# University of California
# Division of Agriculture and Natural Resources
# Agricultural Experiment Station and Cooperative Extension

# Plan of Work for FY 2000 - 2004
## Submitted to USDA-CSREES on July 15, 1999

## Introduction

The University of California Division of Agriculture and Natural Resources (UC -DANR) is the major land-grant arm of the University of California, part of a nationwide public university system "built on behalf of the people" (Lincoln's words) with Experiment Stations established to develop "useful and practical information...and to promote scientific investigations and experiments", and a Cooperative Extension program to "aid in diffusing...useful and practical information."

UC-DANR is based on the Berkeley, Davis and Riverside campuses, and in more than 50 regional and county offices throughout the state. The Division is composed of the UC Agricultural Experiment Station (AES) and UC Cooperative Extension (CE), supplemented by 23 statewide special programs and projects, and supported by 10 Research and Extension Centers and 33 sites of the Natural Reserve System.

The AES has about 650 academic researchers, most of whom also have professorial appointments representing dozens of scientific disciplines.

Cooperative Extension, the principal outreach arm of the Division, comprises academic appointees attached to campus departments as CE specialists or county offices as CE advisors; there are about 142 specialists and 267 advisors.

UC-DANR's mission, "... is to serve California through the creation, development and application of knowledge in agricultural, natural and human resources." The members of UC -DANR share the following vision:

"... In keeping with our mission and consistent with our core values, we will be the link between abstract knowledge and the pragmatic world. With one hand we will generate new knowledge, while with the other hand we will reach out to help people make use of that knowledge to solve everyday problems in the realms of agricultural, human and natural resources. We will actively involve the public in our programs, bringing a global perspective to bear on local issues. Integrating research, education and extension, we will transform ideas into solutions.
Working with our partners within and outside the University, we will connect the people of California with the research-based information that can help them improve their quality of life, and enhance the

environment for all." [Reference: *The Challenge for Change: A Strategic Plan for the University of California Division of Agriculture and Natural Resources, 1997*]

## Program Priorities

For the past three years, UC-DANR has been engaged in a strategic planning process that has involved hundreds of its scientists and educators as well as external stakeholders. Although their expert ise and interests were extremely diverse, a consensus emerged regarding general program directions that will guide the Division in the years ahead. The DANR Strategic Plan, published in May 1997, outlines research and extension priorities for programs in agricultural, natural and human resources, as well as opportunities for integrated programs. These priorities support the public interest in maintaining a globally competitive, economically vital and environmentally sound California agriculture —in co-existence with a largely urbanized state population for whom issues of consumer well -being, resource conservation and quality of life are crucial. These aspirations are entirely consistent with national goals established in the U.S. Department of Agriculture C SREES Draft Strategic Plan and articulated in this Plan of Work for the next five years.

The specific information contained in each of this Plan's National Goal Narrative Statements draws heavily upon UC-DANR's 3-5-year midterm program priorities, updated for 1999. Strategic planning in UC-DANR is an on-going dynamic process; thus refinement and adjustment of program priorities is expected to continue on a regular basis. Significant changes will be reflected in future updates to this Plan of Work.

In the interest of brevity, not all UC-DANR's program priorities are fully described in this Plan. Most of the major programs are presented with sufficient detail so the reader can understand and appreciate the University's role as it addresses major statewid e issues and how these issues are closely aligned with the five national goals.

This Plan of Work represents the combined and integrated efforts of the Agricultural Experiment Station and Cooperative Extension. Our various programs in agricultural, natur al and human resources have been assigned to the five National Strategic Plan Goals and follow the recommended format for "planned programs" as presented in the federal guidelines.

In addition, four narrative sections explain and describe our integrated a pproach to research and extension activities, our multi-state extension and research activities, the processes we are and will be using to obtain stakeholder input, and our program review process.

# National Strategic Plan Goal 1

*Through research and education, empower the agricultural system with knowledge that will improve competitiveness in domestic production, processing and marketing.*

## UC-DANR's Agricultural Resources Programs Covering:

- **Agricultural Productivity and Efficiency**
- **Handling, Storage and Processing Agricultural Products**
- **Pest and Disease Management**

## Statement of Issues:

Global demographic movements, trade agreements, the emerging markets, global income growth, new production areas, and new agricultural commodities are all affecting the markets for the full range of products supplied by California agriculture. Urban expansion is increasing competition for water and land and causing losses in agricultural production and wildlife habitat. Environmental restrictions are also causing a continuing requirement for increased and more efficient production, and for the development of new cultivars or breeds in plant and animal agriculture.

There are opportunities to enhance the sustainability of agricultural production systems by reducing input requirements, increasing efficiency of production practices, decreasing costs and energy requirements, reducing environmental impacts, and increasing efficiency of land and water use.

Development and evaluation of new crop species and cultivars, and evaluation of animal breeds are of particular importance at state, national, or global levels and may result in expanded markets and enhanced agricultural profitability. Such development of plant cultivars and animal breeds can lead to increased production efficiency, or enhanced resistance to pests and diseases, and their integration into comprehensive management systems will contribute substantially to increasing profitability, environmental health and sustainability of agricultural systems. Plant and animal breeding programs should involve both conventional hybridization and selection, and cellular and molecular methods.

When agricultural supply and demand conditions change, new markets will develop and emerge, and production pressures and opportunities will continue to evolve. Changes in demand and market conditions also create opportunities for new technologies related to production, processing and distribution. There is a continuing opportunity to enhance value-added potential, and to provide additional employment, through new technologies and approaches for storing, processing, and reformulation of food, fiber, and ornamental products.

Changes in demographics and locations of food, fiber, and ornamental production at the local, state, national, and global levels, require improved means of storage and transportation of food, fiber, and ornamentals. Even without these changes, society gains from a more efficient agricultural production

system. However, the major payoff of research and extension in agricultural production is to provide the ability to adapt to ever-changing circumstances.

The value-added potential of processed agricultural products provides job opportunities for all sectors of the population and enhances the value of food, fiber, and ornamental production. Profitability of agriculture and job availability may be increased by developing alternative uses and markets for conventional agricultural products. The use of biotechnology to create new mat erials from agricultural products (industrial chemicals, pharmaceuticals, plastics, oils, etc.) creates new opportunities for California agriculture.

Pest and disease management is an important part of all of DANR's integrated programs. New and emerging, and recurrent pests (i.e. weeds, insects, nematodes, disease, vertebrate and invertebrate pests), of plants and animals cause economic losses and production instability. The development and integration of safe, environmentally-sound, economically viable chemical, cultural, and biological approaches for weed and insect pest and disease management will increase the efficiency of management systems while reducing risk and production instability. New and developing technologies must be integrated into effective management strategies.

Management for weed and insect pests and the causal agents of disease in plant and animal agriculture that minimize environmental, human health, and economic risks need to be developed and delivered to clientele. Rapid diagnostic and predictive tools are needed. If pest and disease problems in agriculture are anticipated, there will be less need for crisis management.

## Research and Extension Performance Goals:

❖ **Agricultural Productivity and Efficiency**

DANR is focusing its research and extension resources on increasing the economic and cultural efficiency, productivity, and product quality of animal and plant agriculture while using more ecologically sound practices. In furtherance of these goals, we are proposing to take the following actions:

1. Enhance management methods in agriculture by: developing management systems that integrate resistant cultivars and breeds; developing plant or animal germplasm with resistance to pests; developing monitoring systems and teams to detect and manage pest outbreaks; developing improved comprehensive management systems and methods for extending information on plant and animal health.

2. Improve soil quality by developing improved agricultural systems based on long-term multidisciplinary studies of rotational or other management effects.

3. Increase water use efficiency by developing and extending improved irrigation and cultural methods.

4. Genetically improve crops or livestock by: conducting regional trials to evaluate production potential, adaptability, and quality characteristics of plant cultivars or animal breeds; using traditional or molecular methods, to introduce, develop and release advanced germplasm for use by breeders.

5. Provide agricultural economic analysis by: assessing and extending information on agricultural markets; assessing and extending information on profitability of agricultural ent erprises in California.

6. Evaluate demand opportunities in California, national, or global markets by surveying demand characteristics of potential markets for California products.

❖ **Handling, Storage and Processing Agricultural Products**

DANR is focusing its research and extension resources on improving access to new markets and opportunities for agricultural products through post-harvest technologies that will enhance the value of these products. In furtherance of these goals, we are proposing to take the following actions:

1. Develop new technologies for storage, shipping, and distribution, including sanitation and disinfestation methods, to ensure that California products can be marketed nationally and internationally.

2. Develop technologies and practices to lengthen shelf-life of agricultural products and to improve storage and shipping characteristics.

1. Develop new methods for measuring and improving product quality characteristics and shelf life.

❖ **Pest and Disease Management**

DANR is focusing its research and extension resources on promoting pest and disease management strategies that are safe, environmentally sound, and economically viable. In furtherance of these goals, we are proposing to take the following actions:

1. Provide cost-effective approaches for prevention and management of pests and diseases of plant and animals by developing and implementing: new vaccines; new pest-resistant and tolerant genotypes; new pesticide and disease management tactics; new biological control agents; economical threshold levels of pests and diseases in various production systems; new plant and animal breeding/management tactics; and cultural effects on plant production systems.

2. Improve pesticides and pharmaceuticals and their usage by: developing, evaluatin g and adapting safe, reduced-risk pesticides and pharmaceuticals for use in agricultural production, post-harvest disinfestation, structural disinfestation, and public health; developing safer, environmentally sound methods for use of pesticides and pharma ceuticals; developing strategies for managing development of resistance to pesticides and pharmaceuticals; developing and introducing efficient application equipment and methodology to improve pest and disease management practices.

3. Develop and introduce cost-effective detection and monitoring systems to: detect the presence and abundance of pest and disease organisms; facilitate efficient management of pest and disease organisms in integrated management systems; determine economic-threshold levels of pests and diseases to provide more efficient timing for management practices.

3. Develop and support pest and disease outbreak teams to anticipate and respond to pest and disease outbreaks by working with appropriate governmental and local agencies.

3. Disseminate information by effective technology dealing with: recognit ion and identification of pests and diseases; economic thresholds for pests and diseases; and comprehensive and integrated management strategies for pests and diseases.

## Output Indicators:

**Agricultural Productivity and Efficiency**
Number of extension publications on agricultural productivity and efficiency published
Number of extension programs on agricultural productivity and efficiency delivered
Number of peer-reviewed research papers published on agricultural productivity and efficiency
Number of agricultural producers reached with information on plant and animal health.
Number of acres employing management systems that integrate resistant cultivars and breeds
Number of new crops with genetic resistance to pests
Number of acres employing agricultural systems that lead to improved soil quality
Number of acres utilizing more efficient irrigation techniques and cultural methods
Number of regional trials involving new, genetically-improved crops or livestock
Number of studies that analyze profitability and agricultural produc tivity
Number of surveys that analyze potential market demand for California products

**Handling, Storage and Processing Agricultural Products**
Number of extension publications on storage, shipping, and distribution published
Number of extension programs on storage, shipping, and distribution delivered
Number of peer-reviewed research papers published on storage, shipping, and distribution
Number of technologies developed that specifically address sanitation and disinfestation methods
Number of studies developed that address the lengthening of agricultural product shelf-life
Number of methodologies developed that measure product quality characteristics and shelf-life

**Pest and Disease Management**
Number of extension publications on pest and disease recognition and manag ement published
Number of extension programs on pest and disease management delivered
Number of peer-reviewed research papers published on pest and disease management
Number of monitoring systems developed to detect and manage pest outbreaks
Number of new vaccines and biological control agents tested and released
Number of safe, reduced-risk pesticides and pharmaceuticals tested and released for producers

## Outcome Indicators:

**Agricultural Productivity and Efficiency**
By the year 2004, California's agricultural producers will have increased the economic value of their diverse crops by 5 percent by employing more efficient cultural and ecologically sound practices.

**Handling, Storage and Processing Agricultural Products**
By the year 2004, California's agricultural producers will have improved access to new markets and opportunities for agricultural products through post-harvest technologies that will enhance the value of these products by an additional 5 percent.

**Pest and Disease Management**
By the year 2004, California's agricultural producers will have increased their application of pest and disease management strategies that are safe, environmentally sound, and economically viable by an additional 5 percent. This anticipated outcome can be measured by either reduced use of pesticides or by an increase in acreage or animal numbers under pest and disease management.

## Key Program Components:

The **UC Agricultural Issues Center** was established to meet an urgent need for more broadly-based and objective information about the dramatic changes taking place in California agriculture. The **Center** serves as a forum where crucial trends and policy issues affecting agriculture and natural resources in California and the West are analyzed and the results made available to both policymakers and to those affected by policies. The **Center** concentrates its efforts in the following priority areas: international trade, with particular attention to effects on economic stability and mark et development; advances in agricultural productivity and technology, with particular attention to social and economic impacts; natural resources, with particular attention to water, land use and energy policies; heightened awareness of the role of various minority groups in agriculture and allied industries; impacts of national agricultural policies and of fiscal, tax, and monetary policies on agriculture in the West; and implications of changing domestic and worldwide food consumption patterns on agricult ure in the West. In May 1999, the **Center**, in collaboration with USDA-APHIS, sponsored a conference designed to create multidisciplinary and multi-agency alliances about public policy implications of excluding, detecting and eradicating exotic pests and di seases.

The UC **Small Farm Program and Center's** mission is to enhance the viability of small- and moderate-scale agricultural producers by stimulating research and extension education in production systems, marketing, and farm management. The program serv es and supports small and family farmers, small communities, and UC faculty. Research and education efforts focus on specialty crop production, alternative marketing, and rural/community development issues. It helps small-scale farmers compete and survive by offering practical, positive solutions that also will benefit their consumer clientele and the natural and renewable resources they use.

Researchers at the **Center for Long-Term Research on Agricultural Systems** want to understand the relationship between sustainability and external inputs. Ten cropping systems are being studied that differ mainly in how much irrigation water or nitrogen fertilizer is used (if any). Sustainability will be determined from long-term trends in yield, profitability, effici ency in use of limited resources (such as water or energy), and environmental impact, such as leaching of nitrate or pesticides. The **Center** is

primarily a research facility, but it involves extension and teaching missions by hosting field days, class field trips, undergraduate interns, and graduate student research.

Our statewide **Sustainable Agriculture Research and Education Program** is providing leadership and support for scientific research and education that enables Californians to produce, distribute , process and consume food and fiber in a manner that is economically viable, sustains natural resources and biodiversity, and enhances the quality of life in the state's diverse communities for present and future generations.

The **Center for Pest Management Research and Extension** offers statewide leadership and coordination for the extensive pest management work underway in DANR, helps identify emerging issues and recommends short and long term priorities for research and extension in this important area.

DANR has a strong commitment to address the many pest management questions facing California. Its statewide program in **Integrated Pest Management** is helping farmers manage pests with economically and environmentally sound agricultural practices.

The **Center for Biological Control,** located at the UC Berkeley campus promotes and develops ecologically safe and permanent ways to control pests in natural and managed ecosystems.

The **Center for Exotic Pest Research (CEPR**), located at the UC Riverside campus, was established in 1994 to systematize, prioritize, and implement urgently needed research on exotic pests (invasive species which become pest species). The mission of **CEPR** is to focus the University's resources on basic and applied research and development of methodologies for rapidly coping with exotic pests in the major areas of (a) risk assessment, (b) early detection of invasion, (c) rapid development of control and eradication procedures, and (d) exploring economic and sociological consequences of invasion.

## Internal and External Linkages:

Experiment Station and Extension academics in DANR are collaborating with colleagues in other states in conducting research to evaluate the biological responses of livestock to stress and establishing criteria for effectively predicting well-being of farm animals. This regional collaboration provides an important mechanism for interaction among scientists with varied training (endocrinology, behavior, nutrition, immunology, livestock management, engineering, etc.) and varied species interest (beef and dairy cattle, swine, sheep, etc.) to address these problems in an integrated and effective manner. Environmental and management stressors of livestock account for tremendous economic losses annually to livestock producers throughout the United States. In order to eliminate or minimize the negative impact of stressors on performance and health, it is essential to gain a thorough understanding of the biological responses to stress that are unique to the environments of farm animals. There is also growing interest and increased awareness from the public sector that food-producing domestic animals should be managed in such a way that their long term welfare and short-term well-being be ensured. The measurable biological variables and criteria that would be useful in predicting acceptable well-being in animal management are elusive at best. The establishment of criteria for acceptable well-being of farm animals must include measures of production, physiology, behavioral and immunological traits.

Damage due to freezing is an important problem in US agriculture with estimates of loses approaching one billion dollars annually. Unfortunately losses due to freezing temperatures are a com mon obstacle in the horticulture industry. A severe freeze this past winter in the Central Valley of California is but the most recent example of major crop losses due to untimely frosts or unseasonably cold weather. Freezing injury is not limited to par ticular geographic regions, and producers throughout the U.S. have suffered significant economic losses during the past decade. There are several potential approaches toward developing more freeze-tolerant plants. These include: adapting cultural managemen t practices that enhance plant cold hardiness, selecting taxa developed from crop improvement programs, and employing recombinant DNA technologies to develop more hardy germplasm. These approaches are not mutually exclusive and members of the Division wor king with colleagues in other states in regional research project W-130 have been making progress in each area. Present research involves the use of infrared video thermography, electron microscopy, nuclear magnetic resonance, infrared spectroscopy and transformation technology.

Plant genetic resources conservation and utilization efforts have, in the past, been highly successful for the improvement of agronomic and horticultural crops. In the future, several plant biotechnology approaches for moving alien genes into adapted plant genome backgrounds may become important, making plant genetic resource conservation even more of a priority. Genetic engineering may permit the direct utilization of genes from wild species. These technologies require that a reservoir of genes be available for incorporation into economically important crops. DANR researchers are key participants in Regional Research Project W-006, which addresses the applied aspects of preservation and utilization of plant biotic diversity. Research programs in conserving germplasm are important since they may permit American growers to broaden their crop mix and reduce economic risks at the farm level as well as to provide alternative crops for sit uations where oversupply of major crops exist. In addition these crops may provide consumers with new and less expensive sources of essential industrial products such as oils and waxes.

Seeds are important both in agriculture and in natural ecosystems, a nd the production of high quality seeds is fundamental to the success of U.S. agriculture. DANR researchers are members of Regional Research Project W-168, which provides an interdependent structure within which seed scientists across the U.S. can establish critical research objectives, and focus and combine their efforts on projects of mutual interest to solve problems, discuss and critique results and hypotheses, and contribute to expanding scientific knowledge in seed biology and biotechnology. Their r esearch emphasizes maximizing the quality and performance of seeds in the next century to meet the demands of emerging technologies. For example, the physiological quality of seeds is of increasing importance in conservation tillage and re-vegetation programs.
California is participating in CRIS Multistate Project (W-177) titled, *Enhancing the Global Competitiveness of U. S. Red Meat*. The overall objective of this project is to improve the global competitiveness of the U. S. livestock and red meat industries by conducting integrated/cross-disciplinary research that addresses several primary production and marketing issues:

California is taking the lead in CRIS Multistate Project (W-185) titled, *Biological Control in Pest Management Systems of Plants*.

California is participating in CRIS Multistate Project (W-189) titled, *Natural Products Chemistry as a Resource for Biorational Methods of Insect Control*. Its objectives include: 1. To determine the chemistry, biology, biochemistry, physiology, and the neurophysiological mechanisms of perception of specific semiochemicals potentially useful for control of pest insects, and to study semiochemicals in model insect systems for later application to target pest insects; 2. To discover, identify, and determine the physiological mode of action of plant metabolites toxic to insects, for development into biorational pesticides; 3. To develop peptides and proteins as novel agents for plant protection, and increase our understanding of the roles that peptides and proteins can play in pest control.

Cooperative Extension specialists and AES researchers in California, Arizona, and Utah have combined with ARS researchers and growers to form the Southwestern Insecticide Resistance Management Working Group. The most recent meeting of the Working Group was held at the University of Arizona, Tucson, May 1999. In addition to regular meetings to discuss progress in research and extension, a number of Working Group members have combined in developing cooperative programs dealing with the management of resistance in cotton aphids, lygus bugs, and lepidopterous species on cotton and in whiteflies as they move between various alternate hosts such as cotton, vegetables, and melons. A critical issue is developing field recommendations for use of Bt-cotton (genetically modified cotton incorporating genes which express *Bacillus thuringiensis* toxins) which delay development of insecticide resistance to the modified cotton by requiring some percentage of each field or a nearby field be planted with unmodified cotton (the refugia in which insects would not be selected for resistance). Funding for this work was provided by a wide variety of sources including DANR, Cotton Incorporated, the California Melon Research Commission, the California Cotton Pest Control Board, the California Iceberg Lettuce Board, the Imperial Valley Whitefly Management Committee, the UC Statewide Integrated Pest Management Program, the Western Regional Integrated Pest Management Program, and USDA-ARS.

Easter lily bulbs have been the most important crop in Humboldt and Del Norte counties of California and Curry County, Oregon, since the early 1940s. The lesion nematode, *Pratylenchus penetrans*, is a serious detriment to Easter lily production. Nematicide usage has resulted in groundwater contamination. Cooperative Extension specialists and farm advisors and growers in California and Oregon, and California EPA, have an ongoing collaborative research program to minimize the use of chemical nematicides for nematode management. Efforts include evaluation of environmentally friendly products, improved application methods for traditional nematicides, cover cropping, crop rotation, population dynamics studies, and hot water and ozone treatment of planting stock. Research trials are conducted each year at a research station funded and managed by California and Oregon growers. A meeting to review the previous year's research and discuss future plans is annually held each year in Brookings, Oregon. In addition, a field day to view research in progress is annually held at the Easter Lily Research Foundation Research Station in Brookings. This program has received funding from DANR, Smith-Lever IPM Funds, the Easter Lily Research Foundation, and the UC Statewide Integrated Pest Management Program.

Building on the efforts of previous researchers in pome fruits in many states, CE specialists and AES researchers developed in 1993 an area-wide approach to managing the codling moth using pheromone

mating disruption. In 1994, a group of researchers from UC Berkeley, Oregon State, Washington State, and USDA-ARS developed a coordinated research proposal which was funded largely by USDA-ARS from 1995 to 1999. Parallel grants focusing on closing research gaps were funded by private groups such as the Washington Tree Fruit Commission or the California Pear Board and Pear Pest Management Fund. In addition, other agencies such as the California Department of Pesticide Regulation, EPA, or the UC Water Quality Program also funded various programs or components. After the success of the first 5 area-wide programs, satellite programs were established in more than 15 different regions throughout the western U.S. including many parts of California, Washington, and parts of Oregon or Colorado. Annual area-wide meeting were conducted with researchers, extension personnel, and area-wide program coordinators from all sites from 1993 to 1999. Collaborative extension efforts were developed with AES researchers and CE specialists from California, Oregon, and Washington to develop codling moth workshops that were conducted in all three states. Teams of researchers and specialists were brought from the various states to conduct the workshops in the three states. To date, 20% of the acreage in the western US has been estimated to have adopted the general program of mating disruption for codling moth. Examples of future research issues that remain unresolved include the enhanced integration of existing biological control agents for secondary pest suppression, addressing outbreaks of shifts in species importance associated with the change in the IPM program, and development of newer, more economic means to deliver codling moth pheromone on an area-wide basis.

## Target Audiences:

All of California's agricultural producers of food, fiber and ornamental crops, food processors, pest control advisors, pesticide and pharmaceutical producers.

## Program Duration:

These programs' research and extension goals, actions and proposed outcomes are based on 3 to 5-year midterm priorities that have been updated for 1999 as part of the DANR's annual Program Planning Advisory Committee process. This procedure involves an integrated, multidisciplinary approach to planning.

## Allocated Resources: ($ x 1,000; [FTE=units])

| Component | Current | FFY 99-00 | FFY 00-01 | FFY 01-02 | FFY 02-03 | FFY 03-04 |
|---|---|---|---|---|---|---|
| Research (formula) | $31,555 | $31,555 | $31,555 | $31,555 | $31,555 | $31,555 |
| Research (DANR match) | $64,460 [252.6] | $64,460 [252.6] | $64,460 [252.6] | $64,460 [252.6] | $64,460 [252.6] | $64,460 [252.6] |
| Extension (formula) | $7,178 | $7,178 | $7,178 | $7,178 | $7,178 | $7,178 |

| | | | | | | |
|---|---|---|---|---|---|---|
| Extension (DANR match) | $23,352 [232.0] | $23,352 [232.0] | $23,352 [232.0] | $23,352 [232.0] | $23,352 [232.0] | $23,352 [232.0] |

## Education and Outreach:

California's prune-growing region, the counties of Butte, Glenn, Merced, Sutter, Tehama, Tulare, Yolo and Yuba are the focus of the Environmentally Sound Prune System Project (ESPS), a system employing innovative technologies and management strategies that reduce pes ticide and fertilizer use, save on water and make growers more cost-effective. Compelling economic and environmental forces have given birth to this new approach to prune farming proposed and tested by a steering committee consisting of county-based advisors who regularly work with prune growers, IPM specialists and advisors, other UC Cooperative Extension specialists, UC Davis faculty members with pertinent expertise, growers cooperating in the research, and industry representatives. Funding sources for th e project include: DANR, California Prune Board, California Department of Pesticide Regulation, the USDA, and the UC Sustainable Agriculture Research and Education Program.

Researchers and CE specialists at UC Riverside are cooperating with farm advisors in Ventura, San Diego, Santa Barbara, and Riverside counties in developing and implementing an integrated management program for a new pest of avocados, the avocado thrips. Avocado thrips appeared in California in July 1996. They were probably introduced on avocados smuggled into the state from Mexico, and have rapidly spread to infest 90% of the state's avocado acreage. Economic impact in 1998 was estimated to be between $7.6 and $13.4 million from the combined effects of losses in quality and increased production costs. Research and extension is focusing on developing a better understanding of the basic biology of this new pest species, developing selective pesticides that can be used for control without upsetting biological control of other pest specie s, evaluating augmentative releases of insectary reared natural enemies, foreign exploration in Mexico for biological control agents which may help keep this pest in check, and training pest control advisors and growers in how to sample for and manage fiel d populations. Funding for the project includes DANR, the California Avocado Commission, and the UC Thelma Hansen Trust Fund.

UC Cooperative Extension specialists and researchers at Berkeley, Davis, Riverside, and farm advisors in Orange, San Diego, San Mateo/San Francisco, Santa Cruz/Monterey, and Ventura/Santa Barbara counties have cooperated in developing a broad based pest management program focusing on the state's historically high pesticide use ornamentals industry. The program focuses on training gr owers and pest control advisors in proper pest identification, use of integrated pest management techniques, use of reduced risk pesticides, and safe use of pesticides resulting in minimal applicator exposure. Demonstration programs have been used to show that the cost of integrated pest management programs are more than offset by decreased costs associated with lower pesticide usage and better quality crops. The program has been funded by DANR, the UC Thelma Hansen Trust Fund, the Carlsbad Agricultural Improvement Fund, the California Department of Pesticide Regulation, the UC Statewide Integrated Pest Management Program, the American Floral Endowment, the California Association of Nurserymen, the California Cut Flower Commission/Kee Kitayama Research Foundation, and the U.S.-Israel Binational Agricultural Research and Development Fund.

California's main citrus growing region in the San Joaquin Valley (Fresno, Kern, and Tulare counties) is the target of an integrated pest management program being developed by UC Cooperative Extension specialists, farm advisors, and researchers at UC Riverside. The program emphasizes increased pest monitoring by pest control advisors, release of insectary-reared parasitoids for control of California red scale, use of economic thresholds to make treatment decisions, and use of selective chemicals only on an as-needed basis. Economic returns have been shown to be higher on average in comparison with the traditional broad spectrum pesticide-based management program. Funding for the program has included DANR, the California Citrus Research Board, the California Energy Commission, the UC Statewide Integrated Pest Management Program, and the U.S. Agency for International Development.

DANR personnel were instrumental in developing the Vertebrate Pest Council (VPC) during the late 1960s. The VPC has emerged as the principal international forum for dealing with animal-related damage to agricultural commodities. Representatives from DANR serve vital roles in coordinating a bi-annual, international conference held in California that provides practitioners with science-based solutions to animal damage. Participants include county-based CE advisors, agricultural commissioners, producers, and pest control applicators and operators.

Because irrigated agriculture uses a large fraction of the State's developed water supply, it is essential that water be used as wisely and efficiently as possible. Advisors across the State have collaborated with CE specialists and researchers in estimating the water use of vegetable and row crops. Crop coefficients were developed using portable Bowen ratio instruments that were constructed and tested against lysimeters. These instruments measured evapotranspiration (ET) in fields of vegetable and row crops at various developmental stages. The crop coefficient was calculated at different percentages of ground cover using a direct ratio between the ET of the crop and that of a reference grass, which was calculated using meteorological data collected from local weather stations. These coefficients provide an important tool to aid farmers in optimizing the use of irrigation water.

After 3 years of study, CE academics at the Kearney Agricultural Center and in Tulare and Fresno county have demonstrated conclusively that the unsightly skin discoloration of peaches and nectarines, called inking, is the result of physical injury combined with contamination. Abrasion releases anthocyanin/phenolic pigments, which are located in the skin cells, allowing the reaction of these pigments with heavy-metal contaminants in irrigation or wash water. They found that iron, copper and aluminum were the most deleterious contaminants of those studied in inducing inking on abraded fruit. This contamination can occur within 15 days before harvest, or during harvest or packing operations. They found that foliar-nutrient, fungicide and insecticide preharvest sprays may act as sources of contamination for inking development, depending on the preharvest application interval. To reduce inking incidence, they have developed recommendations for safe preharvest application intervals that yield low inking incidence for fungicides and foliar nutrients containing heavy metals.

Cooperative Extension specialists and dairy advisors in Sacramento, San Joaquin, Madera, Fresno, Merced, Stanislaus and Tulare counties have collaborated in a program in which the principles of Total Quality Management were applied to dairy farm operation in an effort to manage antibiotics and prevent residues in meat and milk. Six California dairies participated in the National Dairy Total

Quality Management Program, which included dairies in 30 states. Dairy producers, their veterinarians, the UC Cooperative Extension dairy farm advisors and Veterinary Medicine Extension veterinarians collaborated during the study. During the project, all six dairies developed written treatment plans to assure that drug withdrawal deadlines were being met. Most of the participating producers judged the management protocols, treatment protocols and treatment records to be "very useful" or "somewhat useful." Perhaps the greatest benefit was increased communication between the dairy management and its workers for a better understanding of what was expected of each worker and who was accountable.

# National Strategic Plan Goal 2

*A safe and secure food and fiber system. To ensure an adequate food and fiber supply and food safety through improved science based detection, surveillance, prevention, and education.*

## UC-DANR's Human Resources Programs Covering:

- **Human Health and Nutrition - Food Borne Diseases**

## Statement of Issues:

The potential risks resulting from both the production and consumption of agricultural products are of increasing concern for California residents. As many as one million cases of food borne disease from consumption of foods containing pathogenic microorganisms such as *Escherichia coli* 157:H, *Salmonella* and *Listeria* may be caused annually in California. Such pathogens disproportionately affect sensitive population groups such as the young, the elderly, and the immuno-compromised. Pesticide residues, other chemical contaminants, and naturally occurring toxins in the food supply also present potential risks.

## Research and Extension Performance Goals:

UC-DANR is focusing its research and extension resources on improving the health of California consumers by decreasing the incidence of food borne diseases and reducing the risks posed from the chemical contaminants in food. In furtherance of these goals, we are proposing to take the following actions:

1. Develop effective research and educational programs directed toward food producers, processors, retailers, restaurants, regulators and consumers to reduce the incidence of food borne disease.

2. Develop effective research and educational programs directed toward food producers, processors, regulators and consumers to minimize the risks associated with chemical contaminants in food.

3. Develop effective training programs addressing food safety and sanitation issues using bi-lingual educational materials.

## Output Indicators:

Number of extension publications on food safety published
Number of extension programs on food safety delivered
Number of peer-reviewed research papers published
Number of food processors, food producers, food retailers, restaurants, and regulators reached

## Outcome Indicator:

By the year 2004, California will have increased the level of adopted practices that will eventually result in the reduced incidence of reported cases involving food borne disease.

## Key Program Components:

UC-DANR, through its land-grant structure, is uniquely positioned with its resources to address these critical food safety issues through its comprehensive research programs in food science, pest management, animal and veterinary sciences, water quality, and public health. These programs are linked to regional and local dissemination systems spearheaded by county CE programs.

A specific campus-based departmental program is in place to address these issues. The **FoodSafe Program** supports a web page. The site, http://foodsafe.ucdavis.edu/ has a Food Safety Directory containing the names of 110 university faculty, campus specialists and county -based advisors working with food safety issues who have consented to be listed in the Directory. Volunteers, known as "Master Food Preservers/Food Safety Aides," are working in several counties under the direct supervision of academic staff.

The **FoodSafe Program** maintains a national database on its web site titled, "Identification and Dissemination of California Food Safety and Quality Materials" which can be accessed by anyone with Internet capability.

## Internal and External Linkages:

California is taking the lead in CRIS Multistate Project (W-122) titled, *Improve Food Safety Through Discovery and Control of Natural and Induced Toxicants and Anti-toxicants.* The objectives of the project are to: 1) Detect and identify natural toxicants and antitoxicants in food, food supplements and herbal products; and 2) Determine effects of agricultural practices, commercial and domestic processing on the occurrence and transmission of natural toxicants in foods and develop methods to minimize associated risks.

A train-the-trainer workshop developed previously with Indiana Plan of Work Funds is proposed to be taught by a Cooperative Extension Specialist and a Registered Environmental Health Specialist from the state of Indiana. CE specialists and advisors including those with EFNEP responsibility will be included as will county Environmental Health personnel (health inspectors). CE Trainers will be expected to team with county Environmental Health Inspectors to provide training in their respective counties. Training sessions will focus on smaller facilities and those with specialized needs .

## Target Audiences:

All consumers of food products are potentially our target audience but of particular concern are those who are young, elderly or immuno-compromised because of their high degree of susceptibility to food pathogens. As stated previously, additional clientele are food producers, processors, retailers, restaurants, and regulators.

## Program Duration:

This program's research and extension goals, actions and proposed outcomes are based on 3 to 5-year midterm priorities that have been updated for 1999 as part of the DANR's annual Program

Planning Advisory Committee process. This procedure involves an integrated, multidisciplinary approach to planning.

## Allocated Resources: ($ x 1,000; [FTE=units])

| Component | Current | FFY 99-00 | FFY 00-01 | FFY 01-02 | FFY 02-03 | FFY 03-04 |
|---|---|---|---|---|---|---|
| Research (formula) | $2,124 | $2,124 | $2,124 | $2,124 | $2,124 | $2,124 |
| Research (DANR match) | $3,039 [12.3] | $3,039 [12.3] | $3,039 [12.3] | $3,039 [12.3] | $3,039 [12.3] | $3,039 [12.3] |
| Extension (formula) | $302 | $302 | $302 | $302 | $302 | $302 |
| Extension (DANR match) | $995 [8.4] | $995 [8.4] | $995 [8.4] | $995 [8.4] | $995 [8.4] | $995 [8.4] |

## Education and Outreach:

In moving towards adoption of the FDA Food Code, the State of California passed legislation in September of 1998 (Assembly Bill 1978) that will require food retail and food service facilities on or before January 1, 2000 to have an owner or employee who has passed an approved and accredited food safety certification examination. Recertification will be required every three years. While this legislation does not require a course in safe food handling, this is one of the easiest ways to study for the test. It is estimated that as many as 100,000 people in California will require food safety training within the next year. While large or national retail chains and food service establishments are likely to provide their own in-house training, smaller facilities
will need to find training elsewhere. Cooperative Extension should be able to fill this long-term training need.

For the past 20 years UC Davis CE has sponsored a one or two day food processing sanitation workshop once or twice per year. In the past three years the program has increased its focus on fresh fruits and vegetables and in 1999 introduced a very successful one-day workshop in Spanish. The Sanitation Workshop has been very successful by annually inviting new speakers who are encouraged to use new materials. The need for a more standardized training program in the basic sanitation concepts has become increasingly evident in the past two years.

Training materials, including PowerPoint presentations, suggested activities and a workshop manual will be prepared based on the experience and materials gathered for prior sanitation workshops. A 6-hour training program will be developed which will include the general topics of basic microbiology, cleaners and sanitizers, sanitizing methods, and human hygiene (about 1 hour each topic) and more specific topics addressing the application of sanitation in the
field, in a packing house, or in a fresh-cut operation. The training materials will be based on the FDA voluntary good agricultural practices guidelines. Designing a program in a two-part fashion with general material presented first followed by product specific information will allow other commodity -

specific training materials to be developed at a later date (e.g. application of sanitation in the dairy or meat industries).

California is the largest producer of fresh fruits a nd vegetables in the United States supplying over 50% of the fresh produce consumed nationwide. Many innovative quality assurance programs have already been implemented by the larger California growers, packers, and processors. Although these large firms handle the bulk of fruits and vegetables produced in the state, there are numerous small and mid-sized operations who lack the expertise to implement these programs. In addition, there is increasing interest in deve loping on-farm value added products. This has included minimally processed fruits and vegetables that have sometimes been processed in inadequate conditions. There is a recognized the need for effective educational programs in sanitation that will enable all growers, packers, and processors to put the new FDA "Good Agricultural Practice guidelines" into practice.

A training course, conducted in both English and Spanish, is being developed to address the basics of food sanitation applied to the productio n and processing of fresh fruits and vegetables.

# National Strategic Plan Goal 3

*A healthy, well-nourished population. Through research and education on nutrition and development of more nutritious foods, enable people to make health promoting choices.*

## UC-DANR's Human Resources Programs Covering:

- **Human Health and Nutrition**

## Statement of Issues:

A plethora of human epidemiological data indicates that improved nutritional and lifestyle practices will significantly reduce potential risks from chronic diseases including, but not limited to, many types of cancer, heart disease, non-insulin dependent diabetes and osteoporosis while also providing prenatal and postnatal benefits. Groups most at risk of nutrient deficiencies are children, women of childbearing years, substance abusers, and the elderly. Also a disproportionate share of diet-related disease is borne by minority subgroups of the population. Twenty-five percent of California's children live below poverty level putting them at risk of food deprivation and vulnerable to under nutrition and other nutrition problems.

UC-DANR's programs to address health risks from consumption and production of agricultural products have been firmly established. They must continue to be improved to meet the growing health needs of Californians. Internal coordination of our research and extension efforts is criti cal. We also need to expand and improve linkage with the agricultural sector, local, state and federal government agencies, nonprofit organizations, and communities.

## Research and Extension Performance Goals:

UC-DANR is focusing its research and extension resources on optimizing the health and dietary well-being of California consumers. In furtherance of this goal, we are proposing to take the following actions:

1. Identify interactions between nutritional status and health.

2. Identify the nutrition, health and lifestyle practices of California consumers who are at risk for nutrition-related health problems.

3. Identify unique food related behavior that put specific cultural groups at risk.

4. Continue to implement, modify, develop and test behavioral models that will facilitate improved nutritional and lifestyle practices.

## Output Indicators:

Number of extension publications on health promotion and nutrition published
Number of extension programs on health promotion and nutrition delivered

Number of peer-reviewed research papers on nutrition-related problems published
Number of nutrition educators reached
Number of families and individuals participating in nutrition education and health promotion programs
Number of parents and care givers using appropriate infant and child feeding practices a s approved by the American Pediatric Association

## Outcome Indicators:

By the year 2004, California's nutrition educators will have increased their specific information available to develop more focused materials and programs based on the problems and life styles of clients.

By the year 2004, California's nutrition educators will use the best approaches for changing the less desirable practices.

By the year 2004, California's University-based scientists will learn of unique nutrition-related problems of California consumers and will undertake research to help solve those problems.
By the year 2004, there will be a 5 percent increase in the participation rate among California's families and individuals who take part in non-formal nutrition education and health promotion programs and who make progress toward meeting the Dietary Guidel ines, the Food Guide Pyramid recommendations and following the physical activity recommendations in the Surgeon General's Report.

Within California, by the year 2004, there will be 5 percent more parents and care givers who are making progress toward the American Pediatric Association's appropriate infant and child feeding practices.

By the year 2004, California will see a 5 percent increase in the participation rate among individuals who complete educational programs and plan to make progress toward adopting one or more health promoting lifestyle changes to reduce risk for chronic diseases.

## Key Program Components:

DANR, through its land-grant structure, is uniquely positioned with the resources to address these critical human health issues through its comprehensive research programs in nutrition, food science and public health. These programs are linked to regional and local dissemination systems spearheaded by county CE programs. Specific federally-sponsored programs including **EFNEP** and **FSNEP** are in place to address these critical issues. The Division's presence and activity in human health matters is also enhanced through successful volunteer programs such as **4-H** and **Master Gardeners**.

**EFNEP** is assisting low-income families, particularly those with young children. Currently there are 10 county-based youth programs and 16 adult programs providing small group nutrition instruction to assist families on how to meet their nutritional needs. Those who complet e the program are using their newly acquired knowledge and skills to provide more economical and nutritious foods for their families. Evaluations of participants' diets show significant and continued improvements in their eating habits, especially in the consumption of milk, fruits, and vegetables.

The **FSNEP** program consists of Adult and Youth program components and operates in 39 California counties. The Adult nutrition education program enrolls Food Stamp recipients and applicants on a voluntary basis at the local country welfare department and other sites. Nutrition education lessons focus on the following topics: self-sufficiency, food budgeting, managing resources, food preparation skills, food safety and sanitation, and feeding infants and children. The Youth nutrition education program targets schools with large numbers of students from Food Stamp households. Teachers at the school sites are trained to deliver a nutrition education program targeted to youth audiences.

The major goal of **FSNEP** is to improve the nutrition-related skills of Food Stamp recipients, specifically those skills related to selecting, purchasing and preparing a low-cost nutritional diet for themselves and their family. **FSNEP** has the following objectives: improved self-sufficiency of Food Stamp recipients, decreased reliance on emergency food resources, increased skills in food budgeting and meal planning, improved diet for entire family, increased consumption of fruits and vegetables, increased variety in food choices, improved food preparation skills and improved knowledge of safe food practices.

The **Center for Hunger and Obesity**, housed at the UC Berkeley campus within the College of Natural Resources, is addressing the closely related issues of hunger and obesity.

The **Program in International Nutrition** located at UC Davis, was established to coordinate research and training activities concerning human nutrition problems of low-income countries, and of ethnic minorities and disadvantaged groups in the United States.

## Internal and External Linkages:

California is taking the lead in CRIS Multistate Project (W-191) titled, *Factors Influencing The Intake of Calcium Rich Foods Among Adolescents*. Its objectives include: 1) To identify the most salient motivators and barriers influencing the consumption of calcium rich foods among adolescents; 2) To assess knowledge and attitudes towards calcium rich foods among adolescents; 3) To assess calcium intake among adolescents; 4) To determine variation in motivators and barriers, attitudes and knowledge and consumption of calcium rich foods across age, gender and selected ethnic groups.

California is participating in CRIS Multistate Project (W-143) titled, *Nutrient Bio-availability - a Key to Human Nutrition*. Its two objectives include: 1) To determine the bio-availability of vitamins (e.g., cobalamin, folic acid, vitamin B-6 and riboflavin) and minerals (e.g., calcium, copper, iron, lead, molybdenum, selenium and zinc) in plant and animal derived foods in human subjects; and 2) To develop methods for determining bio-availability of dietary factors (calcium, iron, folic acid, vitamin B-12, and vitamin B-6) in vitro and in animal models for predicting human bio-availability.

California is participating in CRIS Multistate Project (W-181) titled, *Modifying Milk Fat Composition for Improved Manufacturing Qualities and Consumer Acceptability*. Its objectives include: 1) To identify and characterize important regulatory steps in fatty acid synthesis and desaturation and their positional distribution on glycerol in milk fat; 2) To quantify modification of milk fat composition by manipulating the diet of the cow; and 3) To characterize the effects of modified milk fats on physical, chemical, manufacturing, and sensory properties of dairy products.

Cooperative Extension academics work with several organizations to achieve their goals. The broader nutrition and health community includes but is not limited to the California Farm Bureau, Dairy Council of California, Headstart, Maternal and Child Care Health, California Department of Health Services, California Department of Education, and the Special Supplemental Nutrition Program for Women, Infants, and Children (WIC). This blueprint was supported as a resolution (ACR 58) and was adopted by the State Legislature. This was a first step in the establishment of a coordinated food and nutrition policy in California and the resolution is currently in the Department of Health Services for review and recommendations.

The food and nutrition policy priorities identified were: 1) ensure Californians have access to a secure, acceptable food supply that is nutritious, safe, and affordable; 2) ensure safe food for Californians through maximum protection against foodborne illness from such agents as microbes, chemical contaminants and parasites by: identifying problem areas, controlling hazards, and providing information to consumers to make informed choices; 3) improve nutritional status and reduce diet related diseases of Californians which, in turn, will reduce health care costs, improve the quality of life and promote the health of families and individuals; 4) increase the knowledge, motivation, and skills of selecting, purchasing, and preparing a healthful diet and in adopting a healthy lifestyle, including physical activity, for families and individuals; 5) provide access to accurate and consistent nutrition information and services by qualified nutrition professionals.

## Target Audiences:

All consumers of food products are potentially our target audience but of particular concern are those who are the most at risk of nutrient deficiencies such as children, women of childbearing years, substance abusers, and the elderly. Also a disproportionate share of diet-related disease is borne by minority subgroups of the population. As stated previously, additional clientele are nutrition educators.

## Program Duration:

This program's research and extension goals, actions and proposed outcomes are based on 3 to 5-year midterm priorities that have been updated for 1999 as part of the DANR's annual Program Planning Advisory Committee process. This procedure involves an integrated, multidisciplinary approach to planning.

## Allocated Resources: ($ x 1,000; [FTE=units])

| Component | Current | FFY 99-00 | FFY 00-01 | FFY 01-02 | FFY 02-03 | FFY 03-04 |
|---|---|---|---|---|---|---|
| Research (formula) | $2,630 | $2,630 | $2,630 | $2,630 | $2,630 | $2,630 |
| Research (DANR match) | $2,972 [12.8] | $2,972 [12.8] | $2,972 [12.8] | $2,972 [12.8] | $2,972 [12.8] | $2,972 [12.8] |
| Extension (formula) | $1,030 | $1,030 | $1,030 | $1,030 | $1,030 | $1,030 |
| Extension (DANR match) | $3,381 [30.1] | $3,381 [30.1] | $3,381 [30.1] | $3,381 [30.1] | $3,381 [30.1] | $3,381 [30.1] |

## Education and Outreach:

A Vietnamese Nutrition Education project has recently produced a 49-page flip chart and handout designed to be used with Vietnamese-speaking women living in the United States. The topic of these teaching tools is good nutrition during pregnancy and lactati on. The illustrated flip chart is meant to be used as a teaching tool by professionals or para-professionals who are counseling Vietnamese women. An "English translation" is available for those who are not proficient in reading Vietnamese.

Permitting frequent snacks and forcing children to eat at meals may be disrupting the children's natural ability to regulate food intake and may lead to a higher than average incidence of obesity, according to a study published by a UC Davis nutrition specialist in the May 1999 Journal of the American Dietetic Association. Co-authors of the study were a public health nutrition specialist with the California Department of Health Services and two county-based nutrition, family and consumer science advisors in Monterey and Sonoma counties. The researchers conducted focus groups in Sonoma, Monterey and Riverside counties with 61 low-income Mexican-American parents of pre-school children and observed eating habits during visits to 11 Latino households. While the results canno t be generalized to the larger population, they reflect some clear patterns of feeding practices in Latino homes. The most common strategies used to encourage children to eat were bribes.

The research is now providing professionals with information that will help them work with families to correct detrimental feeding strategies. The researchers will soon develop a radio campaign to extend these messages to Latino families and will hold workshops for professionals who work with Latino populations in Tulare, Kern and Fresno counties. In addition, researchers will analyze surveys completed last year by 239 Latino parents in Kern, Tulare, Fresno and Monterey counties to further examine parental strategies, concerns and attitudes related to pre-school children's feeding practices.

A community and school-based education program has just been completed in Solano County. A tested, comprehensive curriculum for garden-based nutrition education for elementary school aged children will be made available statewide and nationwide for counties and schools interested in utilizing a similar, comprehensive program. This program was unique in that it incorporated the public school system into a research and educational program. By virtue of its design, the pro ject was community based and as such provides information to the communities as well as be used as a framework for educational programs serving additional communities. The program was performed in collaboration with the California Department of Education a nd focused on the goal of strengthening the capacity of families and communities to building strong families and healthy, safe communities, by using the school as the community based forum for education and outreach efforts.

A video "For Goodness Sake! Prevent Anemia" and accompanying fact sheets was developed through an interagency effort which included CE, the **Children's Health and Disability Program** (CHDP) and WIC.

# National Strategic Plan Goal 4

*Greater harmony between agriculture and the environment. Enhance the quality of the environment through better understanding of and building on agriculture's and forestry's complex links with soil, water, air, and biotic resources.*

## UC-DANR's Natural Resources Programs Covering:

- **Human-Environment Interactions**
- **Wildfire Science and Management**
- **Water Quality, Water Quantity, Water Allocation and Watershed Management**

## Statement of Issues:

Concern for human impact on the environment has been growing steadily for several decades. These concerns encompass issues as diverse as contributions to global warming, water quality and supply, air quality, management and disposal of toxic materials and waste, preservation and management of natural resources, planning for community growth, and provision for social and recreational needs of individuals and families. The overall discussion on this urban/rural interface really focuses on land use and addressing the concerns/mandates comparing the interlinking land needs for people, environment, and agriculture. These issues affect and require the involvement of both urban and rural residents.

Individuals and communities need improved understanding and tool s to address these issues more effectively. Researchers, specialists and advisors in the human, agricultural, and natural resources fields have the expertise to identify environmental issues that cross program areas. They also have the ability to measure public knowledge and understanding of key environmental issues and thus have the ability to target educational programming to meet specific shortfalls in this arena. This offers significant educational efficiencies over development on broad-based environmental education programs. Through an integrated approach of research and education, they can promote an understanding of processes that contribute to environmental disruption, and identify potential impacts of such processes on human health and well-being, and develop science-based strategies to minimize such impacts. With its multidisciplinary expertise and effective public outreach mechanisms, DANR is in a unique position to make a positive and constructive contribution to improved public understanding and action on environmental issues.

Addressing the issues of conservation and enhancement of the multiple values, goods and services associated with watersheds such as water quality and utilization, timber harvesting, recreation, grazing practices, fish and wildlife habitat, and other activities, requires scientifically sound decision-making strategies, management techniques and public education. Two specific examples that illustrate the need for interdisciplinary approaches to management in California incl ude wildland fire and water quality and water quantity issues.

Fuel loads have continued to increase to unsafe levels in forest and rangeland ecosystems and at the urban/wildland interface. Increasing fuel loading has tremendous short-term economic, environmental and social costs. There is an urgent need to develop strategies for managing wildland fuels while maintaining public safety and environmental quality.

California's demands for water resources require strategies for quantity, allocation, and quality assessment and public policy development - including all water uses, water transfers, possible use limits, and investigation into alternative sources. Much of the future use of water in California will depend on specific water quality standards. Additional information is needed on appropriate quality requirements for the various end uses, such as specific ecosystem processes, domestic use, production agriculture and recreation. The needs for measuring, monitoring and determining achievable standards in a cost-effective and simple manner will require advances in research and technology.

In addition, it is necessary to increase communication and information between the agencies and groups dealing with water in order to facilitate the reasonable use and allocation of water resources. Public policy decisions regarding water issues are sometimes made without the backing of adequate scientific information. Science-based policy is more likely to be implemented and provide the desired or expected outcome in natural resources management.
DANR has the ability to address these issues by developing new technologies, coordinating communication efforts, and providing information in an unbiased manner to public policy decision-makers.

## Research and Extension Performance Goals:

❖ **Human-Environment Interactions**

DANR is focusing its research and extension resources on improving the public understanding of the importance of the following issues or concerns: 1) environmental issues for public and community health; 2) community activity; 3) quality of life; and 4) the sources, production, and processes used in food and fiber production.

We are also using our resources in an integrated manner to promote attitude and behavioral changes that facilitate involvement of community members and organizations in decision-making processes on public policy issues such as land-use, environment, agriculture, and urban and rural interface. In furtherance of these goals, we are proposing to take the following actions:

1. Establish multi-disciplinary research activities and communication across our programs to develop environmental education and technology programs giving special attention to providing for application of scientific and technical information for local decision-making purposes.

2. Develop, modify, test, and implement environmental educational programs and curricula for youth and targeted groups to increase science-based environmental awareness.

Research, develop, modify, test, and implement agricultural literacy education programs and curricula for youth and targeted groups.

4. Research community-based programs and models to help engage communities in building collective action and educational interventions around public policy issues.

5. Develop, modify, test and implement models of educational programs and curricula for youth and targeted groups to increase participation in developing public policies.

6. Collaborate with the State Department of Education in the development and evaluation of new educational strategies for environmental education curriculum currently focusing on ecological cycles.

7. Collaborate with major state and national formal and non-formal education programs focusing on Human-Environment Interactions (e.g. Project Food, Land and People and Life Lab Science Program) to evaluate the impact and relationship of these programs to student achievement and understanding in environmental education.

**8.** Introduction of greater number of human-environment interaction issues into Extension leadership development programs for youth and adults.

❖ **Wildfire Science and Management**

DANR is focusing its research and extension resources on reducing the risk and intensity of wildfire and to improve public understanding of the role of wildfire in the functioning of an ecosystem. In furtherance of these goals, we are proposing to take the following actions:

1. Evaluate alternative systems of vegetation management comparing the benefits and costs from both an environmental and an economic viewpoint.

2. Coordinate educational efforts directed toward those in positions of managing wildfire and fuel loads, and those affected by wildfire.

3. Inform policy makers and others who influence policy decisions on wildfire management.

4. Determine current fuel loads in various vegetation types.

5. Identify costs and environmental consequences associated with different fuel modification strategies.

6. Employ interdisciplinary teams to evaluate consequences of wildland and prescribed fires on various ecological processes.

7. Conduct research and technology transfer to address role of wildfire management on ecosystem sustainability.

8. Identify historical patterns of wildfire in both pre-and post-settlement periods.

9. Identify changes in ecological functions associated with changing fire frequency.

4. Assure that Extension programs aimed at youth, families, and volunteers in the arena of Human-Environment Interactions contain components that address wildfire science and management issues.

❖ **Water Quality, Water Quantity, Water Allocation and Watershed Management**

DANR is focusing its research and extension resources on the following goals: improve the integration of all water quality factors when determining the beneficial uses of water; impro ve the decision-making process when reallocating existing developed surface water; ensure water resources are valued and priced using appropriate means; maximize the utilization of reclaimed water under appropriate conditions; improve public understanding and knowledge of all water rights and their consequences when making policy decisions regarding water management; improve the standardization, coordination and dissemination of water information when dealing with quality, quantity and interagency transfer efforts; improve watersheds while sustaining local, natural resource-based economies; and improve the integration of sound, ecologically-objective information for the benefit of all watershed components.

In furtherance of these goals, we are proposing to take the following actions:

1. Facilitate interdisciplinary research on water quality issues.

2. Disseminate research-based information on the effects of various activities on water quality to public policy decision-makers and other stakeholders.

3. Encourage and facilitate communication among DANR members conducting programs (research and/or educational) in the area of water quality.

4. Facilitate discussion of water issues in a collaborative manner at the state, regional, and local levels by determining the relationship between state and regional water management plans and local, site-specific implementation of projects consistent with those higher level plans and objectives.

5. Assist local water interests in determining the water quality necessary for the intended use.

6. Disseminate research-based information to public policy decision-makers and stakeholders regarding regulation, allocation and end uses, costs, and water qual ity assessment and technology.

7. Conduct research to determine appropriate uses of reclaimed water (e.g., wetlands, groundwater recharge, irrigation, etc.).
8. Conduct comparative studies on ground/surface water management legislation.

9. Conduct research and outreach programs related to development of new technologies that are usable in the laboratory or in the field for measuring and monitoring water quality.

10. Conduct research and outreach programs related to estimating yields, water runoff, drainage, and benefits and costs of various management activities. Downstream effects including those on coastal and estuarine environments, as well as those within the watershed, should be assessed.

11. Ensure that the full range of the University's expertise is applied to priority watershed-based problems.

12. Improve coordination among watershed planning groups, agencies, etc.

13. Develop communication technology (e.g., over the Internet) to support identification and tracking of watershed management and restoration projects, assessments of their outcomes and efficacy, and contact sources for further information.

14. Demonstrate to stakeholder audiences effective watershed management practices.

15. Facilitate the exchange of information on watershed concepts and the effects of various management options among stakeholders in watershed planning efforts.

16. Assist agencies, landowners, and watershed groups in designing and interpreting long-term monitoring programs assessing new management practices and restoration efforts.

17. Assure that Extension programs aimed at youth, families, and volunteers in the arena of Human-Environment Interactions contain components that address water issues.

## Output Indicators:

**Human-Environment Interactions**
Number of extension publications on environmental education published
Number of environmental educational programs and curricula delivered
Number of agricultural literacy education programs and curricula delivered
Number of peer-reviewed research papers on environmental education and agricultural literacy
Number of community-based programs that help to build collective action on public policy issues
Number of Extension Special Units devoted to theme of human-environment interaction. (e.g., Elkus Ranch, Faulkner Farm, and UC Davis Regional School Garden Resource Center)

Number of Workgroups and Workgroup projects focusing on human-environment interaction issues

**Wildfire Science and Management**

Number of extension publications on fuel loadin g, vegetation management alternatives, and the role of wildfire management on ecosystem sustainability

Number of extension programs on fuel loading, fuel modification alternatives, and the role of wildfire management on ecosystem sustainability

Number of peer-reviewed research papers addressing fuel loading, fuel modification alternatives, and the role of wildfire management on ecosystem sustainability

Number of extension publications addressing historical patterns and fire frequency in both pre- and post settlement periods and their impacts on sustaining ecological functions

Number of extension programs addressing historical patterns and fire frequency in both pre- and post settlement periods and their impacts on sustaining ecological functions

Number of peer-reviewed research papers addressing historical patterns and fire frequency in both pre- and post settlement periods and their impacts on sustaining ecological functions

**Water Quality, Water Quantity, Water Allocation and Watershed Management**

Number of extension publications dealing with public policy decisions surroun ding water issues

Number of extension programs where facilitators are collaborating and dealing with water issues

Number of peer-reviewed research papers involving multidisciplinary work on water issues

Number of research projects focused on determining a ppropriate uses of reclaimed water

Number of research projects focused on new technologies to measure and monitor water quality

Number of extension programs involving new technologies to measure and monitor water quality

Number of comparative studies on ground/surface water management legislation

Number of extension programs where watershed stakeholders receive management information

Number of people submitting water quality plans or letters of intent

## Outcome Indicators:

**Human-Environment Interactions**

By the year 2004, California's agricultural producers will have increased the economic value of their diverse crops by 5 percent by employing more efficient cultural and ecologically sound practices such as reducing pollution and ozone depletion, and improving human health and well-being.

By the year 2004, there will be an increased proportion (5 percent) of community residents with a science-based understanding of community environmental issues. As such, these enlightened individuals will be able to demonstrate their improved understanding of human, social and economic tradeoffs involved in maintaining and improving the environment by becoming more actively involved in local decision-making related to public policy issues r egarding land-use, the environment, and agriculture (food and fiber production processes).

**Wildfire Science and Management**

By the year 2004, Californians will have increased their understanding of the role and consequences of wildland fire and DANR is recognized as a source of expertise on wildfire science and management. As a result of these anticipated consequences, the amount of acres scheduled for prescribed burning and other fuel reduction techniques for r educing fuel loading will increase by 5 percent and California will have reduced by 5 percent, the number of people and the value of property at potential risk due to catastrophic fires occurring in the wildlands and wildland/urban interface.

**Water Quality, Water Quantity, Water Allocation and Watershed Management**
By the year 2004, California's public policy makers and watershed stakeholders will be making decisions regarding water issues by using objective, technically sound information derived from UC - DANR's academic community. As a result of these changes, there will be an increase in the use of reclaimed water in California by 3 percent and the quality of water for beneficial uses is improved by a similar amount. Likewise, there will be a gradual conve rsion to more water efficient crops, more water efficient irrigation systems, and urban water conservation.

By the year 2004, Californians will have developed best management practices that will lead to water quality and water quantity improvement across multiple watersheds. As a result of these improvements, the multiple values, goods, and services associated with watersheds will be produced on a fully sustainable basis.

## Key Program Components:

**Human-Environment Interactions:**
The **Urban and Environmental Outreach Program (UEOP)** was first organized as a DANR program on the UC Riverside campus in 1990. Its mission is to help the public and private sectors in Southern California's urban and urbanizing areas address current and emergin g environmental issues. **UEOP** provides a framework through which faculty and specialists at UC Riverside and county advisors in CE can organize and coordinate research, teaching, and extension efforts. Through symposia, publications, and other educational m aterials, **UEOP** strives to promote a clearer public understanding of environmental issues, to foster cooperative and informed decision making, and to find workable solutions to environmental problems. In pursuit of these goals, one project currently underway is the development of a geographic information system for sensitive species and habitats in Riverside County. This database will streamline the environmental review process and provide for more informed decision making about regional land use options.

Several DANR/CE education centers focus on human - environment interactions. **Faulkner Farm** in Ventura County, **Elkus Ranch** in San Mateo County and the UC Davis **Regional School Garden Resource Center** all conduct programs in applied research and nonformal education with a focus on the food and fiber cycle and the natural resources which support that cycle in various communities. These centers can serve as data collection sites for an evaluation of curriculums and educational strategies used in environmental education.

A number of new educational curriculums have been developed (Agademics, Food For Thought, TWIGS, Project, Food Land, and People, etc) which are being used in a number of settings across the state. These models could be used in a case study analysis to determine alternative strategies for addressing goals outlined in human - environment interactions.

The **4-H Center for Youth Development** has identified school gardening as one of their principal thrusts for research and assessment over the next two years. DANR's **4-H Program** has been a principal collaborator with the State Department of Education's "Garden In Every School" Program. Three statewide regional resource centers now serve schools throughout California and are utilizing faculty, staff and volunteers (Master Gardeners).

AES faculty (Community Development and Nutrition) are engaged with graduate and under - graduate students in assessing the school garden movement as it relates to science education, environmental education, nutrition and public policy in relation to environmental issues.

**Wildfire Science and Management:**
**Integrated Wildfire Hazard Abatement Workgroup** is a Division - wide Workgroup. It is conducting workshops on wildland fire in California during the summer of 1999.

The **UC Forest Products Laboratory** is working on Urban - Wildland Fire Hazard Mitigation issues using grant funds from the Federal Emergency Management Agency. As part of that project, a Fire Safe Inspector Training Program is being launched by the group. A separate study is looking at an Assessment of Urban/Wildland Biomass Utilization and Disposal Options.

**Water-Related Issues:**
The Bank of America and UC have established an international forum on water policy, which is focusing on reducing water - related conflicts while encouraging environmental protection and economic growth. It is called the **Rosenberg International Forum on Water Policy** in honor of retired Bank of America Chairman and CEO Richard M. Rosenberg, who has played a significant role in mediating water issues in California. The Forum will sponsor a major international conference of invited scholars and policy - makers every two years on water policy issues of global significance.

The **UC Groundwater Hydrology Program** supports the water resources industry (public water supply utilities, irrigation districts, water districts, etc.), research, planning, and regulatory agencies on the local, county, state and federal level, farm advisors in county cooperative extension, and the agricultural industry in coping with current and future groundwater resources and groundwater quality problems in rural areas. Research and extension components exist for this statewide program that has an emphasis on rural areas in Central California.
The University has recognized the need for coordinated conservation planning in the Sierra Nevada region and formed the **Sierra Nevada Network for Education and Research**. The **SNNER**

initiative is part of the planning effort for the proposed new UC campus at Merced and will help form the foundation of a renewed research emphasis on the Sierra Nevada. The **SNNER** will contribute enhanced planning through facilitating communication among parties interested and invested in coordinated research and planning for the Sierras and participation in watershed projects. The watershed projects will bring the University's scientific resources to bear on conservation issues at a regional scale in collaboration with interested federal, state, and local regulatory bodies, landowners, and citizen groups.

The UC **Center for Forestry** located on the Berkeley campus has initiated the "Freshwater Creek Watershed Study" which is an assessment and evaluation of existing scientific knowledge related to the cumulative watershed effects of logging in the coastal redwood region and the adequacy of techniques available for assessing those impacts. A team of scientists will examine several coastal watersheds in various stages of timber harvest. Since Freshwater Creek Basin is a current example of the need for knowledge of cumulative watershed effects, particular attention will be paid to that basin.

The UC **Centers for Water and Wildland Resources (CWWR**) are linking natural resource issues and human resource solutions. As a multi-campus organized research unit and special program within DANR, the **CWWR** is charged with stimulating and coordinating research and information dissemination on a wide variety of issues related to the natural resources of California. The **CWWR** has a long standing history of addressing agency, organization, and community needs for research, education, conferences, and publications by linking fiscal resources to University and other human resources. The **CWWR** network of research and administrative expertise routinely facilitates the linkage of agency and private dollars and priorities to sound scientific study and information transfer.

The **Information Center for the Environment (ICE**) is a cooperative facility supporting projects of an interdepartmental faculty, with funding from over a dozen agencies and programs. **ICE** is housed within the College of Agricultural and Environmental Sciences at UC Davis. The Center provides a geographic information system (GIS), several databases offering a variety of environmental information, and modeling development and support for projects related to the environment.

The statewide **Integrated Hardwood Range Management Program** has several research and extension components that are addressing nutrient cycling, water quality, habitat fragmentation, land use change, economic values of open space, oak woodland restoration, and fire effects on habitat. This program has served as an excellent model to demonstrate partnerships between faculty and CE advisors working closely with state agencies on high priority issues.

The UC **Center for Range and Forested Ecosystems** on the Davis campus is sponsoring the **Rangeland Water Quality Program** which is linking faculty, specialists and advisors with rangeland owners and managers to provide educational programs focused on best management practices that will lead to improved water quality within local watersheds. The program and its comprehensive curricula

(shortcourses, fact sheets, etc.) has been endorsed by state agencies as an excellent example of a way to reach private landowners with a voluntary approach to meeting water quality requirements.

## Internal and External Linkages:

California is participating in CRIS Multistate Project (W-128) titled, *Micro-irrigation: Management Practices to Sustain Water Quality and Agricultural Productivity*. Its objectives include: 1) Development of micro-irrigation system Best Management Practices (BMPs) to sustain crop production and minimize water application and water quality degradation; 2) Carry out field evaluations of BMPs for crop production and water quality degradation control using micro-irrigation; 3. Develop an expert system and models for chemical management practices using micro-irrigation systems; and 4. Assess the economics of BMPs developed for micro-irrigation systems.

California is participating in CRIS Multistate Project (W-133) titled, *Benefits and Costs of Resource Policies Affecting Public and Private Land.* Its objectives include: 1) Valuing changes in recreational access; 2) Benefits and costs of agro-environmental policies; 3) Benefits transfer for groundwater quality programs; and 4) Valuing ecosystem management of forests and watersheds.

California is participating in CRIS Multistate Project (W-190) titled, *Water Conservation, Competition and Quality in Western Irrigated Agriculture*. Its objectives include: 1) Develop and assess technologies and management strategies for their potential to conserve water, improve water quality and enhance profitability in irrigated agriculture; 2) Develop and evaluate means for meeting State, regional, and national policy goals for water supply, allocation, and quality under available and emerging technologies and management strategies; and 3) Evaluate alternative laws, institutions, and mechanisms developed to promote and implement State, regional and national policies for water quality and supply allocation.

California is participating in CRIS Multistate Project (WCC-106) titled, *Western Coordinating Committee of Agricultural Literacy*.

DANR 4-H staff will collaborate in the hosting of the **National 4-H Wildlife Habitat Evaluation Program** to be held for the first time in California in the year 2000. This will launch a major effort in rebuilding statewide 4-H wildlife activities which will be integrated into new 4-H agricultural curriculum activities.

DANR 4-H staff formed a team made up of representatives of state government (Fish and Game), City Programs (SF City Parks), and 4-H Advisors and volunteers to attend the **National Sport Fishing Workshop** in Washington. They will work as an ongoing team under state 4-H office leadership to develop education programs on the role of fish in the food chain, industry and in our recreation/leisure activities. They will also collaborate with colleagues and volunteers across the nation in the development of educational curriculum.

An initial meeting of the **Salmon Conservation Workgroup**, involving western Cooperative Extension specialists and advisors/agents, and faculty, with an interest in conservatio n of declining native salmon stocks, was held at U.C.'s Bodega Marine Laboratory March 1999. The meeting provided the current research basis for salmonid ecology and conservation, and examples of local - based CE programs focused on building coalitions betw een diverse groups with a stake in management and conservation of salmon species. Priorities for future efforts involving joint state programs between California, Oregon and Washington were identified. A follow - up meeting will be held in Spring, 2000 at the national natural resources extension workshop in South Lake Tahoe, to track progress on joint program efforts. A new California Anadromous and Inland Fisheries CE Specialist is expected to take the lead in planning future regional programming related to watershed management issues related to fish.

California received two grants totaling $330,000 to implement a ballast water management education project that involves coordination among the West Coast **Sea Grant** programs and will involve hosting 16 video - conferences throughout the multistate region. The project will educate the maritime industry about non - indigenous species introductions which may occur via ballast water operations and potential technological and management strategies to prevent such intro ductions.

California is an active member of the **Western Regional Panel (WRP)** on Aquatic Nuisance Species which is responsible for coordinating work on aquatic nuisance species issues for all western states. One of DANR's Sea Grant Marine Advisors is currently serving as the Chair of the newly formed Coastal Committee of the **WRP**.

Special regional biotechnology training was held with CE **Sea Grant**, and faculty participants from California, Washington and Alaska. California is also involved in workshops to discuss coastal and marine issues within the entire Pacific region which includes California, Oregon, Washington, Alaska and Hawaii.

California is participating in a bioregional planning project that has developed a new short course using the second edition of the Western States (Idaho, Arizona, California, Hawaii, Montana, Nevada, New Mexico, Oregon, Utah, Washington and Wyoming) Cooperative Extension *Cow-Calf Management Guide and Cattle Producer's Library* as a textbook for class participants. The course, titled "Cattle College," utilizes CE personnel from California and Oregon presenting relevant information to ranchers with similar climatic and growing conditions.

## Target Audiences:

All of California's consumers and producers of water, food, fiber and ornamental crops are potentially our target audience but of particular concern are those who are public policy makers, youth, members of local communities, and all watershed stakeholders. For our program efforts in wildfire science and

management, an additional target audience is the agencies that are engaged in wildfire control and prevention at the federal, state and local levels.

## Program Duration:

These programs' research and extension goals, actions and proposed outcomes are based on 3 to 5-year midterm priorities that have been updated for 1999 as part of the DANR's annual Program Planning Advisory Committee process. This procedure involves an integrated, multidisciplinary approach to planning.

## Allocated Resources: ($ x 1,000; [FTE=units])

| Component | Current | FFY 99-00 | FFY 00-01 | FFY 01-02 | FFY 02-03 | FFY 03-04 |
|---|---|---|---|---|---|---|
| Research (formula) | $7,828 | $7,828 | $7,828 | $7,828 | $7,828 | $7,828 |
| Research (DANR match) | $19,032 [71.3] | $19,032 [71.3] | $19,032 [71.3] | $19,032 [71.3] | $19,032 [71.3] | $19,032 [71.3] |
| Extension (formula) | $2,609 | $2,609 | $2,609 | $2,609 | $2,609 | $2,609 |
| Extension (DANR match) | $8,445 [88.6] | $8,445 [88.6] | $8,445 [88.6] | $8,445 [88.6] | $8,445 [88.6] | $8,445 [88.6] |

## Education and Outreach:

A statewide multidisciplinary workgroup on reconnecting children to the land is being formed to address issues related to agricultural literacy, school gardening and environmental education in the broader context.

DANR/4-H is exploring a partnership with Project Food, Land and People in its development of a **World Learning Center** at the Presidio of San Francisco, the nation's newest, most urban National Park. The Presidio is projected to host eight million visitors a year, which would make it an ideal site for UC outreach and extension efforts.

DANR volunteers, primarily **Master Gardeners**, have implemented a variety of environmental education and/or nutrition education programs around gardening with children. The three most notable ventures in this arena are in San Diego, Sacramento and Sonoma counties.

The former DANR North Central Region launched a regional project in 1998 to design an environmental education program based on the investigation of a transect across California from the San Francisco Bay to the rain shadow of the Sierras. This project links both public and private sectors

and attempts to find common ground between environmental interests and industries who have impacts on natural resources in this geographic area. This effort provides an excellent opportunity to conduct applied research, outreach and educational programming.

DANR/4-H staff are integral members of the **California Ag in the Classroom** program sponsored by the California Farm Bureau. They routinely serve as lecturers and/or organizers of local Agricultural Institutes for teachers and policy makers.

Salmon conservation planning efforts are currently underway in five north coast California counties in a project where CE provided an assessment of county land use management and its impacts on salmon. These rural counties contain complex networks of bays, estuaries, rivers, streams and lakes that are home to the coho salmon, which was listed as a federally threatened species in August 1997. Prior to the listing, these counties said they wanted the opportunity to work towards the conservation and recovery of the coho, and both the state and National Marine Fisheries Service agreed to work with them. UC scientists found that existing planning documents, in general, do not adequately address considerations for protection of salmon or their habitat. Only one county has specific salmon policies in its general plan. The UC assessment looked at both past and present practices and found that current policies on development and infrastructure siting are an improvement on past practices, with counties using a variety of tools to exclude development from riparian zones and flood plains.

In Southern California, there is an informal group of "**Watershed Workers**" from three counties who are working on watershed issues and projects. Individuals, representing CE, agencies and the private sector are involved in conducting educational activities and grant procurement.

# National Strategic Plan Goal 5

*Enhanced economic opportunity and quality of life for Americans. Empower people and communities, through research-based information and education, to address economic and social challenges facing our youth, families, and communities.*

## UC-DANR's Human Resources Programs Covering:

- **Human and Community Development**
- **Economically Viable Families and Communities**

## Statement of Issues:

Human resources, the foundation of any society, are developed in community and familial environments. The creation, maintenance and enhancement of these environments are vital to youth development and adult and community well being. Human resource issues in California cross demographic and socio-economic lines, affecting all ages, from children to the elderly, and diverse cultural groups. The dimensions of the problems are immense and range from the lack of life skills needed to be productive members of society to self- destructive behavior in youth and adults.

California is the most populous state with a population of 32.7 million in 1997. Growth projections call for more than 17 million persons by 2025. Demographic changes along with other environmental changes such as family structure, technological advances, and political environment, contribute to unique challenges for its youth and families. The need for effective educational and research programs to support them is pressing. Between 1995 and 2005 the California youth population will increase by 13%, the fastest rate in the country. Of that 13% increase, 39% will be Asian/Pacific Island and 34% Hispanic. This will have a major impact on local communities throughout California and for schools and other social service agencies that work with youth and families. The list of social ills plaguing our communities and especially our children is extensive. California has the highest teen pregnancy rate, greatest number of ESL children, unacceptable social promotion figures, etc. One in eight of the nation's children now reside in California. By the year 2025, estimates project one in five of the nation's children will live in the State.

There are 3.3 million people over the age of 65 living in California, more than any other state in the country. In 1990, people 65 years of age and older made up 10.5% of the population. This percentage is expected to continue to increase. There was a 35% increase in people over the age of 85 in California from 1980 to 1990. This continues to grow, as does the increase in those over the age of 100.

Our society is formed around an economic system of production and consumption of goods and services. Sustainability of that system, particularly at the community level, is critical to UC -DANR's mission. Economic viability is a priority today.

Even at a time when our economy is booming, communities, both large and small, struggle to remain solvent and meet the needs of those living in the community. The supply of adequate and affordable housing continues to be problematic for communities throughout the state. The housing of migrant farm workers is of special concern. Many of California's children are not faring well. Of California's 9.5 million children, fully one-quarter live in poverty (an annual income of $15,600 or less for a family of four). Nearly another 25% of California's children live in families with incomes low enough to qualify for subsidized school meals ($29,000 or less annually for a family of four). Most poor children have at least one parent who works, yet 1.2 million children have a parent earning the minimum wage. Even middle-income families feel squeezed by California's high housing prices and rents, childcare costs and other expenses - especially those living in high-cost counties.

Economic pressures within California and the nation ultimately impact families and individuals. Changing employment opportunities and eroding purchasing power have reduced personal and family self-sufficiency. Transformations brought on by health care and welfare reforms necessitate new applied research and educational programs in workforce preparedness and resource management. The ability of communities to respond to these critical economic issues is complicated by growing populations; greater demands on schools, limited resource families, health services, and utility systems; a growing shortage of affordable housing; and concerns for resource use and allocation. The ability to respond to these challenges depends upon active cooperation between community businesses and government, the non-profit sector, agriculture, researchers and educators.

Our experience and success in working with and changing behaviors of limited-resource individuals and families positions us to take a leadership role within the state and county as new directions are being formulated. Local delivery systems and networks functioning at the county level places us in a unique position to assist families and agencies - public and private, in building skills for management of personal resources, job training and retention, and preparation for economic change and uncertainty. Financially self-sufficient families help to build and support economically viable communities.

Education pressures are also building in California. In an economy increasingly dependent on science, technology, and a healthy environment, the requirement for scientific, ecological and technological literacy is critical. The late 1990's have clearly marked the dawn of an education era in which all segments of the American social and industrial landscape have recognized the need to rethink and rebuild our education system. Politicians, industry leaders, educators, and parents are calling for more responsive and accountable education. DANR should play a pivotal role in this movement, not as an advocate for special interests, but as an objective observer pointing out strategies which have been accurately examined and proven themselves to be effective.

DANR is uniquely positioned to strengthen the linkages between research and practice to address issues of California's youth, families and communities. We have the resources to provide targeted applied research, education, outreach, and technical expertise to build community and personal capacities of youth and adults.

## Research and Extension Performance Goals:

❖ **Human and Community Development**

UC-DANR is focusing its research and extension resources on the need to create supportive environments in which culturally diverse youth and adults can reach their fullest potential and to strengthen the capacities of families and individuals for self-sufficiency and well-being by improving life skills. In furtherance of these goals, we are proposing to take the following actions:

1. Improve the quality and quantity of before and after school child care and supervision by delivering curriculum, providing staff training, and promoting collaborations and increased funding to enrich the learning environments of children in extended care programs. Develop programs for parents that promote parental participation and support for extended care programs.

2. Improve the effectiveness of schools by introducing nonformal educational strategies which emphasize hands-on, experience based activities. Identify ways family and communities can complement the work of schools.

3. Improve the capacity of targeted communities to provide integrated approaches to support healthy youth development that involve youth, families, and community members, and provide training and technical assistance to family, youth, and community professionals.

4. Strengthen, expand, and evaluate educational programs that build the capacity of youth and adults to acquire leadership skills.

5. Develop and implement programs that teach and demonstrate collaboration building.

6. Develop effective citizenship education programs for all community members. These programs would engage citizens in every age group to become involved in identifying and meeting community needs.

7. Improve understanding of multicultural and diversity issues by providing youth and family service agencies with training and technical assistance in issues of diversity and promoting tolerance. Research the parenting practices of Californi a's minority populations to develop and disseminate more culturally appropriate parent education materials.

8. Improve literacy skills necessary to function socially, economically and politically by providing youth and family service agencies with training and technical assistance in basic literacy in non-formal settings.

9. Improve the ability of volunteers and staff to effectively work with groups of youth. Provide training in youth development pr ogram management, youth development and educational

theories, and non-formal educational curricula. Research youth and family development agencies and practitioners and the needs and interests of their staff and volunteers to develop more appropriate educational strategies.

10. Improve outcomes for families affected by reductions in public assistance by developing, implementing, and evaluating programs, educational models, and curricula for youth and adults that focus on developing life skills which incre ase preparedness to enter the workforce.

11. Prepare youth for an employable future by developing and extending to youth service agencies curricula on youth career decision making, workforce preparation and entrepreneurship experience of youth. Generate new knowledge about workforce preparation strategies by conducting comparative studies.

12. Improve the status and well-being of families and youth living in high risk environments by reviewing and disseminating research in Human Development.

13. Increase public, especially youth's, understanding of and ability to apply scientific processes by developing, modifying, testing, and implementing science literacy education programs and curricula.

14. Improve and enhance community based programs addressing unique problems of elderly, such as diminished capacity, isolation, retirement, nutrition, special needs in living accommodations.

❖ **Economically Viable Families and Communities**

UC-DANR is focusing its research and extension resources on the need to improve the capacity of consumers to efficiently use economic and personal resources and strengthen the capacity of communities, families and individuals to create and maintain sustain able economic growth. In furtherance of these goals, we are proposing to take the following actions:

1. Develop, test and institute effective educational programs on topics related to economic health: consumer choices, personal and family resources management, employment readiness and training, transition from welfare to work, etc.

**2.** Develop, test, and institute effective economic education outreach models for building community coalitions with emphasis on economic self-sufficiency of individuals and economic development for communities.

**3.** Conduct community level research on the effects of economic changes and decisions on communities and households.

**4.** Perform evaluation research on economic programs that demonstrate effective results for potential creation of economic development models. Develop a "best practices" approach for replication of models that work.

## Output Indicators:

**Human and Community Development**

Number of extension publications describing the features of high -quality child care programs
Number of extension programs delivered on strengthening the capacity of targeted communities to maintain sustainable economic growth
Number of peer-reviewed research papers on parenting practices of minority populations
Number of educational programs delivered to targeted schools aimed at reducing truancy and dropout rates
Number of educational programs delivered to targeted schools aimed at reducing teen pregnancy rates
Number of formal and informal program support networks and resources in targeted communities
Number of youth participating with community decision -making bodies
Number of youth, families and individuals participating in community leadership programs
Number of literacy-rich programs and activities being offered in communities and on school sites
Number of trained adult volunteers and staff capable of delivering youth development programs
Number of DANR Workgroups addressing human and community development

**Economically Viable Families and Communities**

Number of extension publications on financial management strategies
Number of extension programs delivered on financial management strategies
Number of targeted families and individuals with increased savings and reduced debt
Number of targeted individuals making the transition from welfare to work
Number of community coalitions resolving economic issues and promoting economic development
Number of "best practices" economic development models that have been studied and developed for replication

## Outcome Indicators:

**Human and Community Development**

By the year 2004, high-quality child care programs in California are experiencing a 5 percent increase in parental participation and support.

By the year 2004, truancy and dropout rates in California will experience a decline due to an increase in the number and quality of collaborations among community members, schools, community organizations and agencies.

By the year 2004, the teen pregnancy rate in California will experience a decline due to an increase in the number and quality of collaborations among community members, schools, community organizations and agencies.

By the year 2004, the number of articles and feature stories about positive California youth accomplishments will increase by 5 percent because of community -based programs focused on providing youth teamwork and leadership skills.

By the year 2004, the number of California's literate students and families will increase by 5 percent.

By the year 2004, the number of trained adult volunteers and staff who have increased their abilities and skills in the development and delivery of educational programs focused on the needs of youth will have increased by 5 percent in California.

**Economically Viable Families and Communities**
By the year 2004, there will be a 5 percent increase in the number of targeted families and individuals receiving and utilizing information leading to "financial satisfaction."

By the year 2004, there will be a 5 percent increase in the number of targeted individuals who will have transitioned from welfare to work by receiving special training in life skills.

By the year 2004, there will be a 5 percent increase in the number of community coalitions that will be resolving economic issues and promoting economic development with the community.

By the year 2004, there will be an increase of 5 percent of families and communities who believe their quality of life has improved as a result of sustained economic growth.

By the year 2004, University researchers an extension workers will have studied and developed "best practices" models that can be replicated in community settings.

## Key Program Components:

Programs such as **4-H Youth** and the many volunteer programs have demonstrated the potency of these models for expansion to new subject areas with new partners and culturally diverse audiences. Moreover, through centers located on the campuses such as the **4-H Center for Youth Development, Center for Child and Family Studies, Center for Cooperatives, California Communities Program** and others, new models are being developed. This work can be linked with other community agencies. DANR's role as a problem-solving partner provides us with the opportunity to work with clientele to develop and strengthen California's youth, family and community human resources.

In 1998 the **4-H Program** reached over 120,000 youth and more than 18,000 volunteer adults across California with significant educational experiences focused on leadership development, skill development and citizenship. The program receives leadership and support from three statewide units, the **4-H Center for Youth Development**, the **4-H Foundation** and the **4-H Program Director's Office**. The heart of the program is represented by the local community programs led by DANR academic staff and program representatives who deliver research based, age appropriate educational experiences addressing needs identified by local communities and DANR's Human Resources Program Planning Advisory Committee. The Program operates through a number of different delivery methods: local community 4-H clubs, after school activity programs, school enrichment program s, day camps, etc. 4-H academic staff also conduct applied research in a number of critical areas affecting human and community development. These research efforts reach an even broader cross-section of youth, families and community service agencies across the state. Over the past two years the **4-H Youth Development Program** has been in the midst of a reorganization which is occurring simultaneously with DANR's development of a mission focused organizational structure. These two efforts in

organizational change should result in a more seamless system that addresses youth, family and community development issues.

The **4-H CYFAR Project (Children, Youth and Families at Risk)** is a unique federally funded national project operated through the 4-H Center for Youth Development addressing special human and community development needs in four California communities.

The **California Communities Program (CCP)** provides direction and focus for the DANR's research and outreach in the area of community development. The aim of this work is to strengthen the leadership capabilities of local citizens, fortify community self-governance, and enhance local and regional economies. In pursuing this mission, **CCP** will implement community research and education activities in the program's three priority areas: citizenship, governance, and prosperity; hold workshops, provide training, develop publications; identify resources that support the work of CE professionals in community development; link campus research and other resources with county CE educational activities; serve as a central clearinghouse for DANR activities related to community development; and, establish collaborative relationships with outside agencies that have California community programs, including state and federal agencies, local governments and their associations, regional agencies, non-profit organizations, private businesses, and citizens groups.

The **Center for Child and Family Studies (CCFS)** serves as a laboratory for the development of experimental programs for children and families, an observation laboratory for UC Davis undergraduate and graduate students to complement courseware in child and human development, and as a research facility for UC Davis faculty and graduate students. The experimental programs and research of the laboratory are intended to advance the field of child development. **CCFS** focuses on issues of human health and well being and quality of life as they relate to the development of children and their families.

The **Center for Cooperatives** was created to provide a balanced program of research, education and technical assistance for agricultural and non-agricultural cooperatives. The **Center** publishes a wide range of popular articles and books about cooperatives, offers educational programs for cooperative directors and employees and provides technical assistance for new cooperative development. The **Center** provides public information about cooperatives through a newsletter, invited presentations, a course at UC Davis and its web page (www.cooperatives.ucdavis.edu).

## Internal and External Linkages:

California is participating in CRIS Multistate Project (W-167) titled, *Family and Work Linkages*. Its objectives include: 1) Determine how family factors (e.g., time, support, control) enhance or impede work performance and well being; 2) Determine how work factors (e.g., time, support, control) enhance or impede family performance and well being; and 3) Define the consequences of family/work interaction for family members and the workplace.

California is participating in CRIS Multistate Project (W-193) titled, *Resilience to Violence among At-risk Youth.* Its objectives include: 1) Measure variables confirming risk and protective mechanisms (i.e. resilience) in children, families, schools, and communities; 2) Align individual, family, school, and community variables ecologically and developmentally to describe predisposing and situational resilience to violence perpetration and victimization; and 3) Write a research monograph and generate implications and ideas for program development useful

to prevention-oriented professionals.

California is taking the lead in CRIS Multistate Project (W-162) titled, *Rural Economic Development: Alternatives in the New Competitive Environment*. Its objectives include: 1) Identify and analyze the demographic and socioeconomic implications of economic restructuring in non-metropolitan areas, with special emphasis on labor market implications and how various ethnic groups are affected by policy and market changes; and 2) Identify changing public policy initiatives and relationships and their impacts on rural economies and governments and investigate the effectiveness of alternative policy instruments to affect rural economic and fiscal viability and structure.

California is participating in a North Central Regional Research Project, (NC-223), *Rural Low-Income Families: Tracking their Well-being and Functioning in the Context of Welfare Reform.* Sixteen states are working on this project and collecting data on the individual and family circumstances, functioning, and well-being of rural low-income families with children and the changing welfare policy environment and community factors that facilitate family support. Two counties in California will assist in the collection of data.

DANR'S programs emphasize financial readiness. The primary goals are to understand and increase the economic well-being of families and help families and individuals facing financial risk become financially self-sufficient. These goals are accomplished through teamwork among the county advisors across county lines as well as by cooperation with other states. Many of our programs emphasize partnerships with other organizations. For example, the **Financial Information Program** is co-sponsored with the American Association of Retired Persons (AARP), CE in several counties, and multiple agencies in each county. Another similar program is the **High School Financial Planning Program** sponsored by the National Endowment for Financial Education. With this program, the county CE advisors work with high school teachers to implement a financial management curriculum. This program has been very successful in California schools as well as across the nation. Evaluation data indicate that students who participate in the program save more money and recognize good money management practices. Additionally, they retain the information.

Because of the large Hispanic population in California, a number of DANR publications are available in Spanish. Many of these booklets are being used by other states. The San Francisco Foundation of Bank of America has provided several grants to pay for the development and distribution of many of these materials. Limited evaluations of these materials have indicated that they have been useful in helping individuals manage their resources, identify community resources, and identify lower cost sources of credit.

Frequent military deployments have intensified awareness of the critical role family well-being plays in the nation's military readiness. Military personnel need information to manage and cope with the changes that mobilization and deployment place on their lives and the lives of family members. Cooperative Extension cooperated with Texas A&M University, CSREES, and the U.S. Army to develop and distribute family readiness materials throughout the U.S. Army worldwide. Additionally, a **Financial Fitness** curriculum was developed in cooperation with North Carolina State University, the University of Georgia, and the U.S. Marine Corps. The curriculum is being used by the Personal Financial Management Program Specialists throughout the U.S. Marine Corps to provide training for military units, to assist in individual counseling, and to train peer counselors. County CE advisors from

North Carolina, Georgia, and California have used these materials to work with the U.S. Marine Corps installations in their states. Preliminary results of an eval uation of the effectiveness of these materials indicate that there has been an increase in financial readiness in the U.S. Marine Corps. As a result of these military efforts, the U.S. Air Force has asked UC-DANR to develop a **Financial Readiness** curriculum for distribution through the U.S. Air Force. We are working with North Carolina State University and the University of Hawaii to produce these materials. Many of the military educational modules have been adapted for civilian use and are being used thr oughout California and as well as the U.S.

The **California 4-H Program** is engaged in a number of collaborative efforts, several of which are identified as follows: 1) the **National 4-H Impact Assessment** – This multistate study of 4-H program impacts and outcomes features California as the most diverse and populous state in the study; 2) the **National Camping Institute** – Camping represents a major educational delivery method. We participate with other states in this institute designed to enrich the curriculu m of the camping experience; 3) the **National 4-H Technology Corp** – California was one of the original founders of this program and provides the most active leadership on a national level. The Corp brings together youth, adults and staff to address educational needs of 4-H in computer science and information technology; 4) the **National 4-H Conference** – This annual week long youth leadership development conference brings together a diverse group of youth and adults from across the county to address major nati onal issues such as: teen tobacco use, AIDS, poverty, etc.; 5) the **Western Region Teen Leadership Camp** – This leadership development institute combines youth and volunteers from the Western Region states to study leadership skills and strategies; 6) the **Western Region Image and Visibility Project** – This effort combines the resources of the Western Region states in an effort improve the image and visibility of 4-H programs; 7) the **Western Region Leaders Forum** – This annual 4-H volunteer training event rotates among the seven Western states; 8) the **Western Region Roundup** – A leadership development conference and competitive event featuring many traditional 4-H agriculture related projects and programs; 9) **Partners In People** – This regional conference offers th e latest research in youth, family and community development to grass roots agencies in their communities.

## Target Audiences:

All Californians are potentially our target audience but of particular concern are those who are limited-resource individuals and families by virtue of their financial or housing needs. We also view those agencies- public and private, who are providing support for these individuals as an important part of the target audience. Youth, especially those who may be at-risk or lack leadership or literacy skills are an additional audience for these important and critical programs.

## Program Duration:

This program's research and extension goals, actions and proposed outcomes are based on 3 to 5-year midterm priorities that have been updated for 1999 as part of the DANR's annual Program Planning Advisory Committee process. This procedure involves an integrated, multidisciplinary approach to planning.

## Allocated Resources: ($ x 1,000; [FTE=units])

| Component | Current | FFY 99-00 | FFY 00-01 | FFY 01-02 | FFY 02-03 | FFY 03-04 |
|---|---|---|---|---|---|---|

| | | | | | | |
|---|---|---|---|---|---|---|
| Research (formula) | $1,239 | $1,239 | $1,239 | $1,239 | $1,239 | $1,239 |
| Research (DANR match) | $5,561 [26.7] | $5,561 [26.7] | $5,561 [26.7] | $5,561 [26.7] | $5,561 [26.7] | $5,561 [26.7] |
| Extension (formula) | $1,286 | $1,286 | $1,286 | $1,286 | $1,286 | $1,286 |
| Extension (DANR match) | $4,111 [49.4] | $4,111 [49.4] | $4,111 [49.4] | $4,111 [49.4] | $4,111 [49.4] | $4,111 [49.4] |

## Education and Outreach:

Gateway To A Better Life is a training curriculum emphasizing workforce preparedness that will help individuals prepare to enter the workforce. It was developed as a result of the changes in the welfare laws that require counties to move individuals from welfare to work. The purpose of the **Gateway** curriculum is to educate those preparing to enter the workforce with information they will need to help them get a job as well as balance work and home. The curriculum aims to educate those who have little time and few resources, using simple, engaging activities with the ultimate goal of providing the background that welfare to work recipients will need to enter the workforce, maintain balance, and stay employed. This program has been very successful in promoting cross-county work. It was developed by a team of advisors and specialists representing twenty-three California counties and three UC campuses. Many of the counties in the state are implementing the program. Additionally, several states including Georgia, Louisiana, and Arizona have adapted the materials for use in their states.

**Steps Towards Self Sufficiency** is a multi-county, multi-campus effort which utilizes the resources in Gateway to a Better Life to equipment young people and adults entering or reentering the workforce with essential skills to successfully balance work and their personal life. The mission of Steps to Self Sufficiency is to facilitate transitions and skill building of youth and adults as they enter the workforce to prepare them for success in decision making, problem solving, and balance in their lives through educational outreach programs and collaborations. Pilot projects are currently being conducted in four counties with specific emphasis and evaluation of three of the Gateway lessons: It's About Time, Stretch Your Dollars with Personal and Community Resources, and Feeding Kids.

**MONEY 2000+** is a multi-state, multi-county effort to encourage families and individuals to increase savings or decrease debt by $2000. Preliminary indicators find the "learn-at-home" educational program is working and families are making significant reductions in debt and increasing their saving. UC-DANR is taking the lead in developing a companion effort directed at increasing the saving level of teens. Six counties in the state are working together to develop these materials. A survey of teens was conducted in Southern California to determine how teens want to learn about money and what they want to learn. The results of these data are being used to develop the materials for use with the teen MONEY 2000+ effort. After completion, the materials will be shared nationally.

# Integrated Research and Extension Activities

Cooperative Extension (CE) and the Agricultural Experiment Station (AES) in California are administered by a single authority, the Vice President for Agriculture and Natural Resources, University of California. In his dual role as CE Director and AES Director, the Vice President ensures integration of *all* research and extension activities, including all activities supported by Hatch and Smith - Lever 3(b)(1) and (c) funds.

California AES and CE programs are planned and conducted so as to form a seamless continuum from creation and development of new knowledge to the dissemination and applicatio n of that new knowledge. Research and extension programs are coordinated at a statewide level by four Program Leaders - Agricultural Policy and Pest Management, Agricultural Productivity, Human Resources, and Natural Resources - who promote the integration of research and extension goals and activities across and with AES and CE.

The Program Leaders oversee a network of "workgroups," each of which brings together AES and CE personnel to collaboratively plan and coordinate research and extension programs in a particular high priority program area. Workgroups also include clientele and other external stakeholders as appropriate. Through the workgroups, research goals are developed that will address practical information needs and mesh with outreach and educational capabilities. Likewise, extension goals are defined in keeping with the available and anticipated stream of research findings.

Thus, California AES and CE are fully integrated not only administratively, but programmatically as well, thereby ensuring that all major programs include both a research and extension component, planned and delivered as a unified whole.

# Multi-state Research and Extension Activities

Rather than describing the comprehensive range of UC-DANR's involvement in multi-state research and extension activities within this separate section, we have included the relevant information in each of the five national strategic goals under the component titled, "Internal and External Linkages." We chose to take this approach in the belief that the reader would more fully appreciate the scope and nature of the various multi-state activities within the context of each national strategic goal and its performance goals, actions, indicators, key program components, audiences, etc.

To facilitate the reader's time, each goal's multi-state extension and research activities can be found on the following pages:

# Stakeholder Input Process

The University of California Division of Agriculture and Natural Resources (UC DANR) utilizes a variety of mechanisms to seek stakeholder input on the development of Division program priorities and use of its research, extension and education funds.

**Program Planning Advisory Committees (PPACs)**
These committees are comprised of forty-five Division members representative of the diversity of UC DANR disciplines and program areas, from all Division-affiliated campuses and from county offices throughout the state. The specific charge of the PPACs is to identify and prioritize statewide programmatic issues annually, to develop three-to-five year Division-wide research and extension goals that address high priority issues, and to recommend approaches and methods for attaining those goals. Fifteen individuals serve on each of three subject area committees, Agricultural Resources, Human Resources and Natural Resources, that are charged with recommending Division-wide program priorities within their respective subject areas. Nominations for these committees are solicited Division-wide and appointments are made by the Assistant Vice President - Programs. Members serve three year terms, thus ensuring that at all times two-thirds of the members will have one or two-year histories on the committee.

The PPAC members consult with their UC DANR colleagues as they review and revise the Division's program priorities and make recommendations on actions and approaches to achieve the goals. In addition, the members seek the input of external stakeholders, both formally through circulation of the PPAC's issues statements and informally through meetings, consultations, and other activities. The input from both internal and external stakeholders is then considered as the PPAC members determine the program priorities for the Division.

**External Stakeholder Consultations**
The Council of Deans and Directors, the Division's senior administrative group, invited 514 external stakeholders to a series of four meetings between June 20 and June 30, 1997, held at different sites around the state: Fresno, Sacramento, Ontario and Oakland. These stakeholders were identified by faculty, CE specialists, CE advisors, and Division administrators as individuals who were involved with the Division's programs or as individuals from organizations that might benefit from involvement with the Division's programs. A total of 137 external stakeholders attended along with Division administrators and faculty who had served on UC DANR planning groups. Before the meetings each participant received a copy of the UC DANR Strategic Plan, *The Challenge of Change*, which outlined priorities for UC DANR programs over the next several years and identified organizational management strategies for improving UC DANR's effectiveness as an organization. Also included was a copy of the latest annual report of the UC DANR Program Planning Advisory Committees (PPACs), which gave more detail on the Division's program plans.

Feedback from these meetings were circulated widely throughout the organization. Administrators and planning groups at all levels of the Division – county offices, campus departments, regional and campus administrative offices, and statewide administrative offices – carefully considered the comments of the external stakeholders in their planning efforts and incorporated them into the recommended program priorities, actions and approaches.

**Formal advisory groups**
The President of the University recently initiated and chairs the President's Advisory Commission on Agriculture and Natural Resources to identify the education needs of California's agri cultural, natural and human resources interests and advise him on how the University can best meet these needs through its science-based research, classroom instruction and educational outreach. The members represent 28 business, consumer, youth and government leaders from throughout California and meet twice a year to provide input. The Vice President - Agriculture and Natural Resources participates as a member of this Commission.

Each of the three colleges at Berkeley, Davis and Riverside and the School of Veterinary Medicine at Davis, have external stakeholder advisory councils that meet at least annually to provide feedback on their research, extension, and teaching programs. Members of these councils represent the spectrum of clientele who use the Division's programs and who have expressed interest in providing input to the college/school planning efforts.

Several of the Statewide Special Projects and Programs have external Advisory Councils that meet at least annually to review progress and offer recommendations for future program direction.

**Commodity Organizations/Marketing Order Boards**
Members of these organizations provide annual input on research and extension needs for their commodities to UC DANR members through regular meetings and discussion of funding for research projects. These individual groups also come together on an annual basis to form the California Commodity Commission. This Commission meets with the Vice President and offers specific recommendations on program planning and funding issues.

**UC DANR Workgroups**
Program workgroups provide grassroots leadership for statewide program development by bringing together AES scientists, CE advisors, CE specialists, and non-DANR partners, cooperators and clientele to work on emerging and continuing issues in Division program areas. Non-DANR participants are identified by the scientists, advisors and specialists working in the specific program area and invited to participate in workgroup activities, including needs assessment and issue identification and evaluation and reporting of program results. The involvement of external stakeholders in the workgroups ensures that real world needs are brought to the attention of University scientists and extension specialists and advisors as programs are planned and implemented.

# Program Review Process

**Scientific Peer Review**

Each project funded under the Hatch Act is peer reviewed at the department level in the colleges at Berkeley, Davis, and Riverside. A peer review committee is appointed by the department chair. The committee evaluates the relevance, quality and scientific value of the proposed research. Upon completion of the peer review, the project is also reviewed at the dean's office for USDA compliance and forwarded to the Vice President's office for final review and submission to CSREES.

**Merit Review**

The Division's new organizational structure emphasizes that resource allocation decisions will be driven by programmatic considerations and developed through a broad participatory process. This process will include review of the quality and relevance to program goals for all of the Division's programs.

Workgroups are the focal point and primary mechanism for accomplishing DANR's high priority research and extension goals. They provide grass-roots leadership for program development and evaluation at the statewide level. Structured to bring together CE and AES personnel along with non-DANR partners to work on emerging and continuing issues, they look at the Division's program priorities and determine the programs that will best address these needs. The workgroups are also responsible for evaluating and reporting the program results of the efforts they have supported.

At the statewide level, the UC DANR Program Council is charged with coordinating statewide planning and program policies and providing statewide leadership for coordination of resource allocation. Chaired by the Assistant Vice President for Programs, it is composed of the Associate Deans for Research and Extension at the three colleges and the school of Veterinary Medicine at the Berkeley, Davis, and Riverside campuses, three CE Regional Directors, and four Program Leaders. The Council will review all DANR budget proposals, program area budget proposals, and position proposals from a statewide perspective and develop recommendations for a comprehensive DANR program budget. These recommendations will then be considered by the deans, and the Assistant Vice President - Programs as position plans are finalized. Final review and approval of program plans, including positions, is made by the Associate Vice President.