add practical experience in meat science and microbiology and to prepare students for leadership positions in the meat production and food manufacturing industries and regulatory agencies. Graduate education, research, and outreach will focus on pre-harvest management of livestock to prevent acquisition of human pathogens in livestock production and handling, post-harvest detection and management systems to prevent contamination of meat products with human pathogens, assessment of production systems and regulatory protocols for effective food safety results and domestic and international credibility of the meat product, and producer, consumer, and food handler education in food safety to prevent contamination.

Imperative: Animal agriculture is a major economic sector in the United States. The red meat industry contributes substantially to the U. S. economy. Each year 30 to 35 million cattle (26.5 million fed steers and heifers), 80 to 92 million hogs, and 5 to 7 million lambs are marketed in the U. S. Remaining competitive requires that the industry provide consumers with products that meet their demands for safety, wholesomeness, quality, convenience, and price. Efforts in Meat Science focus upon the manner in which harvested animals are produced and on appearance and palatability of fresh beef, pork and lamb. Specific needs are to assure that US fresh meat is acceptable to both domestic and international markets and performs beyond expectation when consumed. Much has been done to assist industry with research results intended to help solve problems related to *Escherichia coli* O157:H7 in fresh beef, *Listeria monocytogenes* in processed meat products, and bovine spongiform encephalopathy in beef. As new food safety issues develop (e.g., the advent of antimicrobial resistance of food-borne pathogens, etc.), it will be increasingly important that proactive scientific investigation occurs so that policy-makers have access to the necessary factual information from which sound regulatory decisions may be made. Consumer confidence also requires that livestock producers, packers, and processors generate products from animals that are reared in a compassionate manner, handled appropriately, and produced with environmentally responsible methods.
Colorado State is in a strong position to assist with the economic development of Colorado's livestock and meat industry and to enhance the public health of citizens by educating meat industry scientists and professionals, researching technical and economic issues related to improved product quality, safety, and international competitiveness, and being actively involved with the livestock and meat industry and governmental agencies to assure that the latest knowledge is incorporated in management and regulatory decisions.

Colorado State University's Strengths: Colorado State is recognized as a "five star" institution conducting research, teaching and extension activities in the food safety and food quality arena. There is an outstanding network of working relationships with the meat processors and food regulators of Colorado and the nation with active consultation related to maintaining and enhancing the safety, palatability, and demand for products they

generate; faculty and staff display a sense of urgency in finding solutions to industry and regulatory issues. Colorado State is among the leading universities conducting research, teaching and outreach related to *E. coli* O157:H7, *Salmonella* spp., and *Listeria monocytogenes* control and prevention in animal food products, as well as instrument assessment, quality management practices, and trade access to export markets. Faculty are well-known across the spectrum of meat product quality, meat safety, and humane animal handling. Faculty attract grant resources and students nationally and internationally. There are the Center for Red Meat Safety and the cross-campus Graduate Program in Food Science and Food Safety. Faculty have excellent working relationships with key personnel in federal agencies, e.g., USDHHS-FDA, USDA-AMS, USDA-FSIS, USDA-APHIS, USDA-FAS and excellent working relationships with Swift & Co., which offers access to product development laboratory space, graduate seminars with industry, and faculty-industry symposia.

Colorado State University's Weaknesses: Physical facilities, including modern laboratories, graduate student and support staff office space, are far inferior to competitive universities. Poor facilities negatively affect grant competitiveness, student recruitment, and perceptions of strength of meat science and food safety researchers by peer institutions. The number of faculty positions devoted to the area and base support funding for program development and travel support are far less than at peer institutions.

Organization and Personnel: The meat science program is led by Dr. Daryl Tatum, the Center for Red Meat Safety by Dr. John Sofos, and the Graduate Program in Food Science and Food Safety by Dr. Patricia Kendall. These entities will develop (many exist) relationships with faculty in the Department of Agricultural and Resource Economics, the Colleges of Veterinary Medicine and Biomedical Sciences, Applied Human Sciences, Business, and Natural Sciences, as well as several federal and state agencies.

Strategic Initiatives:

- Develop new approaches for meat science and safety research management to be more responsive to industry, regulatory, and export issues.
- Develop new approaches with which to transfer technology from research to industry and governmental partners.
- Double the number of graduate students in the program (to 36).
- Develop a five-year BS/MS degree program in Meat Science.

Critical Resource Growth:

- Renovate and expand the Animal Sciences Building to improve laboratory, classroom, and office space (estimated at $12 million).
- Add a faculty position in each of food microbiology and muscle biochemistry.
- Secure one endowed faculty chair to raise the level of one faculty position.
- Add two Post-Doctoral Fellows, two Research Associates, two meat science/food safety outreach professionals, and 18 graduate student first year stipends.
- Secure an additional $50,000 annually for faculty, student, and outreach professional travel and project development.

EQUINE SCIENCE AND BUSINESS

Goal: Colorado State University will enhance its focus and depth in undergraduate education, graduate education, and outreach in equine sciences, and be recognized as the leading university program in equine science in the nation. Undergraduate education will include experiential learning designed to add practical experience in the science, production, sales, and show management aspects of the equine industry and prepare students for leadership positions in the equine industry. Graduate education will consist of a master's degree program in Equine Industry Leadership to further scientific and business knowledge in the field. Outreach will focus on youth and adult horse competition organization and teaching, nutrition and waste management for horse owners, and equine management on small acreage holdings. NOTE: This goal refers only to the planned activity of the College of Agricultural Sciences, the Agricultural Experiment Station, and Cooperative Extension. It does not include strategic goals of the College of Veterinary Medicine and Biomedical Sciences.

Imperative: Estimates place the U. S. population of horses at 9.2 million with an industry economic impact of $102 billion. In Colorado, the horse population is 194,000 and the economic value of the equine industry in Colorado is $754 million. At Colorado State, the undergraduate program is a major within the Department of Animal Sciences in the College of Agricultural Sciences. In fall 2005, the program had 417 undergraduate majors and an additional 94 majors with a dual major in Agricultural Business. The program is the largest undergraduate major in the College of Agricultural Sciences and enjoys a national reputation; approximately 45% of the students are non residents. The equine teaching and outreach program was reviewed in 2004 with considerable input from industry leaders and others. A thorough revision of the curriculum was undertaken during the fall of 2004 to make changes deemed important by the industry leaders to better prepare students to be successful in the industry. The largest service and outreach audience are participants in the 4-H equine project, one of the largest 4-H projects with activities ranging from competitions to educational activities. Adult outreach is offered with an adult horsemanship program, farrier science and management short courses, and extension programs in nutrition, small acreage management, and waste management.

Colorado State University is in a strong position to assist with the economic development of Colorado's equine industry and enhance the well-being of citizens with interests in horses by educating equine industry professionals and hobbyists, researching technical and economic issues related to equine production, training, and utilization, and being involved with the equine industry, governmental agencies, youth and other consumers to assure that the latest knowledge is incorporated in management and regulatory decisions.

Colorado State University's Strengths: Colorado State University offers the only Equine Sciences degree at a land grant university, with nearly 500 majors, making it the largest major in the college. The Equine Science degree program was modified substantially in spring 2005 to emphasize teaching of sales management and preparation, the science of raising horses, and business management and communications. Colorado State is a national leader in equine reproduction research and outreach. Current research

programs in equine nutrition are becoming recognized for their contributions to the establishment of uniform nutritional requirements for horses. Colorado outreach programs are focused on 4-H youth and small acreage owners providing information on competitive showing, ethics, and husbandry, nutrition, selection, and waste management. Colorado State is nationally competitive in common equine competitions.

Colorado State University's Weaknesses: Equine research is not a priority of either the Agricultural Experiment Station or the College of Agricultural Sciences. However, equine faculty are associated with nationally recognized equine reproduction research in the College of Veterinary Medicine and Biomedical Sciences. There is no graduate program in equine science. Faculty resources and operating support have not kept pace with the growth of student majors or the outreach demands of youth, horse owners, or communities.

Organization and Personnel: While the Equine Science degree is offered through the College of Agricultural Sciences, all equine programs are part of the Colorado State Equine program. The program is managed by a 5-member Steering Committee composed of the Deans of Agricultural Sciences and Veterinary Medicine and Biomedical Sciences and Heads of the Departments of Animal Sciences, Biomedical Sciences, and Clinical Sciences; the Center is managed by the Director of the Animal Reproduction and Biotechnology Laboratory (research, graduate education, and short courses) and the Director of Teaching and Outreach (outreach and undergraduate education). Fundraising for the undergraduate degree is coordinated through the College of Agricultural Sciences. Program faculty include 3.0 FTE of tenure track faculty (17 months of Resident Instruction, 5 months of AES research, and 5 months of CE outreach), 0.5 FTE non-tenure track faculty, 2.0 FTE of instructors (18 months of Resident Instruction and 2 months of CE outreach), and 0.75 FTE of the Director of Teaching and Outreach. There also are a barn manager, a farrier, and a half-time instructor for packing and outfitting.

Strategic Initiatives:

- Develop a non-thesis masters degree of Equine Industry Leadership.
- Enhance faculty size.
- Develop a competitive horse show team.
- Develop a therapeutic riding class and an equine sales management/preparation class.
- Develop detailed plans for an undergraduate advising program, and outreach programs in 4-H, and outreach programs in small acreage management, waste management, and the Colorado Horse Expo.
- Increase support through development activities.

Critical Resource Growth:

- Add permanent funding to the half-time non-tenure track faculty position.
- Acquire one additional tenure track faculty position.
- Develop a significant fund-raising program to support the Equine Sciences undergraduate program, especially for scholarships and facility and animal maintenance.

ANIMAL ENVIRONMENTAL SYSTEMS

Goal: Colorado State University will enhance its focus, depth, and integration in undergraduate education, graduate education, research, and outreach in environmentally sound systems for animal production units and be recognized as the leading university program in the West and among the top five university programs nationally in cattle and equine environmental systems. This will include experiential learning in courses contributing to the BS in Animal Sciences, Equine Sciences, and Soil and Crop Sciences designed to add practical experience in the science and applications of environmental management systems for air and water quality protection related to animal production systems. Graduate education, research, and outreach will consist of masters and doctoral degree programs related to livestock nutrition and management, soil science, engineering, and economics of waste management systems and the evaluation of production systems and regulatory protocols for effective environmental protection.

Imperative: In 2003, live meat animal sales in Colorado were valued at $3.252 billion and the value of dairy production was $264 million. Livestock and livestock products accounted for 60% of crop and livestock sales in Colorado. The Colorado horse population is 194,000 with an economic value of $754 million. Cost effective technologies to protect soil, water, and air quality near livestock production sites is one of the most limiting factors to growth in the livestock industries. Livestock production in the South Platte Basin is known to have resulted in nitrate contamination of groundwater and elevated phosphorus levels in reservoirs. Water quality issues are not limited to nutrients, but could include pathogens and pharmaceuticals. The Arkansas Basin, Great Plains, and Tri-River Area (Gunnison, Uncompagre, and Colorado Rivers) on the West Slope face similar issues. Over the last decade livestock operations have become more concentrated, thus multiplying the potential for environmental hazards. Rapid urbanization along the Front Range has led to increased competition between urban and rural water uses and increased conflict between urban and rural people. Regulatory enforcement has increased at both federal (EPA) and state (Colorado Water Quality Control Commission and Colorado Air Quality Control Commission) levels.

Colorado State University is in a strong position to assist with the economic development of Colorado's livestock and equine industry, to enhance environmental quality, and to enhance the public health of citizens with improved livestock environmental solutions by educating livestock and equine industry professionals and small acreage owners in best management practices for nutrient management and odor and dust control; researching technical and economic issues related to improved animal production practices; and being actively involved with livestock and equine industry personnel, governmental agencies, and small acreage owners, to assure that the latest knowledge is incorporated in management and regulatory decisions.

Colorado State University's Strengths: Thirty-six faculty in 13 departments in 5 colleges and county extension offices do research and education on aspects of animal environmental systems at Colorado State University. The university has strong programs in beef, dairy, and lamb production systems with significant research feeding facilities, as

well as strong programs in alternative agriculture and atmospheric sciences. Colorado State has developed undergraduate courses in Manure Management and elements on the topic in several other courses. The Agricultural Experiment Station provided $70,000 annually for six years to develop research programs in the topic area (terminated after FY'05). A proposal for a Center for Animal Agriculture and Community Enhancement (CAACE) has been developed.

Colorado State University's Weaknesses: There is a lack of cohesion among scientists and educators to develop an effective research, teaching, and outreach strategy for impact on the industry or regulatory agencies. There are incomplete relationships with Colorado's regulatory agencies for water and air quality which impedes recognition as the primary knowledge source on the scientific and economic aspects of animal feeding operation environmental management and regulatory solutions. There is a shortage of faculty expertise devoted to the topic as a primary focus of their research and educational programs, especially with no faculty in the Departments of Animal Sciences or Environmental Engineering.

Organization and Personnel: There is one identified faculty person in the Department of Soil and Crops with specific responsibility to work on the topic. There are thirty-five other faculty with expertise and interest in elements of the environmental effects of livestock production, without an integrating entity.

Strategic Initiatives:

- Establish an active Center for Animal Agriculture and Community Enhancement with a governance structure to regularly promote professional development, communication, joint project and grant proposal development, and teaching and outreach program development; the Center will organize continuous relationships with livestock production organizations and regulatory agencies to create the position of knowledge leader in the topic area; potential subunits include water quality, air quality, improved production systems, and policies and regulations.
- Develop new approaches for animal environmental system research management to be more cohesive and more responsive to industry and regulatory issues.
- Develop new approaches with which to transfer technology from research to industry and governmental partners.
- Develop Colorado industry funding mechanisms, like market order (check-off) systems, to provide sustainable sources of revenue for research and educational work in animal environmental systems.
- Develop an active graduate program in animal environmental systems.

Critical Resource Growth:

- Add one animal scientist and one environmental engineer devoted to animal environmental systems.
- Add a producer-based check-off fund of $500,000 annually to support animal environmental research and education, and rise grant funding.

FUNDAMENTAL BIOLOGY OF PLANTS AND PLANT PESTS

Goal: Colorado State University will enhance its focus and depth in graduate education and research in fundamental plant biology and be recognized nationally and internationally as a competitive institution for national and international grants that is attractive to graduate students across the United States and the world. This will include graduate education and research in molecular biology and genomics of crop plants and their pests, mechanisms of biological resistance to pests, mechanisms of invasion of weed species, and understand the molecular and cellular foundations for crop improvement and crop pest management.

Imperative: Fundamental plant biology linking basic science with applied science is important to bring the results of basic plant science toward a usable form for applied agricultural sciences. Molecular biology and genomics are opening many new pathways for crop plant improvement and pest management, which will enhance the economic development of agricultural regions, enhance human health through more nutritious and safer food products, and find fundamental solutions to societal issues through renewable and sustainable crop production and pest management. Successful applied crop science, environmental science, and pest management do not occur in the absence of scientists actively involved in fundamental plant and pest sciences. Many of the faculty in the Department of Bioagricultural Sciences and Pest Management (BSPM) are faculty in the Graduate Degree Program in Ecology (GDPE) and advise MS and PhD students through GDPE. BSPM also offers Masters and PhD degrees in "Entomology" and "Plant Pathology and Weed Science." Colorado State University is in a strong position to assist with the economic development of Colorado's agricultural industry and to enhance the public health and well-being of citizens with research in fundamental genetic potentials of crop plants, management of plant pests, and preparation of industry, government, and academic scientists.

Colorado State University's Strengths: The Colorado State College of Agricultural Sciences has strengths in molecular biology and genomics of plants, insects, and plant pathogens, cytogenetics, and molecular mapping. There also are strengths in applying modern technologies to understand the fundamental biology needed for crop improvement, improving the nutritional qualities of food, and developing environmentally sound strategies to manage invasive species; these strengths include molecular genetics and genomics, bioinformatics, population biology, and microbiology. The College has strong, complementary, applied programs in cancer-food relationships, pest management, and plant breeding of wheat, dry bean, and potato. Colorado State's capacity in bioinformatics has been enhanced by recent university and college investments. Presence of the Gillette Museum of Arthropod Diversity and a cross-campus molecular plant biology consortium help strengths Colorado State's capacity in this area.

Colorado State University's Weaknesses: Much of the research infrastructure is inadequate due to many years of low investment, e.g., greenhouses no longer meet APHIS standards for working with transgenic organisms and high-throughput molecular mapping equipment is beyond the means of the university. Insufficient expertise is devoted to this area in plant transformation, plant genomics, secondary metabolism, biochemistry, and proteomics. Support staff, graduate students, and base operating support are very poor.

Organization and Personnel: Faculty in this area are represented by 12.0 tenure track faculty in the Departments of Bioagricultural Sciences and Pest Management, Soil and Crop Sciences, and Horticulture and Landscape Architecture.

Strategic Initiatives:

- Build greenhouse and laboratory facilities to EPA, USDA-APHIS, and NIH standards to permit research with transgenic and exotic pest organisms.
- Build faculty capacity in secondary metabolism and the genomics and population genetics of complex traits.
- Build capacity in bioinformatics, especially related to the evolution and distribution of novel, complex traits.
- Fully engage in the cross-college plant molecular biology consortium to seek jointly major grants, training grants, and graduate student recruiting.

Critical Resource Growth:

- Secure funds to bring greenhouse and growth chamber facilities up to regulatory standards for transgenic research.
- Secure one endowed chair faculty position.
- Enhance contract and grant income.
- Add $100,000 annually for first year graduate students support in the molecular plant science consortium.

CROP IMPROVEMENT EXTENDED TOWARD CROPS FOR HEALTH

Goal: Colorado State University will continue undergraduate education, graduate education, applied research, and outreach in genetics and breeding of cultivars for wheat, potatoes, and dry beans focusing on characteristics relevant to pest resistance and climatic conditions of Colorado. Additionally, Colorado State University will combine the knowledge of human nutrition and plant genetics to extend crop selection, germplasm screening, and crop improvement with the objective to build greater amounts of compounds relevant to improved human health and disease prevention into these crops and be recognized nationally and internationally as a competitive institution for competitive grants and attractive to graduate students in this topic. Crops for Health will include graduate education and research in human nutrition, plant genetics, and plant breeding.

Imperative: Non-hybrid crop plants require public investment in genetic improvement to provide varieties of cultivars which improve yield, resist environmental and pest stresses, and serve the consuming public. Colorado State has a history of providing cultivar breeding for wheat, dry beans, and potatoes to serve the industries in climatic zones represented in Colorado. Additionally, Colorado State has a history of providing crop selection and testing in other agronomic crops and fruits and vegetables to support the development of these agricultural industries in Colorado. In 2004, wheat generated $161 million in commodity sales, dry beans $38 million, potatoes $192 million, and other agronomic crops and vegetable and fruit crops generated $776 million, in Colorado. The value of these industries to the Colorado economy through other related economic activity is at least double these combined amounts. The miracles of molecular biological science have presented new opportunities to extend the selection and improvement of Colorado crops to incorporate improved human nutritional characteristic. The quantity and quality of the foods we eat have a dramatic impact on the current epidemic of metabolic diseases, e.g., cardiovascular disease, Type 2 diabetes, cancer, and obesity. Metabolites are biochemical compounds that carry out the business of cells in all organisms. Metabolites (like lipids and anti-oxidants) present in food and in the human body are critical to understand the development and prevention of metabolic disease. Metabolomics is the comprehensive analysis in which all of the metabolites of an organism are identified and quantified. Colorado State has invested in building the capacity to be a leader in discovery research in metabolomics by establishing an interdisciplinary research consortium to determine relationships between metabolites and disease, and to identify metabolites in animal and crop foods to help prevent disease and improve health. Colorado State University is in a strong position to assist with the economic development of Colorado's agricultural industry and to enhance the public health of citizens with research to improve crops which resist environmental and biological pests, increase price and lower cost of production, and incorporate higher human nutritional values of food, and by educating agricultural industry, governmental, and academic professionals in the principles of crop selection and improvement.

Colorado State University's Strengths: Colorado State has the highly regarded Cancer Prevention Laboratory (CPL) imbedded among strong programs of plant breeding and crop production research. The CPL is focused on diet-based approaches to cancer prevention.

Research capacity recently has been added with funding of the "metabolomics" academic enhancement proposal (AEP) to add mass spectrometers for small molecule chemistry, and funding of the "bioinformatics" AEP to enhance database development of the genetic foundation of metabolites in food crops. Initial collaborations between the Cancer Prevention Laboratory and crop improvement programs, have included studies of potentially health-related phyto-chemistry in Colorado-grown apples, dry beans, potatoes, and wheat. The dry bean germplasm base has been developed over 40 years. In wheat breeding, Colorado State was first to release a Russian Wheat Aphid resistant variety, first to release a variety carrying a proprietary gene conferring herbicide tolerance to "Beyond" of BASF, and has developed white wheat varieties to make Colorado wheat more competitive in world markets. The Colorado State potato program has a strong national and international reputation in certified seed production and cultivar development. Outstanding field research in crop selection occurs for fruits, vegetables, and organic crops at the Horticulture Field Research Center (Ft. Collins), the Arkansas Valley and Western Colorado Research Centers, and the student organic garden at PERC. A Specialty Crops Program includes the Rocky Mountain Small Organic Farms project and a system for awarding grants to innovative growers. The Department of Soil and Crop Sciences has undergraduate and graduate degree programs in plant breeding and genetics.

Colorado State University's Weaknesses: Gaps in faculty expertise include food chemistry, plant biochemistry, and molecular genetics of novel nutritional traits. Industry support for breeding programs has been essential, but appropriated base funds are at risk; these base funds are essential to maintain scientist positions, research fields, and operating staff and support.

Organization and Support: Breeding programs in wheat, dry bean, and potatoes are well organized in the departments of Soil and Crops and Horticulture and Landscape Architecture with financial support of the Agricultural Experiment Station and respective industry check-off programs. The new metabolomics initiative calls for the establishment of the Research Consortium in Agriculture and Metabolic Diseases. The Consortium will coordinate research on crop development and human response to food biochemical components. Faculty include 6.0 FTE of tenure track faculty, 4.0 FTE of research scientists, and 4.0 FTE of technicians.

Strategic Initiatives:

- Secure faculty expertise in plant biochemistry, molecular genetics, and food chemistry with interests in applying knowledge to characterizing genetic traits of plants useful to human nutrition; secure enology expertise.
- Recruit graduate students and post-doctoral fellows to support the program.

Critical Resource Growth:

- Secure substantial grant support for fundamental research linking human nutrition to the development of food crop improvement.
- Secure funds for three faculty positions, one an endowed chair in the area.

DESIGN AND MANAGEMENT OF COLORADO LANDSCAPES

Goal: Colorado State University will enhance its focus and depth in undergraduate education, graduate education, research, and outreach in design and management of Colorado landscapes, be recognized as the primary source of knowledge for Colorado's landscape industries, and be recognized nationally for graduate education and research in green industry crop evaluation and limited-water landscape plant cultivation. This will include continuation of the nationally recognized BS degree in landscape architecture and BS degree in landscape horticulture, graduate education and research in plant selection and improvement, limited-irrigation landscape plant cultivation, and landscape policies, and outreach in landscape industry plant selection, cultivation management, and Master Gardener education and volunteer development.

Imperative: Colorado is an urban and urbanizing state in which demographic evolution is changing the scope of "agriculture." The landscape (green) industry of Colorado, and the nation, is large and growing and comprises a significant part of Colorado agriculture (the green industries have been recognized as "agriculture" by the Colorado General Assembly). The industry includes production, wholesale, and retail sales for floriculture, nursery, and tree crops, garden supplies, irrigation equipment, outdoor equipment, and development and care services for landscapes, such as golf courses, landscape design and construction, and landscape maintenance for homes, businesses, and public gardens and cemeteries. Colorado expenditures on garden-related products, landscape and lawn service, and other related green industries (irrigation, botanical gardens, and outdoor equipment) have averaged 10 percent annual growth since 1993, resulting in $1.67 billion in direct sales, in 2002. (This generates an economic impact of $2.1 to $5.0 billion depending on the economic multiplier used.) The value of the Colorado golf industry alone is $1.2 billion. The landscape-related industries of Colorado employ nearly 34,000 positions (6 percent average annual growth) with a payroll of $825 million annually (18 percent average annual growth). Thirty percent of industry revenues are generated from out of state (domestic and international) sales. Appropriate design and management of the landscape, especially in the environmentally sensitive regions that typify subdivisions and development of ranch lands, are essential for the quality of life in Colorado and for economic development related to tourism, industry location, retention of home valuation, and the green industry itself. Community landscaping strongly influences the physical/biological environment and mitigates many aspects of urban development by moderating climate, conserving energy, using carbon dioxide, improving air quality, controlling rainfall runoff and flooding, lowering noise levels, preserving green spaces, harboring wildlife, and enhancing the attractiveness of cities. The Department of Horticulture and Landscape Architecture offers the Bachelor of Landscape Architecture (184 majors in fall, 2004) and the B. S. in Landscape Horticulture (166 majors in fall, 2004). These degree programs have excellent support from industry. Colorado State University is in a strong position to assist with the economic development of Colorado's green industry and to enhance the well-being of tourists and citizens by educating green industry professionals, researching commercial and residential issues related to ornamental plantings and landscape restoration, and providing continuing education to industry employees and citizens on best practices for plant selection, plant production and maintenance, water conservation and irrigation, pest control, and landscape design.

Colorado State University's Strengths: There are no comparable, competitive university programs in the Mountain Time Zone. The Department of Horticulture and Landscape Architecture has a critical mass of landscape-interested students (350 in fall 2004) and there is an exceptionally well-qualified team of county-based faculty specializing in horticulture. Faculty expertise is excellent, credible, and committed, producing such programs as the Annual Trial Gardens (among the top three in the U.S.), Plant Select® (a rich collaboration with Denver Botanic Garden and industry), the Colorado Master Gardener program, the turfgrass program (including municipal landscape irrigation with recycled wastewater and saltgrass development for use on stressed landscape sites), the Great Plains Diagnostic Network, and an emerging set of continuing education (on-line and distance) courses that will help educate a new group of learners. There is an outstanding network of relationships with the green industry and strong partnerships for the delivery of industry-focused educational programs (ProGreen EXPO, Rocky Mt Regional Turf Association Conference, etc.).

Colorado State University's Weaknesses: There is a shortage of faculty, support staff, and facilities to adequately respond to the increasing demand for, and complexity of, landscape horticultural issues as Colorado continues to urbanize and the green industry increases in scope and sophistication. Faculty expertise and support staff in floriculture, physiology of landscape plant water use efficiency, landscape irrigation, and industry management and marketing economics is critical. Quantity and quality of laboratory and greenhouse space are poor, as well as field laboratories. Communication and connection with the landscape architecture profession in Colorado is weak.

Organization and Personnel: Faculty include 4.5 FTE Landscape Architecture faculty, 7.0 FTE Landscape Horticulture faculty in nursery crops, turf science, greenhouse production, landscape design and contracting, 2.0 FTE Pest management faculty devoted mostly to landscape issues, and 13.0 FTE of County Agent faculty. Most of the work is organized through the Department of Horticulture and Landscape Architecture, with support from the Departments of Agricultural and Resource Economics, Soil and Crop Sciences, and Bioagricultural Sciences and Pest Management. Extension programs are organized through multi-disciplinary and campus-county work teams.

Strategic Initiatives:

- Establish a "Designing and Managing Colorado Landscapes" faculty and county agent working group to maintain cohesion of teaching, research, and outreach efforts, build professional expertise, and strengthen relationships with the industry.
- Establish a Native Plant Master Volunteer program, a Master of Landscape Studies degree, and a B. S. concentration in golf course management.
- Grow the BS in Landscape Horticulture student enrollment by double the rate of Colorado population growth, or 3 percent per year.

Critical Resource Growth:

- Secure the Holley Endowed Chair in Floriculture, add a position in Landscape Architecture, and add GTAs in greenhouse, turf, and floricultural sciences.
- Secure funds for renovation and development of the Shepardson Building ($18 million) and the Plant and Environmental Research Center (PERC) ($8 million).

SCIENCE AND MANAGEMENT OF PEST INSECTS, PLANT PATHOGENS, AND WEEDS

Goal: Colorado State University will enhance its focus and depth in undergraduate education, graduate education, research, and outreach in entomology, plant pathology, and weed science; be recognized as a primary source of pest management expertise in Colorado and the Mountain West region; and be recognized internationally for research and graduate education in genetic determinants of host plant resistance, fundamental mechanisms of biological invasions, and ecology, bioinformatics, genomics, and population genetics of pests. Undergraduate education will include contributions of courses to undergraduate agricultural degrees and introductions to plants, insects, and agriculture to the university's core curriculum. Graduate education and research will provide fundamental and applied science regarding pest species (their taxonomy, genomics, population genetics, and ecology) and pest management that is environmentally sound and economically effective. Outreach will include applied research and education relevant to emerging issues of Colorado's agricultural industries, including biosecurity, safe and effective pesticide use, and implementation of effective pest management strategies that do not rely on pesticides.

Imperative: Management of weeds, insect pests and plant pathogens is one of the most costly inputs that clientele in agriculture, the green industry, and consuming households must finance every year in Colorado. A diverse and expanding pest complex requires enhanced management skills that often increase production costs. A conservative loss estimate of 5 to 10% due to plant pests could cost Colorado producers in urban and rural settings $50 to $100 million annually. There is a long-term need for a comprehensive, high quality, integrated pest management system encompassing the disciplines of entomology, plant pathology and weed science. Pest activity and severity are dynamic and thus demand for management education and a systems approach will be ongoing. Integrated Pest Management (IPM) is the application of disciplinary, scientifically-based knowledge to profitably solving practical problems related to management of pests in agricultural and non-crop systems and landscapes in environmentally sound ways. Special emphasis within the Pest Management Team is placed on generating and providing information related to science-based policy, pest activity, pest diagnostics and identification, pest management recommendations, pest forecasting, safe and effective pesticide use, restoration ecology, integrated vegetation management, and the appropriate relationship of pest activity to pesticide use, pesticide alternatives, and pests versus profitability. New targets for IPM programs arise constantly as exotic, invasive species are creating unanticipated challenges in both agricultural and non-agricultural environments; combined with potential biosecurity breaches and mitigation. At the undergraduate level, while the Department of Bioagricultural Sciences and Pest Management offers two minors (Entomology and Plant Health), a much more important aspect of the department's undergraduate program is targeted at providing educational opportunities to students in majors in the College of Agricultural Sciences and across the campus in entomology, plant pathology, weed science, and pest management. In addition, the department's faculty are very active participants in the Life Sciences

program (teaching sections of LSCC 102 Attributes of Living Systems and BY 320 Ecology), and in several large enrollment courses taught under the "A" designation.

Colorado State University's Strengths: Colorado State compares quite favorably with universities in the Intermountain West in breadth of programs, research and outreach, and number and quality of MS and PhD graduates. Nationally recognized strengths lie in the population biology and ecology of pests and the application of this knowledge to pest management, particularly invasive species. CSU is highly competitive within some niches in ecology of relevance to pest problems and applied research and outreach related to a select number of the most critical management problems of Colorado pests, including the key invasive species. Specifically, strong areas include: research in population ecology and chemical ecology of pests, epidemiology of plant pathogens, population genetics of pests and their biological control agents, insect systematics and taxonomy, biological control of weeds and insects, wheat and bean breeding for resistance to insect pests and plant pathogens, research and outreach in the management of the most critical pests in dryland and irrigated cropping systems, tree health problems (shade and forest), turf pests and rangeland weeds, research in the ecology of biological invasions, research and outreach in management of some of the most troublesome invasive species of weeds, insects, and plant pathogens, and diagnosis of pest insects, plant pathogens, and weeds.

Colorado State University's Weaknesses: Many areas of disciplinary expertise typically found in strong Land Grant Universities are not represented in entomology, plant pathology, and weed science. Many faculty, especially in applied areas, are responsible for a wide range of problems that makes it impossible to give adequate attention to more than the most critical. Facilities, equipment, operating funds, and support staff are not well funded.

Organization and Personnel: Most of the doctoral level faculty are in the Department of Bioagricultural Sciences and Pest Management. The Cooperative Extension pest management work team is a cohesive unit of Extension Specialists and County Agents; departmental faculty and county agents will become more cohesive as Cooperative Extension reaches out to non-Extension employees and as County Agents with strong interests in pest management become joint appointments in the department. Faculty include 12.0 FTE of tenure tract faculty and parts of the time for 34 County Extension Agents.

Strategic Initiatives:

- Coordinate applied efforts in pest management across research and extension.
- Enhance applied research and teaching facilities and graduate student recruiting.
- Take the invasive weed research and graduate degree program worldwide.

Critical Resource Growth:

- Renovate space for the Gillette Museum of Arthropod Diversity ($1.8 million).
- Secure one endowed faculty chair in the area and first year graduate stipends.

LONG-RANGE AGRO-ECOSYSTEM DYNAMICS

Goal: Colorado State University will enhance its focus and depth in undergraduate education, graduate education, research, and outreach in the long-range adaptation of agriculture in the 21st century in response to changes in demography, water availability, water and agricultural policies, environmental and land use policies, demand for recreation, and national and international markets. Colorado State University will be recognized regionally, nationally, and internationally for modern crop, range, and livestock systems in semi-arid environments. This will include disciplinary and interdisciplinary work in crop and soil sciences, animal sciences, pest sciences, range science, wildlife biology and ecology, forest science, water sciences, economics, and landscape design and policy.

Imperative: The state of Colorado can be viewed as an ecosystem with its basic parts consisting of soil, air, water, plant life, animal life, and human inhabitants. Many connections exist among the system components as each affects the other and each is affected by the other, e.g., the dependence of humans on soil, water, plants and animals for food and the effects of humans on land use and water availability and quality through actions and policy. The Colorado ecosystem is shared by agricultural producers, a rapidly growing human population, and wildlife. As competition grows for finite water, land, and air resources, and as agricultural and natural resource policies and international markets change, opportunities to maximize the economic value of agriculture in Colorado will change continuously. The complex relationships of ecosystem variables must be well understood to predict these opportunities. Colorado State offers BS degrees in Soil and Crop Science (6 concentrations and a minor with 48 majors in fall, 2004) and in Horticulture (2 concentrations and a minor with 47 majors in fall, 2004), including pest management courses in the Department of Bioagricultural Sciences and Pest Management, and MS and PhD degrees in Soil and Crop Science (29 students in fall, 2004) and Horticulture (19 students in fall, 2004). These college degrees prepare professionals to understand economically important plants using soil and water resources. Twentieth century agriculture focused on mono-cultural production of commodity foods, however, 21st century agriculture will focus on a broader array of food products of higher value, differentiated in the marketplace and produced with much higher cost land and water resources in more crowded environments. Professional agriculturalists and agribusiness people will require much more education in the relationships of ecosystem variables.
Colorado State University is in a strong position to assist with the economic development of Colorado's agricultural industries within the context of increasing population, higher competition for land and water, and changing policy environment by educating agricultural and resource industry professionals, researching technical and economic issues related to improved resource utilization, and enhancing international competitiveness by being actively involved with agricultural industries and governmental agencies to assure that the latest knowledge is incorporated in management and regulatory decisions which are important to sustain the agricultural industry with rapidly evolving competition for resources.

Colorado State University's Strengths: Colorado State is in the ideal geographic position to address irrigated agro-ecosystem level issues. Colorado has a wide diversity of water supply/management regimes that include ground water, diverse surface water management in

five river systems, and various diversions of West Slope water. Colorado State has the professional credibility in dryland production agriculture to be a world leader, and in Colorado the importance of dryland agriculture is likely to grow relative to irrigated agriculture. Colorado State has an international reputation in agro-ecosystem modeling and soil carbon dynamics and associations with the NSF Long Term Ecological Research Short-Grass Prairie unit near Ault, the USDS-ARS Great Plains Systems Unit in Akron, a five-university dryland agriculture research team, the modeling group at the Natural Resources Ecology Laboratory on campus, atmospheric sciences research programs at CU and CSU, the US Geological Survey, USDA-NRCS, USDA-ERS, a strong set of dryland cropping extension agents, and the dryland crops industries. Colorado State has field research laboratories at Walsh, Rocky Ford, Ft. Collins, Cortez, Center, Orchard Mesa, Rogers Mesa, and Fruita capable of experimentation on cropping systems. Undergraduate and graduate programs emphasize strong teaching, advising, experiential learning, and professional development as faculty and students work together on agro-ecosystem issues.

Colorado State University's Weaknesses: There is a shortage of scientists with expertise in salinity and irrigation, energy generation from organic wastes, range science, economics of production and marketing of locally generated energy, air quality engineering, and alternative crop production for bio-fuels. There is a shortage of graduate student support and support for travel to accept invitations to participate in outside natural resource agency workshops and meetings. Staff/training within extension to implement agro-ecological programs is lacking. Linkages with the natural resource-based commercial sector (skiing, hunting, fishing, camping, adventure seekers, and associated industries) are weak and the image of Colorado State in agro-ecology is viewed as pro-agriculture and the University of Colorado is viewed as pro-environment. Quality of relationships among Colorado State disciplines is mixed.

Organization and Personnel: Faculty include 20.0 FTE of tenure track faculty, 7.0 FTE of senior scientists, 5.0 FTE of county extension agents, and several research support staff.

Strategic Initiatives:

- Establish a coordinated, integrated research, graduate education, and outreach program in long-range agro-ecosystem dynamics, led by a faculty steering committee, incorporating disciplines in the Colleges of Agricultural Sciences, Natural Resources, Engineering, and Natural Sciences.
- Align research facilities for integrated plans and fill gaps in expertise through collaboration or new positions.
- Realign Soil and Crop Sciences undergraduate concentrations, expand the environmental soil science concentration, and develop a new degree in "organic and sustainable food systems" in collaboration with several Colorado State departments.

Critical Resource Growth:

- Assure adequate faculty staffing in irrigation, rangeland, and wildlife sciences and community development economics to support a comprehensive approach to the area.
- Develop a small number of large, multi-disciplinary grant programs to provide research and travel support.

ECONOMICS, MANAGEMENT, POLICY AND TRADE FOR AGRIBUSINESS AND COMMUNITIES

Goal: Colorado State University will enhance its focus and depth in undergraduate education, graduate education, research, and outreach in the economics and business aspects of agricultural business firms and industries and be recognized nationally for these contributions. This will include experiential learning in the BS degree in Agribusiness offered on its own or as a double major with agricultural sciences, natural resources, and human nutrition. Research and graduate education will focus on marketing strategy, financial and risk management, and firm responses to agricultural and trade policies. Outreach will include marketing, finance, risk and production management, and policy response for agricultural input, production, and processing/merchandizing businesses of Colorado.

Imperative: Production agriculture is a $6 billion enterprise in Colorado and, with related input, processing, and merchandising support industries, agriculture is a $16 billion part of the Colorado economy. Production agriculture has changed over the years. Price and income supports are no longer the centerpiece of U. S. farm policy and with the new round of international trade negotiations, these supports likely will be of less value in the future. Agricultural producers now operate in a market-oriented, individual-responsibility environment. Producers, individually or in groups, are finding greater profitability in differentiated, consumer-oriented products requiring knowledge of supply and marketing chains, product differentiation, consumer product marketing, corporate accounting, and new risk and financial management tools. The newest themes for farmers, local commodity handlers, processors, and rural businesses are "total resource management" and "rural entrepreneurship." Also, the Census of Agriculture reports that there are decreasing numbers of mid- and large-sized farms and a significant increase in the number of small farms; the latter category of individuals frequently does not contain much agricultural business knowledge.

The B. S. in Agribusiness and the B. S. in Agricultural Economics combine to host 125 primary undergraduate majors, 79 secondary majors, and 35 graduate students. With changes in curricula in the Equine Science and Animal Science majors, additional purposeful effort to develop secondary majors with Horticulture and Landscape Architecture and Forest, Rangeland, and Watershed Stewardship, and the recent growth in student interest in double majors, plus the differential tuition charges for courses in the College of Business, demand for agribusiness courses is expected to grow rapidly.

Colorado State University is in a strong position to assist with the economic development of Colorado's agricultural and rural industries and to enhance the viability of agricultural and rural business by educating professionals for the agricultural industries with knowledge of modern business practices, researching technical and economic issues related to differentiated agricultural products in the ever-changing domestic and international market place, and by being actively involved with agricultural industry personnel and governmental agencies to assure that land managers and communities can evaluate a broad range of opportunities to enhance viability.

Colorado State University's Strengths: The Department of Agricultural and Resource Economics manages a top ten agribusiness program with consistently high teaching evaluations, numerous teaching awards, national student awards for case studies, and personal advising of students. Faculty have distinguished themselves in research and graduate education in market and policy analysis of food chain systems, especially for alternative livestock markets, functional foods, and innovative horticultural products, relying on strong campus programs in meat science, horticulture, and food science and strong industry relationships with the livestock, green, and natural foods industries of Colorado. Strength of research and graduate programs exploring the interface between agribusiness, rural development, and natural-resource-amenity-based opportunities in the Intermountain West, e.g., the wine industry and agri-tourism, make the Department of Agricultural and Resource Economics a natural partner with the university's new Office of Economic Development. Outreach for agricultural businesses is produced with statewide programs for industry and local programs for producers and credit firms.

C**olorado State University's Weaknesses:** The faculty size of 17 is slightly more than half of close competitors at Kansas State (32) and Washington State (31). The program has virtually no base support for graduate student recruitment or research operations. Low enrollment in the B. S. in Agricultural Economics contrasts with strong enrollment in the B. S. in Agribusiness degree. The Department of Agricultural and Resource Economics has a weak relationship with the Colorado Institute of Public Policy and with national and international policy groups due to the inability to specialize in narrow bands of policy studies.

Organization and Personnel: Most of the economics and business capability takes place in the Department of Agricultural and Resource Economics with collaborations with the technical sciences. The Department structure will continue to be effective. There are 17 campus faculty positions plus 3 regional extension economists and one FTE of graduate teaching assistant personnel in the department.

Strategic Initiatives:

- Grow the faculty to reflect growth in student demand.
- Strategically develop double majors with other disciplines and on-line courses.
- Host a high-profile policy conference attracting regional and national figures.
- Connect the department to the Office of Economic Development, Colorado Institute of Public Policy, and the Community Development Core Area.

Critical Resource Growth:

- Add three faculty positions in agribusiness to reflect student demand and complement the graduate program with differentiated Ph.D. classes.
- Add a $100,000 annual fund to support graduate student first year stipends.
- Secure two endowed chair positions for the Department of Agricultural and Resource Economics.
- Enhance departmental operating support by $70,000 annually.

WATER RESOURCES

Goal: Colorado State University will enhance its focus and depth in undergraduate education, graduate education, research, and outreach in water resources. The fundamental goal is to develop tools and approaches to address the technical, institutional, economic, and social issues attendant to use and management of Colorado's water resources.

Imperative: Colorado is a semi-arid state. Water distribution and control institutions have changed through history. As the 20th Century closed, Colorado citizens grew concerned about the quality of Colorado's landscape and witnessed their economy undergo rather dramatic shifts, resulting in rapid urbanization along the Front Range and the I-70 corridor. Shifts in use of Colorado's limited water resources followed the changes in its economy, shifts of water away from traditional uses, such as irrigated agriculture, to municipal uses. There is an emerging need to balance the water resource needs of Colorado's growing urban, recreation, and tourism centers (and perhaps its energy centers) with the impacts such shifts have upon traditional uses and the rural communities such uses support. The current Statewide Water Supply Investigation (SWSI), funded at $3 million, is exploring ways to create the balance Colorado seeks in its use of water in the 21st Century. SWSI is recognition on the part of the General Assembly that the reallocation of water to competing uses is a major challenge facing Colorado citizens in the future. As this evolution occurs, Colorado State will provide much of the science, technology, information, and education that is needed to support the transitions. The recent drought fostered a number of new legislative efforts to adjust traditional water management's institutions and practices to new realities of population growth, tourism, recreation, and ecosystem protection. With irrigated agriculture currently consuming 84% of the water consumed by human activity each year (5.5 million acre-feet), it is highly likely that irrigated agriculture will continue to see more of its water flow to uses other than agricultural production. Water will be used to irrigate landscapes, left in streams to restore healthy aquatic ecosystems, and allocated to recreational and tourism enterprises. Agricultural irrigators will be challenged with shrinking water supplies. Natural and economic sciences will be called upon to determine physical and economic options for agriculture.

Colorado State University's Strengths: Colorado State has 22 departments (disciplines) that apply their expertise to solve water problems. This extensive expertise supports over 150 senior and graduate level courses that address water issues. The Water Center has developed a "water minor" to guide undergraduate students to the breadth of Colorado State's water expertise. Fort Collins based federal agencies are complementary with Colorado State resources and help attract grants and graduate students. Colorado has strength in water resources planning and management, relying on expertise in biophysical and social science aspects of water resources. A system of off-campus research centers are capable of conducting research and outreach on irrigated agriculture and issues of irrigation, such as, addressing salinity in the Arkansas Valley. The Agricultural Experiment Station supports applied research projects in Colorado's river basins and

Cooperative Extension provides water management and policy education at the local level.

Colorado State University's Weaknesses: While there is much water expertise at Colorado State, there are difficulties in connecting the appropriate individuals with the problems to be solved. Much of the capacity to address water management issues is fractionated among faculty and staff who do not necessarily specialize in water resources, especially in the social sciences, resulting in a difficulty to evaluate the complex policy issues and, ultimately, undermines the ability for Colorado State to be recognized as a primary source of information for the development and evaluation of water resource policy in Colorado. Fiscal constraints have resulted in the loss of faculty positions directed to irrigation, ecology, management, and social sciences in the water resources area. The loss of faculty has resulted in Colorado State having minimal expertise in some critical areas required for a comprehensive program in water resources. Loss of regional research and extension specialists in the Grand Valley and Arkansas Valley due to budget cuts as well as loss of county based extension staff with water expertise has reduced Colorado State's capacity in applied research and public education. Shift priorities of federal agencies has reduced federal support for applied research and graduate student support in water resources.

Organization and Personnel: Water resource faculty and staff are distributed across departments and colleges. The Water Center has been a facilitator of communication between water scientists. The Agricultural Experiment Station and Cooperative Extension have provided funds and supported departmental and cross-departmental research and education projects directed at solving specific Colorado problems. There is not an effective coordinating structure in the university to coalesce expertise across units to respond to natural resource issues in general. Currently, 20 tenure-track faculty, 5 senior scientists, and 3 county extension agents have primary responsibilities in water resources at Colorado State.

Strategic Initiatives:

- Develop an integrated research, graduate education, and outreach program in water resources incorporating expertise in the Colleges of Agricultural Sciences, Natural Resources, and Engineering.
- Fill gaps in faculty expertise with currently non-cooperating Colorado State faculty, faculty from other institutions, or new positions.
- Reestablish water management and resources as a priority area within the College of Agricultural Sciences, College of Engineering, Agricultural Experiment Station, and Cooperative Extension.

Critical Resource Growth:

- Develop a small number of large, multi-disciplinary grant programs to provide graduate student, post-doctoral fellow, operating, and travel support.
- Develop a dialog with state and federal water agencies and state water conservation organization to assess opportunities for increased research and education financial support.

YOUTH DEVELOPMENT

Goal: Colorado State University will enhance outreach to Colorado's youth through 4-H and Youth Development programs in county 4-H clubs, schools, state-wide programs, and county and state fairs. This family-based program emphasizes personal growth of young people through experiential learning with well-designed curricula and projects. Development of volunteers to provide much of the leadership to this organization and private fund-raising are especially important. The College will offer, in collaboration with the School of Education, the BS degree in Agricultural Education with the primary goal of preparing high school teachers of agriculture. The College will participate in the statewide agricultural education activities for high school teachers, develop the Colorado Association for College Teachers of Agriculture (CACTA), host more than 1,000 FFA students annually for their state-wide contests, support college students in professional development activities sponsored by Agriculture Future of America, and support various high school, FFA, and 4-H livestock judging and showing events.

Imperative: 4-H is Cooperative Extension's (CE) youth development program. Positive youth development addresses broader developmental needs of youth and focuses on the development of assets, in contrast to deficit-based models which focus solely on youth problems. Studies have shown that youth who have developed these assets are involved in positive group settings and become productive citizens and successful young adults. .

Overall, 121,477 Colorado youth are touched by 4-H (7.03% of Colorado's youth population compared with 11.57% of youth nationally). Specifically, 17,169, or close to 1% of Colorado's youth participate in traditional 4-H Clubs (2.56% nationally), the most effective in bringing youth and adults together in a long-term relationship for experiential learning. Special interest, short term programs serve 4,182 Colorado youth (0.24% in Colorado compared with the national average of 3.88%). School aged child care serves 7,456 Colorado youth (0.43% in Colorado compared with the national average of 0.15%). School enrichment through 4-H resources serves 89,696 Colorado youth (5.19% in Colorado compared with the national average of 6.17%).

There are 94 high schools in Colorado with vocational agriculture programs, with about 15 position turnovers annually. Colorado State offers the only BS in Agricultural Education with teaching licensure in the State. The program at Colorado State has attracted less and less students in the last several years. It is important that the Agricultural Education degree program set a goal of 60 majors if the university is to graduate sufficient numbers of agriculture teachers to fill available positions. Currently, Colorado State hosts the annual FFA contest event about the first day of each May; over 1,000 student participants, plus 300 teachers and parents attend. This provides a useful educational service and a useful way to attract high school students to Colorado State.

Colorado State University's Strengths: Cooperative Extension has experience in community and family-based parent education, access to research-based knowledge, a statewide delivery network of specialists and field faculty, and its own model, evidence-based program. There is significant research that can direct our solutions and existing

programs that have been proven effective with a wide range of audiences. Alignment of 4-H Youth Development curriculum with the Colorado Department of Education Model Content Standards for Learning provides a strong basis for currently available materials that are already experiential, age appropriate, and research based. Student teachers partner with local CE agents to provide 4-H Youth Development projects, Cloverbud Kits, etc. in schools. Extension plays a key role in facilitating networking and collaboration among organizations and agencies that serve families. 4-H has a very active and professional group of 4-H agents and active volunteers. Colorado has the most active 4-H International Program in the country. About 75 percent of the counties in Colorado are involved in this program in some way. This is due to the fact that Colorado is one of the few states that have a full time International 4-H Program Coordinator whose sole job responsibility is to manage the Colorado 4-H International Program. Assuming responsibility for the management of this program provides resources for most of the salary of the coordinator.

Colorado State University's Weaknesses: Enrollment of Colorado youth in 4-H programs is below the national average. This may be due, in part, to urbanization. Extension is facing decreasing professional staff, increasing number of youth to serve, and greater demand for measurable results. Growth of volunteers appears the only way to fill the gap. Extension educational effort to strengthen families through 4-H is neither catalogued nor impacts measured. Communications between animal science youth specialists and the 4-H system need improvement. The current Agricultural Education program does not attract majors (there are 19 majors in fall, 2005).

Organization and Personnel: The 4-H program is guided by a Director who reports to the Associate Director of Cooperative Extension. Several project coordinating committees and several advisory committees serve to maintain communications throughout the state for campus faculty, county agents, volunteers, parents, and youth. This system works well. A recent survey of extension staff identified 50.0 FTE of specialist and area/county agent professional staff devoted to the 4-H program. The Agricultural Education program is an intercollege collaboration between the College of Agricultural Sciences and the School of Education; the model is in place.

Strategic Initiatives:

- Increase the number of club and special interest project members closer to the national average by expanding traditional 4-H club membership in urban areas.
- Identify the optimal staffing pattern for state, regional, area, and county delivery of the 4-H program.
- Encourage donors to endow the future of the 4-H program by creating endowed 4-H agent positions in every county of Colorado.
- Conduct intensive day-long, statewide volunteer workshops by nationally known presenters on various topics, such as "How to be an Effective Teacher of Others," to raise funds and place 4-H in the position of being a youth education leader.

Critical Resource Growth:

- Develop a private and foundation fund drive to endow the 4-H program

SUSTAINABLE COMMUNITY DEVELOPMENT

Goal: Colorado State University will enhance its focus and depth in graduate education, applied research, and outreach in analyses related to sustainable community development and be recognized by municipal, county, state, and federal agencies, nongovernmental organizations, and citizens as a leading source of information and analysis promoting community development. This will include community impact analyses of economic activity, community organization for progress, evaluation of the drivers of local development, and workforce professional and personal development.

Imperative: Colorado communities are changing rapidly as a result of external influences, like loss of agricultural water, influx of retirement populations, development and demise of mineral extraction industries, changes in military deployments, and changes in cultural composition of residents. Communities struggle to develop and maintain resources: human, financial, physical, social, environmental, and political. They also are challenged to provide the organizational capacity to assess, plan, and implement activities to address resource development and management. These issues especially are acute in smaller rural communities. Colorado's communities are relatively unique in terms of sparse populations, a high natural amenity and public lands base, a transitory population, and relatively low public service provision. People in rural areas tend to be older, poorer, more likely to be uninsured, and less educated than their urban counterparts. Communities require knowledge to evaluate their resource base, their economic and social service alternatives, and their futures.

Colorado State University's Strengths: Expertise and partnerships exist within the university to provide research and education to help communities build capital, including environmental, financial, human, political, physical, and social capital. Faculties in the Departments of Agricultural and Resource Economics, Natural Resources Recreation and Tourism, Design and Merchandising, and the School of Social Work, along with the Extension/Department of Local Affairs Community Technical Assistance Program and the Colorado State Forest Service provide a critical mass of professional expertise to assist Colorado communities. New programs of the Economic Development Center and the Colorado School of Public Health will be complementary.

Colorado State University's Weaknesses: The university's assets in this area have not been brought together in a cohesive way. Research and educational support resources have not been developed well, except in the Department of Agricultural and Resource Economics which has developed significant research grant resources in nonmarket valuation of community resources.

Organization and Personnel: A new effort to coalesce expertise in the sustainable community development area has begun with Cooperative Extension's Core Competency Area Work Team, expanded with relationships with other university faculty. Initial efforts will focus on rural tourism, economic impacts of community activities and industries, workforce professional and personal development, and community

organization for progress. Four campus faculty positions, three professionals employed by the Community Technical Assistance Program, one regional economic development specialist, contributions of small parts of three regional specialists, and contributions of small parts of 12 county extension agents comprise the personnel commitment to this area.

Strategic Initiatives:

- Coalesce the personnel resources in the rural community development area to create significant programs in rural tourism and workforce professional distance education opportunities.
- Work with multi-county, rural regions to assess opportunities and organization for future development.
- Develop relationships with the Colorado State Office of Economic Development and the School of Public Health to provide an outreach component for these enterprises.

Critical Resource Growth:

- Small amount of seed capital to initiate team efforts to assess opportunities and organization for rural regions.
- Enhance grant resources in the areas of rural tourism development and assistance and agency contracts for workforce development distance education.

COMMUNITY HEALTH FOR COLORADO

Goal: Colorado State University will enhance its focus and depth in applied research and outreach education in a coordinated set of programs related to community health in Colorado and be recognized by state agencies, nongovernmental agencies, and citizens within Colorado as a leading source of information and activities promoting the health of individuals, families, and communities. This will include research, education, and active statewide and community programs in health promotion and chronic disease prevention, food security for limited resource families, food safety, early childhood and out-of-school age care, strengthening families and marriage, family economics and credit management, and healthy home environments.

Imperative: Health promotion: Excess weight and obesity are growing public health problems affecting adults, adolescents, and children, and can increase the risk of high blood pressure, high cholesterol, type 2 diabetes, heart disease, stroke, and certain types of cancer (60% of American adults are overweight or obese). Nutrition, exercise, and lifestyle choices affect susceptibility to disease and debility. Composition of nutrient intake affects health, such as the importance of calcium in the prevention of heart disease and osteoporosis and the presence of antioxidants to prevent cancers and infections. **Food security for limited resource families:** Many Colorado families are at risk for food insecurity, including the working poor, elderly, homeless, single parent households, children in poverty, residents of lower income inner-cities and isolated rural areas, immigrants, and welfare recipients. In 2000, 46.5% of low-income single mothers with children were food insecure; 20% of Colorado children are hungry or at risk of malnutrition which leads to poor developmental and behavioral outcomes. **Food safety:** The national yearly cost of lost productivity due to hospitalization for foodborne illnesses is estimated at $20 to $40 billion (FDA, USDA, EPA, 1997). Public health challenges of foodborne disease are changing rapidly with emerging pathogens and vehicles of transmission, changes in food production, improper food preparation, improper food storage and distribution practices, insufficient training of retail employees, increasingly global food sources, insufficient consumer awareness of safe home food handling practices, and an increasing number of people at risk due to aging and compromised capacity to fight diseases. **Early childhood and out-of-school age care:** The dramatic increase of women in the workforce has raised the demand for early child care and education outside the home. Colorado licenses 9,000 child care facilities, but a majority of parents rely on family-care providers or relatives, many of whom have limited training in early child development and care. **Strengthening families and marriage:** Colorado families have a diversity of problems, including a rising divorce rate, third highest child abuse rate, seventh highest high school dropout rate, rising percent of teens not attending school and not working, rising percent of low birth weight babies, and fourth highest suicide rate. The number of grandparent-headed households doubled from 1960 to 2000, to 4.5 million; in one-third of these households, neither parent was present. **Family economics and credit management:** Individuals and families are suffering from excessive consumer credit indebtedness, are saving less, and filing bankruptcies at an increasing rate. Consumers are faced with a wider and increasingly complicated array of options for managing their personal finances and selecting investment, credit, and insurance products. **Healthy home environments:** Poor indoor air quality can be a serious health risk for Americans. EPA research shows that indoor air is five times more polluted than outdoor air. One significant

air pollutant is radon, the second leading cause of lung cancer next to cigarette smoke. **All of these issues** are interrelated aspects of individual, family, and community health.

Colorado State University's Strengths: Colorado Cooperative Extension has well-established, productive, and respected programs on health promotion, diet and exercise effects on chronic disease prevention, food safety, and food security. The faculty involved in these programs have close working relationships with interdisciplinary basic and applied research in human nutrition, exercise and health, the Cancer Prevention Laboratory, the Graduate Program in Food Science and Safety, The Center for Red Meat Safety, and the Colorado Food Stamp Nutrition Education Plan. The network of campus specialists and county extension agents provides access for Colorado families to these educational programs. Colorado State has a history of providing unbiased, preventative, non-commercial financial management information and education providing a unique ability to gain trust and credibility among program participants. Extension educators do not have regulatory functions and can provide child development, management, and food safety education for child care providers in non-threatening ways to unlicensed care givers. Strong relationships with state and local agencies multiply the effects of extension education in community health.

Colorado State University's Weaknesses: The quality and impact of community health programs varies. The broad range of responsibilities assigned to county family and consumer science agents to too great to allow specialization and depth of professional development to be consistently effective. The population of Colorado continues to grow and the number of campus and county faculty devoted to community health education continues to fall. Growth in the Hispanic population is dramatic and Colorado State has few educators with language and cultural understanding to address this population.

Organization and Personnel: Most of the campus faculty involved in community health programs are in departments of the College of Applied Human Sciences. Campus faculty and county extension agents are organized together in extension core competency area work teams to maintain cohesion and uniformity of program offerings throughout Colorado. Interactions between extension program faculty and research and teaching faculty with related expertise is good to improving.

Strategic Initiatives:

- Align county family and consumer science agent responsibilities so they can specialize in two or three aspects of community health to be effective teachers.
- Appoint masters-trained county agents as joint appointments with campus departments to strengthen professional development and program cohesion.
- Align staff appointments to reflect Colorado's cultural diversity.

Critical Resource Growth:

- Add a campus Health and Exercise specialist to provide at least one faculty leader for each of the specialty community health areas identified (7).
- Add sufficient Family and Consumer Science county extension agents to provide access in all counties served by Cooperative Extension.

OVERARCHING GOALS AFFECTING ALL TOPICAL AREAS

UNDERGRADUATE EDUCATION: The Colorado State University College of Agricultural Sciences will provide undergraduate degrees in Agricultural Business, Agricultural Economics, Agricultural Education, Animal Sciences, Equine Sciences, Horticulture, Landscape Architecture, Landscape Horticulture, and Soil and Crop Sciences. Programs in Animal Sciences and Equine Sciences have been renovated recently to expand learning opportunities in agribusiness, economics, business, and communications. The program in Agricultural Education recently has been renovated to create greater learning opportunities in the agricultural sciences. Explorations are taking place in Horticulture to provide concentrations in Viticulture/Enology and Golf Course Management. Exploration is taking place between Horticulture and Landscape Architecture and Soil and Crop Science to provide a degree in organic production. For all undergraduate degree programs additional emphasis is being placed on: 1) experiential learning in out-of-class settings, such as internships, service learning, international study, and special projects, allowing knowledge to be put to work in real-life situations, 2) international study to broaden the perspective of students to the world marketplace and to international influences on the domestic environment, 3) advising to provide long-term academic planning to improve capabilities of students to participate in the largest number of learning experiences possible and graduate in four years, 4) public service to instill values of service and community responsibility, and 5) leadership development. The strategic goal is to attract 1,600 undergraduate majors (from 1,267 in 2005). Growth of the undergraduate student body will require additional emphasis on recruiting activity, including: a) regional socials within Colorado's regions in conjunction with high school agriculture teachers, extension agents, and alumni, b) direct relationships with community and junior colleges with agricultural programs, c) creating ways to enhance short-term enrollment in upper division courses, e.g., the agribusiness concentration for Colorado State University-Pueblo business majors, d) national advertising of nationally recognized majors, e) involvement in national conventions (FFA, AFA, MANRRS) and national judging and showing events, f) developing scholarships directed toward recruitment, and g) engaging College Ambassadors in calling admitted students and inviting them for campus visits.

GRADUATE EDUCATION: The Colorado State University College of Agricultural Sciences will provide graduate degrees in Agricultural and Resource Economics (MS and PhD), Animals Sciences (MS and PhD), Equine Science (Master of Agriculture), Integrated Resource Management (Master of Agriculture), Extension Education (Master of Agriculture), Horticulture (MS and PhD), Entomology (MS and PhD), Plant Pathology and Weed Science (MS and PhD), and Soil and Crop Science (MS and PhD). For all graduate degree programs, additional emphasis will be placed on 1) experiential learning in professional activities appropriate to the sciences of study, 2) exposure to disciplines outside the major, and 3) publication of research results. The strategic goal is to attract a graduate student body of 400 (from 219 in 2005) including 100 Master of Agriculture, 150 Master of Science, and 150 PhD students. Special emphasis and creativity will be required to recruit toward and finance this goal.

RESEARCH: The Colorado State University College of Agricultural Sciences will become responsible for the management of the Colorado Agricultural Experiment Station. College and Experiment Station research will focus on fundamental and applied science supporting the fourteen core topical themes. By the nature of the issues involved, researchers from many disciplines, across departments and colleges, will be engaged together in finding solutions to the most critical issues. Researchers will participate with other faculty on steering committees to find common ground for project and grant development. The most significant source of research resource growth will lie in competitive research grants, but interactions with corporate and producer group businesses also will be pursued in the spirit of partnership to provide scientifically-verified solutions to industry issues. The combination of competitive and industry grants is targeted at $20 million annually. A pre-award service office will be initiated to assist faculty in obtaining grants. Off-campus field and laboratory research remains important for field testing sensitive to climate, altitude, and soil type differences. Where there is not a significant need for a scientist position to be located at the off-campus site, efforts will be made to concentrate research positions on campus with the greatest potential for interaction with other scientists and with the greatest access to scientific infrastructure.

EXTENSION: Outreach education will consist of dissemination of knowledge gained through basic and applied research identified in the fourteen topical themes above. Cooperative extension has adopted six core programming themes including: Strong Families, Nutrition and Health Promotion, 4-H Youth Development, Sustainable Community Development, Competitive Agriculture, and Protection of Natural Resources. The fourteen topical themes and the six extension program themes are compatible and will be implemented jointly. The College will package its knowledge and expertise into saleable services to be delivered to qualified end-users in pre-determined marketplaces by select teams representing the expertise needed and the requirements of the end-user. Outreach will be directed toward science-based solutions to the most significant issues of agriculture, agribusiness, and rural and urban communities. Different market segments will be identified and addressed in unique and effective ways. For example, managers of large, economically viable units ($250,000 and above in gross sales; 3,000 units in Colorado) want hard-hitting, easily obtainable knowledge customized to their operation. Presentations at annual events and schools with a rich array of presenters are effective with this group. Managers of smaller commercial units ($100,000 to $250,000 in gross sales; 2,000 units in Colorado) prefer to receive their knowledge from local companies, farm magazines, or local county extension agents. Small, part-time, and residential farms/ranches exist either in poverty or as retirement/second-home residents. Their managers frequently do not possess any significant background in agricultural topics and rely on local county extension agents and supply companies for their information.

Cooperative Extension county offices will be repositioned into learning centers representing the entire university. An agreement between Cooperative Extension and Admissions and Recruitment to have local extension offices assist Colorado State in recruiting is in place. Cooperative Extension will implement the strategic initiative to serve as the “Front Door” to Colorado State University, whereby local agents engage in

major local developments, transmit the need for expertise to the campus, and coordinate expert responses to local knowledge needs to support economic and community development. Local county extension offices will become Colorado State learning centers in cooperation with local county governments and other local educational entities, e.g., community colleges, and efforts will be made to improve the appearance, functionality, and recognition (signage and advertising) of county offices.

New county extension personnel will be required to have a master's degree in the field of stated specialty and will be positioned to spend at least 40 percent of their effort in education related to their specialty. Masters-trained extension agents will be connected with university departments of their specialty by joint appointment. Counties will be grouped together for cooperative programming to allow all citizens access to all programs offered, plus expertise from the broader university. County administrative assistants will be trained to direct clients to appropriate expertise whether with the local agent, an agent in a nearby county, a specialist, or on Answerlink and the web.

INTEGRATION: While the departmental structure of the university will protect disciplinary developments, there is much value to be added by integrating teaching, research, and outreach across departments, colleges, state and federal agencies, and other universities. The College will encourage multi-disciplinary effort by forming steering committees to govern the implementation of each of the fourteen topical program goals to assure that relevant disciplines and mix of teaching, research, and extension faculty (including county extension agents) are involved in the problem identification, research and outreach program design, and project implementation.

DIVERSITY AND INCLUSIVENESS: The Colorado State University College of Agricultural Sciences and Outreach Agencies will enhance its focus and depth of results in diversity and inclusiveness with respect to serving diverse communities (students and citizens); training of students, staff and volunteers in cultural competency; and recruiting faculty, administrative professionals, and classified staff to achieve "meaningful representation" of underrepresented groups. Colorado is a diverse community in terms of age, culture, economic status, education, ethnicity, family status, gender, geographic location, learning style, life experiences, physical and mental ability, race, religion, sexual orientation, social position, spiritual practice, and other qualities of life, preference, and situation. Colorado State University is committed to equal opportunity and access to all programs of teaching, research, and outreach by keeping programs open to all regardless of these differences. Colorado State University is a public institution receiving funds from a treasury to which all segments of society contribute and deserve to receive the benefits and employment opportunities offered by the College of Agricultural Sciences and Outreach Agencies. Agribusiness employers seek culturally competent college graduates to manage a workforce which is itself diverse. Colorado State University is committed to encourage and offer opportunities for students and public clientele groups to gain multi-cultural awareness and opportunity through club experiences, internships, service learning, international travel, and language and other learning activities. Colorado State University will prepare outreach materials in Spanish language editions to maximize access to learning materials and will enhance the number

of Extension positions with people of bilingual capability where appropriate. The College of Agricultural Sciences will interact with secondary and community college institutions of learning to build career awareness and move toward recruiting students from those institutions with historically high enrollments of students from minority populations. Of 125 faculty and research scientist positions in the College of Agricultural Sciences, all are white Americans except 8 faculty who are foreign born (4 of Asia, 2 of Europe, 1 of Africa, and 1 of Latin America). Eighteen are women. The College of Agricultural Sciences consists of five departments, the smallest in the land grant system. Many of the disciplines attractive to minority students interested in agriculture at other universities are not in the college at Colorado State, like food science and agricultural journalism. Agriculture remains an area characterized by low minority enrollments across the nation and will likely remain so. In fall, 2005 the College of Agricultural Sciences has 7.3% of students of minorities. The university has 12.5% minority students. The College of Agricultural Sciences will seek to expose students to professionals of non-majority races and gender through seminar presentations, involvement in learning activities, and active faculty and staff searches.

INTERNATIONAL EXPERIENCE AND EXPOSURE: All people live and work in a global community in which each individual is either directly or indirectly affected by international events. A university is a place of knowledge where students and the public obtain knowledge, experience, and perspective relevant to their work and citizenship. Universities also have a history of providing international research, technical assistance, and educational experiences for students (domestic and international), faculty, and citizens. The federal government has taken a 15-year hiatus in support of university international agricultural programs, but the need for international education is greater today than at any time in the past. The College of Agricultural Sciences and the Outreach Agencies will provide: a) faculty experience abroad at scientific meetings, international sabbaticals, and purposeful travel, b) student exposure to international influences with faculty-led educational tours abroad, e.g., Peru, Africa, and Australia, and memberships in organizations to provide exposure in Colorado to international business professionals, e.g., meetings of the International Committee of the National Western Stock Show, the Meat Export Federation, the Colorado World Trade Center, Swift & Company, and others, c) student study abroad experiences, e.g., New Zealand semester at Lincoln University, France summer program at Ecole Superieur d'Agricultur, Czech Republic semester at Mendel Agricultural University, and Mexico semester at Monterrey Tech., d) research experiences at international research centers and agricultural research centers and universities in other countries, e.g., research exchanges at Saratov University in Russia and the Agricultural Research Service of Brazil, e) graduate education for faculty of international institutions seeking to improve their faculty training, e.g., the Colegio de Post Graduados in Mexico, and f) involvement of current and retired faculty with international experience in the classroom. The goal of the College is to achieve 25 percent of graduates having had organized, purposeful, educational experience in another country within five years. This goal will require development of scholarships directed toward international travel experiences, four-year advising containing plans for off-campus experiences, and collaboration with the study-abroad office at Colorado State and with other universities initiating travel experiences.

CULTURE, CONNECTION, AND COMMUNITY: Colorado State University is committed to building and maintaining a culture that instills values and builds pride in the CSU experience, for students, professionals, and clientele. Education provided in and out of class is extended and enhanced through day-to-day living and learning that encourages civic responsibility, personal growth and health, and helps prepare individuals for leadership in a democratic society. This includes providing programs of positive, socially responsible and community minded activities, promoting leadership development and civic engagement, promoting health and well-being, and cultural awareness.

FACILITIES AND INFORMATION TECHNOLOGY: Colorado State University is committed to excellent facilities and information technology to enhance the professional quality and opportunity for faculty, students, and public clientele. Faculty and students will be provided with modern computer-based communication, management, and teaching tools, modern scientific equipment, and building facilities with modern offices, laboratories, field laboratories, and work spaces which make faculty competitive in attracting students and grant awards and provide a sense of pride in those associated with the university. The College of Agricultural Sciences and the Outreach Agencies will focus on renovation of the Animal Sciences Building, Shedpardson building, the Plant Environmental Research Center (PERC) building and teaching gardens, the Gilette Museum of Arthropod Diversity, off-campus research centers, and enhancement of county extension office facilities. Signage and locations for county and area extension offices will be improved to recognize the close association between county governments and Colorado State University in a broad expanse of programs.

HUMAN AND FINANCIAL RESOURCES: Resident Instruction budgetary foundations will be sought to add 12.5 faculty positions including 1.5 FTE in Equine Sciences, 4.0 FTE in Agricultural and Resource Economics (Agribusiness), 4.0 FTE in Horticulture and Landscape Architecture (landscape architecture, enology, base support for Henry Thompson, and floriculture), 1.0 FTE in Bioagricultural Sciences and Pest Management (biotechnology), and 2.0 FTE for diversity hires. Colorado State University is committed to achieving nationally competitive compensation and benefit packages for faculty, administrative professionals, and classified employees and to provide professional development opportunities and reward structures which recognize superior performance. The university will be attractive to the highest caliber of employees nationally to fulfill the highest caliber teaching, research, and outreach programs to which the university is committed. The university also is committed to growth of all revenue sources necessary to grow and deepen teaching, research, and outreach programs. This will include strategic approaches to federal and state appropriated funds, grant and contract competitiveness, fee structures for products and experiences where appropriate, and philanthropic giving by donors. Integrated management of all resources will be practiced to maximize leveraging capabilities in university finance.

ACCOUNTABILITY: Colorado State University is committed to setting the standard in integrated academic and business planning, evaluating performance quantitatively against performance standards, and continuously seeking to improve administrative and

operational efficiencies. Colorado State also will inform the public of educational opportunities and relevant research results. Performance will be measured annually in terms of the following outcomes:

- Number of BS, MS, and PhD degree graduates and the number of Post-Doctoral Fellows trained in the program.
- Magnitude of grant/contract/gift awards to the program.
- Numbers of refereed scientific publications published.
- Outreach products including non-refereed publications and participation in state, national, and international committees, programs, and task forces, and numbers of consumers, regulators, and industry personnel educated and/or served and acreage of forest lands managed/treated.
- Evidence of adoption of practices recommended through Colorado State University.

An annual report will be submitted to the Dean of the College of Agricultural Sciences and the Directors of the Agricultural Experiment Station, Cooperative Extension, and the Colorado State Forest Service, by the topical program leader, enumerating the five types of outcomes listed (student and post-doctoral graduations, extramural support generated, numbers of refereed scientific articles, outreach products, and recommendations adopted) and a narrative summary describing the impact, or likely impact, of these outcomes.