

**Annual Report of Accomplishments and Results**  
Fiscal Year 2000

College of Tropical Agriculture and Human Resources  
University of Hawaii at Manoa

Research and Extension Programs

## **GOAL 1: AN AGRICULTURAL SYSTEM THAT IS HIGHLY COMPETITIVE IN THE GLOBAL ECONOMY**

### Overview:

Hawaii's agricultural competitiveness was enhanced in several ways. New or improved plant varieties were released, among them longan, papaya, protea, heliconia, taro, sweet basil, and tomato (the latter is being tested). All these enhanced varieties are expected to keep Hawaii growers more competitive in a global market. In another arena, Big Island beef producers have benefited from an aggressive marketing program that has brought them national media coverage, established contacts with new buyers including Department of Defense commissaries, and more than doubled their visibility with local buyers.

Profits of Hawaii growers have been or will be increased by several improvements in plant handling, both pre- and post-harvest. A detailed protocol has been established for commercial growers for post-harvest treatment of cut flowers. Another project met its stated objective of maintaining the number of export shipment rejections due to insects below 0.1%. Less water can be used to process coffee, reducing costs and environmental damage. Hot water treatments have reduced revenue loss due to quarantine rejected shipments by 50%. Reduced use of nitrogen and increased plant spacing have saved costs for taro growers.

Animal production efficiency may be enhanced by the leguminous tropical tree *Leucaena*, which has been shown to have excellent potential as a nutritious, high protein fodder for grazing ruminants. Pig producers participating in a computerized management program have consistently produced two more pigs per sow per year than the industry average. Livestock producers have installed innovative or improved waste management practices recommended to them by college faculty.

U.S. Patent #5,866,150, obtained by a college researcher, is for "antibacterially active extracts from the marine algae *Chaetoceros* spp. and methods of use." Studies conducted have shown that a number of compounds extracted from the marine diatom display antibacterial properties. Researchers have also developed an open outdoor system that will help in their production. College researchers are the only active research group in Hawaii helping the growth of freshwater and marine ornamental fish industries.

Tropical sweet corn is one of the commodities that benefits from the college's biotechnology work. The dendrobium orchid industry has also reaped benefits from the tools of biotechnology. Development of RNA extraction methods will directly benefit orchid researchers and ultimately benefit commercial growers and their consumers through variety development. Incremental progress is being made toward introducing fragrance to anthuriums. A long-term study of the genes that control photosynthetic function in higher plants has progressed. Ultimately, the findings will be used to improve plant productivity.

Some innovative farming techniques developed by college faculty have been successfully adopted by Hawaii growers. Papaya growers are using a transgenic seed, IPM techniques are being adopted by macadamia, litchi, and rambutan growers, and the banana industry is using an ELISA assay to screen for banana bunchy top virus infection. A number of commercial farms have adopted the practice of growing hydroponic lettuce by the suspended pot technique.

College-recommended methods of control of invasive plant species are being adopted by ranchers, foresters, conservationists, and state agencies. A workshop attendee from Yap has reported excellent efficacy and very low labor requirements with the methods in Yap.

International cooperation has resulted in improved immunodiagnostic and DNA-based methods for detection and rapid identification of plant pathogenic bacteria that can satisfy the requirements of zero tolerance in international trade.

Plant production efficiency in turfgrass is improved by new recommendations for the control of the aggressive weed seashore paspalum. Turfgrass managers now have means to control or even eradicate the weed. A new critical soil phosphorus level for Kauai wetland taro growers was established that will help them improve their production efficiency.

Two projects have been successful in assisting ranchers to manage weed problems in their rangeland and pastures. A ranch on the Big Island has now treated several thousand acres of pastures infested with gorse using methods recommended by the college. A ranch on Maui is planning to clear its pastures of Christmas berry trees. In wider cooperation, the state's Division of Forestry and Wildlife has cleared trails for safer, more pleasant hiking and is able to manage vegetation on trails at 3% of the cost of their traditional practices.

Localized versions of the national Farm\*A\*Syst/Home\*A\*Syst programs to reduce risks of pollution were developed and pilot tested. Ten agencies or private organizations have expressed interest in using the college's web page where the materials are available. Plans are to adapt the materials for dissemination in the Pacific Islands. In another arena, home and commercial producers of papaya have been certified in the proper use of the transgenic papaya. The success of the certification program is reflected in the acreage being harvested (53%) and planted (40%) to genetically modified varieties Rainbow and SunUp.

An issue of major concern in Hawaii is the viability of small farms. Hawaii is the only state in the union where the number of farms is increasing and the average age of farmers is decreasing. The college has several highly successful programs in place to assure the viability of small farm operations. Such programs exist on Molokai and Hawaii and on all islands where residents live on Hawaiian home lands. Special video programs have been widely disseminated to provide agricultural training to displaced sugar workers and immigrant farmers, among others. One agent advised and assisted 80 new farmers—of whom only two gave up farming. An agent on the Big Island facilitates communication by hosting regular discussions among coffee growers, writing a newspaper column, and maintaining a gardening hotline. Taro growers have worked cooperatively with the college to improve yields and battle plant diseases.

Progress has been made in identifying pests and pesticides for two crops that are specifically tropical: 'awa and noni, Pacific Basin crops that have significance for the local population.

#### ALLOCATED RESOURCES -- GOAL 1

Fiscal Year	Research Hatch Funds (\$)	Research State Funds (\$)	Research Other Fed & Non Fed Funds (\$)	Research Total Funds (\$)	Research Scientist Years (SY)
2000	927,917	7,505,001	1,020,857	9,453,775	37.1

Fiscal Year	Extension Smith-Lever Funds (\$)	Extension State Funds (\$)	Extension Other Funds (\$)	Extension Total Funds (\$)	Extension Faculty Years (FY)
2000	344,700	1,149,896	0	1,494,596	21.9

#### Key Theme – Biotechnology

- a. Description of activity. Germplasm acquisition, enhancement, and distribution; identification of new genes or novel allelic combinations useful in sweet corn improvement; and utility of market assisted selection. Reduce environmental impacts of sweet corn production while maintaining or improving product quality. (864R)

- b. Impact/Accomplishment. About half the 17 major Hawaii Composites were advanced. Many of the 200+ inbreds were advanced (Hi38 into its 74<sup>th</sup> cycle of selection), and many hybrids were tested in Hawaii, Australia, Thailand, and Florida. Microsatellite analysis revealed the University of Hawaii germplasm to be much more broadly based than that of the USA generally. Hybrid #10 (a 3-way supersweet) continues to dominate Hawaiian production. Other Hawaii lines are important in Thailand and Australia. The Corn Field Day is used as a vehicle to display new hybrids, attract growers, and reveal new ways to use corn. A “supersweet corn cookbook” continues to be a much requested publication.
- c. Source of Federal Fund. Hatch MRF.
- d. Scope of Impact. Multi-state research with Florida, Wisconsin, and New York.

#### Key Theme – Biotechnology

- a. Description of activity. Establish and evaluate recombinant inbred lines (RILs) of corn for resistance to tropical pests, diseases, and stresses. Identify quantitative trait loci (QTLs) governing segregations for significant resistances and selected agronomic traits and apply molecular probes (SSR, RFLP) for the chromosomal mapping of QTLs and/or genes of high commercial value. Genetically improve tropical and temperate corn inbreds by conversion to selected QTLs using marker-assisted selection where warranted, and release improved inbreds and hybrids for grower evaluation. (866H)
- b. Impact/Accomplishment. The first thousand acres or so of University of Hawaii’s silage corn were grown this year, and the prospects seen as fairly bright for impact on our dairy industry. The UH hybrids were more than competitive with those of industry, and (significantly) could be grown pesticide-free. Our Hawaii Foundation Seed Facility, continued to provide important tropical maize germplasm to institutions worldwide, in some cases involving collaborative research (e.g., Novartis on rust, U. of Illinois and CIMMYT (Thailand) on genome mapping).
- c. Source of Federal Fund. Hatch.
- d. Scope of Impact. State Specific.

#### Key Theme – Adding Value to New and Old Agricultural Products

- a. Description of activity. Develop dendrobium cut flower cultivars with modified seasonality, improved colored and white flowers, and improved cultivars for marketing flowering potted plants. Eradicate virus from tissue cultures, further develop biotechnologies for orchid genetic engineering, and assess engineered traits in breeding lines and cultivars. Develop and expand knowledge on species relationships, breeding behavior, and biochemistry of orchids. (842H)
- b. Impact/Accomplishment. Knowledge of RNA extraction methods for orchids is essential for molecular characterization of transgenic plants and for orchid gene cloning. The reported protocol may be useful for a variety of orchid genera. This will directly benefit orchid researchers and indirectly orchid consumers through varietal development. Two new varieties of dendrobium orchids were released for production in Hawaii – a two-tone lavender seed-propagated potted cultivar named D. Winifred Ogata and a pure white pansy lip clonal potted cultivar named D. Ethel Kamemoto ‘White Cascade’.
- c. Source of Federal Fund. Hatch.
- d. Scope of Impact. State Specific.

## Key Theme – Adding Value to New and Old Agricultural Products

- a. Description of activity. Develop and disseminate red, orange, pink, coral and white cultivars with disease resistance, high yield and other important horticultural traits and assemble and evaluate germplasm. Develop cultivars with new shapes and colors and nematode resistance or tolerance. Develop and expand knowledge on flowering potted plants. Use biotechnology to develop gene transfer methods for spathiphyllum, with an emphasis on flower color engineering. (841H)
- b. Impact/Accomplishment. Multicolored (“obake”) flowers are a standard component of the color assortment offered by many anthurium growers and retailers. We named and released the white obake ‘Mauna Loa’ to the Hawaii anthurium industry.
- c. Source of Federal Fund. Hatch.
- d. Scope of Impact. State Specific.

## Key Theme – Plant Production Efficiency

- a. Description of activity. The major goal of this research project is to address the hypothesis that DNA and mRNA binding proteins mediate light-activated transcription and translation, respectively, of genes encoding photosynthesis functions in higher plant chloroplasts. The long-term goal is to elucidate the biochemical mechanisms by which light quality alters gene expression in chloroplasts. Once the relevant factors have been cloned and their biological function established, their expression will be manipulated using biotechnology to improve plant productivity. The specific objectives are as follows: (1) To clone and characterize the Arabidopsis cDNAs encoding proteins binding to the psbD promoter cis elements and to the 5' UTR of psbA mRNA; (2) To clone and characterize proteins recognizing the psbD 5' UTR; (3) To determine the roles of the DNA and RNA-binding proteins in plant chloroplasts. (670H)
- b. Impact/Accomplishment. Several protein factors that interact with a blue light-responsive psbD gene promoter have been identified. These factors have been purified, which is an important step in cloning the genes for the factors. Competitive funding for this project was awarded for another three years from the U.S. Department of Energy. This will allow us to clone the genes and manipulate gene expression and plant growth. This project has expanded to include investigations into other processes influencing photosynthetic productivity, such as leaf aging and senescence. Genes involved in senescence have been cloned in anthurium and the expression of a senescence-regulated promoter has been demonstrated.
- c. Source of Federal Fund. Hatch and Grant.
- d. Scope of Impact. State Specific.

## Key Theme – Agricultural Competitiveness

- a. Description of Activity. The Mealani Forage Field Day “A Taste of the Hawaiian Range” Food Show was initiated and organized in 1996. The focus and goals of the project were to highlight the efforts of the College of Tropical Agriculture and Human Resources and to bring exposure to Hawaiian forage-fed beef. Provide researched-based information to expand this segment of the beef industry. Provide information on the production and marketing of forage-based meats. Educate chefs on the quality and health aspects of forage-based meats. Provide information to the public about the quality of forage-fed meat and its preparation options.
- b. Impact/Accomplishment.

Hawaiian forage-fed beef received exposure in the following media: (1) Gusto Magazine, June and November 1999. (2) Food Arts Magazine, December 1999/January 2000. (3) Honolulu Advertiser on June 17, 1998 and June 21, 2000. Food section feature “Greener Pastures’ and “Advantages of Grass-fed Meat.” (4) The Blondee Food Show, TV Food Network.

The Island Fresh Beef Label was created in 1997. Ranchers and processors from Kauai (2), Oahu (1), Maui (2) and the Big Island (5) are utilizing the labels. The labels are currently being used in many supermarkets and specialty stores throughout the state. A survey in the largest supermarket chain on the Island of Hawaii indicated the success of promotional efforts. In 3 years, the percentage of people that can identify locally produced beef increase from 26% to 70%.

Through education and product awareness: (1) A Major Big Island supermarket has increased its proportion of forage-based beef on its beef shelf from 0-5% to 35% in the past four years. (2) Processors have created new value-added, locally produced beef products, such as hot dogs, specialty sausages, and smoked products.

“A Taste of the Hawaiian Range” has become a premier event for the town of Waimea on the Island of Hawaii. Attendance by the public has increased from 350 to 1,600 in four years. Chef participation has increased from 12 to 32. Participation by other food production segments of agriculture has increased from 5 to 27 vendors and exhibitors. The event has been featured in several local TV specials.

- c. Source of Federal Funds. Smith-Lever 3 (b) and (c).
- d. Scope of Impact. State Specific.

#### Key Theme – Agricultural Competitiveness

- a. Description of Activity. Cooperate and participate in the NPGS, a coordinated national acquisition and management program for plant germplasm valuable for agricultural, horticultural, environmental, medical and industrial uses in the SR and throughout the U.S. In this role, promote cooperation among elements of the NPGS, and the SSAESS. Acquire, conserve, and distribute seed and/or vegetative stock of 1,369 plant species. Within the SR, throughout the U.S., and internationally, encourage the use of a board diversity of germplasm by evaluating germplasm for specific desirable traits, and disseminate this information through the GRIN database. (820R)
- b. Impact/Accomplishment. A new, very productive longan cultivar (*Dimocarpus longan* (Lour.) Steud.) named ‘Egami’ is available for distribution to tropical fruit growers in Hawaii. This new selection originated from an open-pollinated seedling of unknown origin and has consistently produced large clusters of fruits. In comparison to nine other cultivars in the collection at the Kona Station, ‘Egami’ was preferred based on taste and crispness of the pulp. It was also highly accepted as a dried fruit based on flavor and pulp recovery.
- c. Source of Federal Funds. Hatch MRF.
- d. Scope of Impact. Multi-state. All states that participate in MRF project S-009.

#### Key Theme – Agricultural Competitiveness

- a. Description of activity. To improve the viability of Maui County’s diversified agricultural industry by increasing efficiency and productivity of the farming system. Develop and maintain an integrated approach for the management of disease and insect pests affecting edible crops. Increase grower involvement in

resolving problems facing industry (e.g. marketing, water, transportation, etc.). Increase efficiency in the delivery and dissemination of research-based information. (21-030)

- b. Impact/Accomplishments. As a result of the field trials, 20 taro growers learned how to better manage the taro leaf blight by using disease resistant taro varieties. The growers like the P1, P5, P7, P8, P10, and P20 taro varieties, which they have adopted. The P7 variety is especially prized for poi processing. During the months of December through March when the taro leaf blight is severe, the use of the Palauan taro varieties have allowed the Keanae growers to harvest approximately 90% of the taro leaves for luau sales as compared to less than 25% recovery for the industry standard variety Bunlong. These growers can now also harvest the leaves from poi taro paddies. The use of the Palauan taro varieties has also reduced the growing time by several months. In Keanae, growers are now able to harvest the Palauan taro within 6 to 9 months as compared to the 9 to 14 months required for the industry standard Maui Lehua Variety.
- d. Source of Federal Funds. Smith-Lever 3 (b) and (c).
- e. Scope of Impact. State Specific.

#### Key Theme – Agricultural Competitiveness

- a. Description of activity. Develop premium quality markets for Kauai tropical ornamental growers. Advise, coordinate and maintain the Hawaii Tropical Flowers and Foliage Association (HTFFA) – Kauai Chapter, and Kauai Anthurium Association (KAA). Conduct trials with 22 cooperators to test and assess commercial production and vase-life of tropical flower accessions. (23-040)
- b. Impact/Accomplishment. Fifteen tropical flower plant materials with high impact commercial value were released and adopted by commercial and hobby growers. The following 94 tropical flower accessions were released statewide: 80 Heliconia spp., 8 Costus spp., 3 Calathea spp., 2 Zingiberales spp., and 1 Stromanthes spp. Two Heliconia orthotricha cultivars, ‘Garden Island Fuzzy Pink’ and ‘Kauai Treasure’, were released for commercial production.
- c. Source of Federal Funds. Smith-Lever 3 (b) and (c).
- d. Scope of Impact. State Specific.

#### Key Theme – Agricultural Competitiveness

- a. Description of activity. Collect trade and market share data for as many Hawaii-grown products as possible. Markets of primary concern are the Mainland U.S., Japan, and the European Union. Modify the ‘national’ revealed comparative and competitive advantage measures for application to a ‘regional’ setting such as Hawaii. Estimate revealed comparative advantage and revealed competitive advantage measures by product for each market. Rank products according to the estimated values for the above measures. Estimate cost of production of major competitors for Hawaii products, which have the “greatest” comparative advantage and competitive advantage and compare these costs with cost of production in Hawaii. Utilize the above results to draw inferences on the competitiveness of related commodities grown in Hawaii and on the future of Hawaii’s agriculture. (420H)
- b. Impact/Accomplishment. In evaluating Asia-Pacific trade, this research found that the degree of competitiveness has risen most rapidly for economies in the Pacific Basin and certain Asian countries (especially China and Vietnam). Increased competitiveness, on the one hand, may be an indicator of successful trade negotiations under the Uruguay GATT (General Agreement on Tariffs and Trade) Round. However, this implies that competition in the international arena has increased. Information on the Revealed Comparative Advantage (RCA) and Revealed Competitive Advantage (RC) trade indices enable

researchers and policy makers to address whether or not their country/region has trade advantages in the production of various commodities and how these trade advantages are affected as the country/region develops. For Hawaii, commodities such as coffee (ranked third among Hawaii's diversified crops in terms of production value) will face stiffer competition in the Asia-Pacific markets. This research has also shown the importance of aggregate trade data (United Nations' COMTRADE and UNCTAD databases) in answering questions on competitive/comparative advantage.

- c. Source of Federal Funds. Hatch.
- d. Scope of Impact. State Specific.

#### Key Theme – Agricultural Competitiveness

- a. Description of activity. To demonstrate, transfer, and promote adoption of non-chemical practices that are effective in managing diseases such as Phytophthora leaf blight. (16-914)
- b. Impact/Accomplishment. A total of 685 growers and gardeners throughout the state learned how to manage the taro leaf blight through the use of disease resistant taro varieties. A total of 150 of these growers became interested in the disease management strategy, secured planting material, and conducted on-farm test plantings for evaluation. The project investigators also worked with 10 commercial taro processors across the state to evaluate and promote the blight resistant taro varieties for various uses such as table taro, chipping, luau (taro leaf), and poi. After 2-3 years of on-farm evaluations and test marketing trials, 76 growers and gardeners produced the disease resistant taro varieties on a regular basis. These varieties readily gained high acceptance for use as Polynesian table taro, have gained moderate adoption for use as luau (cooked taro leaves), and their use as a blend in poi processing is slowly but steadily increasing. It is expected that the production and utilization of the disease resistant taro for Polynesian table taro, poi, and luau, will continue to increase steadily over the next 3 to 4 years. Growers now recognize the benefit of the inherent disease resistance to the taro leaf blight, the high plant vigor, and the high corm and leaf yield potential of the introduced taro varieties. The use of the disease resistant taro varieties is a non-chemical approach to managing the devastating taro leaf blight. The introduced taro varieties Ngesuas (P1) and Dirratengadik (P20) performed well overall.
- c. Source of Federal Funds. Smith-Lever 3 (b) and (c).
- d. Scope of Impact. State Specific.

#### Key Theme – Agricultural Competitiveness

- a. Description of activity. Demonstrate, transfer, and promote adoption of non-chemical practices that are effective in managing diseases such as Fusarium wilt of basil. (16-907)
- b. Impact/Accomplishment. The statewide team of project investigators increased seeds of the Fusarium wilt tolerant "UH Sweet Basil" variety. The team conducted educational programs to promote the adoption of the disease tolerant variety as a non-chemical means of managing the serious and widespread disease. These efforts included the development of informational materials, classes, and on-farm evaluation trials. Seeds of the disease resistant basil variety were offered for sale to growers and gardeners through the Seed Lab. A total of 5 commercial growers and 51 home gardeners purchased 'UH Sweet Basil' seed from the Seed Lab since the seeds were first offered for sale.
- c. Source of Federal Funds. Smith-Lever 3 (b) and (c).
- d. Scope of Impact. State Specific.



### Key Theme – Agricultural Competitiveness

- a. Description of activity. Provide Kauai taro growers with information on water quality regulations. Monitor taro production impacts on water quality and demonstrate in-field practices to mitigate degradation. Provide growers with information, technology and support to enable grower to make proper site and crop selection decisions within marketing expectations and limitations and to adapt cultural practices to mitigate short and long term problems. (23-041)
- b. Impact/Accomplishment. Eleven taro growers adopted soil sampling and crop monitoring practices that resulted in reducing fertilizer use by approximately 20% without reductions in yields. Thirty-two growers adopted improved cultivars of taro, in particular, the Palauan cultivars (P1 and P20).
- c. Source of Federal Funds. Smith-Lever 3 (b) and (c).
- d. Scope of Impact. State Specific.

### Key Theme – Agricultural Competitiveness

- a. Description of activity. Coordinate activities related to needs of orchid, protea, and tropical flower producers. Coordinate and conduct applied research and demonstration trials on dendrobium flowering, leucospermum nutrition, leucospermum variety trials, biological pest control, bunchy top virus, and dendrobium decline. Develop production cost analyses and provide resource and technical support to county agents and industry organizations. (18-809)
- b. Impact/Accomplishment. 8,563 protea cuttings were distributed to the local industry including 1,500 cuttings of 6 new Leucospermum cultivars. These new cultivars are the first new introductions released in about 15 years. They have a broader flowering season and greater disease resistance than older cultivars.
- c. Source of Federal Funds. Smith-Lever 3 (b) and (c).
- d. Scope of Impact. State Specific.

### Key Theme – Agricultural Competitiveness

- a. Description of activity. Increase farm productivity and profitability. Develop and maintain an integrated approach for the management of insects, diseases, nutrients, and other related disciplines affecting crop production and/or increase multi-disciplinary efforts in resolving problems affecting the agricultural industries on Moloka'i and Lanai. Increase efficiency in the delivery and dissemination of research-generated information. (21-003)
- b. Impact/Accomplishment. Eighty people participated in the Moloka'i Taro Workshop and Field Day. The participants received information on 63 Hawaiian taro varieties. More than 2,100 taro planting materials were distributed to interested participants. New Hawaiian taro varieties are being produced for their export and value-added market.
- c. Source of Federal Funds. Smith-Lever 3 (b) and (c).
- d. Scope of Impact. State Specific.

### Key Theme – Agricultural Profitability

- a. Description of activity. Develop post-harvest treatments and handling technologies to avoid disorders, maintain quality, extend shelf life, and develop valued added products. Fruit crops to be studied include pineapple, papaya, litchi, carambola, guava, and annona. Determine the effect of insect disinfestations treatments, variety, and cultural practices on postharvest quality and postharvest life of tropical fruits and ornamentals. Determine the effect of preharvest and postharvest treatments on vase life of tropical ornamentals. Study the wall degrading enzymes involved in papaya ripening. (660H)
- b. Impact/Accomplishment. The following recommendation can be made for commercial practices: (1) Inflorescences should be harvest at mature stage (at least 2/3 open stage). (2) After harvest, inflorescences should be washed in tap water containing detergent to remove insect contamination and field heat. (3) Despite seasonal variation in the effect of hot water treatment (preconditioning at 40 C for 15 min, and then hot water treatment at 50 C for 10 min (winter) to 12 min (summer)) to extend vase life, the treatment should be applied as it suppressed geotropic response during transportation. (4) Inflorescences should be sprayed with 200 ppm of BA before shipping. (5) Inflorescences can be packed wet (moistened newspaper) or dry (dry newspaper), but the plastic liner (20 um thickness) in the cardboard box should not be omitted. (6) After packing, horizontally storage and shipping should not lead to any geotropic curvature for at least 7 days following the heat treatment. (7) The application of chemicals to control ethylene synthesis and action is not effective. (8) Recommendations on the use of sucrose in the holding solution cannot be made as our results (2% w/v sucrose holding solution increased vase life) were on the stems without leaf sheaths.
- c. Source of Federal Funds. Hatch.
- d. Scope of Impact. State Specific.

#### Key Theme – Agricultural Profitability

- a. Description of activity. To develop and conduct an educational program to improve production and post-harvest practices of cut flowers and cut foliage and targeting, but not limiting this program to 18 grower/shippers using timely and effective information delivery methods. To increase 18 growers/shippers' present knowledge of chemical and cultural in-field and post-harvest pest control measures by 25%. To maintain the number of export shipment rejections due to insects below 0.1% of the total shipments by target growers/shippers. To decrease overall product losses due to improper post-harvest handling to less than 30% by target growers/shippers. To increase the overall industry standard of high quality cut flowers and cut foliage through the adoption of proper post-harvest handling techniques by all 18 target grower/shippers. (20-024)
- b. Impact/Accomplishment. This project has met its stated objective in maintaining the number of export shipment rejections due to insects below 0.1%. According to records from the Hawaii Department of Agriculture, 17 Hawaii County shippers involved in the Hawaii/California Origin Inspection Program (OIP) have shipped 10,415 lots (shipments) containing 14,436 parcels (boxes) with no rejections between October 1, 1999 to September 30, 2000. This excellent record of shipments has assured the continuation of the OIP program, allowing faster product delivery despite our great distance to mainland market.
- c. Source of Federal Funds. Smith-Lever 3 (b) and (c).
- d. Scope of Impact. State Specific.

#### Key Theme – Agricultural Profitability

- a. Description of activity. Develop sensor technology for quantitative measurement of fruit and vegetable properties indicative of quality. Integrate sensor technologies and handling systems that will retain post harvest quality in fruits and vegetables. (538R)

- b. Impact/Accomplishment. Demonstrated that very low water processing of coffee had no effect on the flavor, aroma, or taste of brewed coffee. Using less water to process coffee reduces processing cost and eliminates environmental damage caused by processing wastewater.
- c. Source of Federal Funds. Hatch MRF.
- d. Scope of Impact. Multi-state.

Key Theme – Agricultural Profitability

- a. Description of activity. To demonstrate, transfer and promote adoption of non-chemical practices that are effective in managing insect pests, including ants, aphids, armored and soft scales, mealybugs and whiteflies. (16-908)
- b. Impact/Accomplishment. The hot water demonstration system was installed at Greenpoint Nurseries (GPN) in Hilo, Hawaii. GPN was convinced that the hot water would disinfect floral gingers, heliconia, palm and ti leaves, and bird of paradise (treated upright) without affecting flower quality or vase life. Demonstrations of the hot water systems were conducted for several interested nursery growers and flower shippers. Meetings were held with major exporters of fresh flowers and potted plants regarding the implementation of heat treatments for pest disinfestations. Significant progress in the acceptance of heat treatments as an effective and practical disinfestations method was achieved. Heat treatments will provide an effective quarantine treatment for export of fresh flowers and potted plants. Foreign countries and other state quarantine inspectors, which will be recognized by buyers, will no longer reject export products. Hawaiian exportation of pest-free flowers and plants will result in exponential increase in export sales revitalizing the economy in Hawaii.
- c. Source of Federal Funds. Smith-Lever 3 (b) and (c).
- d. Source of Impact. State Specific.

Key Theme – Agricultural Profitability

- a. Description of activity. Improve field management programs for pests of flowers and foliage by minimizing the use of chemical pesticides and by maximizing the use of biorational and non-chemical control tactics. Develop post-harvest disinfestations treatments, including heat treatment and irradiation that can be integrated with field pest management programs to ensure pest-free flowers and foliage for export. (944H)
- b. Impact/Accomplishment. Three grower/shippers who have implemented hot water treatment for 1 to 2 years (1997-1999) have reduced dollar loss due to quarantine-rejected shipments by 50%, decreased labor requirements and lowered post-harvest insecticidal dip by 80 to 90%. These grower/shippers represent 14% of the floriculture industry and 8% of the export floriculture industry. Two additional grower-shippers who represent a major portion of shipments from Hawaii to California will implement hot water treatment in 2001.
- c. Source of Federal Funds. Hatch.
- d. Scope of Impact. State Specific.

Key Theme – Agricultural Profitability

- a. Description of activity. Determine the cause of diseases and develop improved cultural practices for crops important to agricultural diversification in Hawaii. (19-705)
- b. Impact/Accomplishment. Latron 1956B was found to be an effective spreader for papaya. However, type of spray equipment is also important to achieve distribution of sulfur to control powdery mildew diseases on papaya. Hertiage and Kaligreen were identified as effective controls for powdery mildew on Gerbera. Kaligreen is relatively economical compared with Heritage and Systhane and each represents different chemical groups, making rotation feasible. These products give growers new options to control this common market limiting disease. Agronomic and pathological tests are continuing with the taro growers in the state. Grower support and rapport continues to be strong with several growers implementing test results to reduce crop costs. Experiments have show that nitrogen can be reduced from 800 lbs per acre to 350 lbs. Changing the interplant distance from the traditional 18” spacing to the 24” spacing saves growers over 8,000 plants per acre with nearly the same yield. The biggest savings comes from reduced labor to plant, maintain and harvest the extra 8,000 plants.
- c. Source of Federal Funds. Smith-Lever 3 (b) and (c).
- d. Scope of Impact. State Specific.

#### Key Theme – Agricultural Profitability

- a. Description of activity. Provide clients with accurate, reliable, and appropriate analytical tests on submitted samples. Return the results within reasonable lengths of time. Procedures with strict adherence to sound laboratory practices will be carried out and will enforce quality control and assurance measures. Project investigators will collaborate with faculty in the departments of agronomy and soil science and horticulture, and cooperative extension agents and specialists to research and report on new and appropriate analytical testing procedures. A database will be maintained to assist commercial and homeowners with fertilizer recommendations. (09-092)
- b. Impact/Accomplishment. A total of 2,588 soil samples were submitted for testing. A total of 5,739 soil analyses were conducted. A total of 2,892 plant tissue analyses were conducted. Soil and tissue analyses have helped commercial growers in papaya and taro improve the efficiency of their fertilizer application. This has helped improve their productivity and reduce their fertilizer costs.
- c. Source of Federal Funds. Smith-Lever 3 (b) and (c).
- d. Scope of Impact. State Specific.

#### Key Theme – Animal Production Efficiency

- a. Description of activity. Determine the nutritional and antiquality characteristics of species and hybrids of Hawaiian Leucaena. Determine animal production characteristics (growth, health and stocking densities) for four species of leucaena that are currently viewed as outstanding fodder, especially diversifolia hybrids. Develop a small animal model that can be used to screen for palatability of leucaena species that are currently viewed as outstanding fodder, especially diversifolia hybrids. (266H)
- b. Impact/Accomplishment. The leguminous, tropical tree Leucaena shows excellent potential for providing a nutritious and high protein fodder for grazing ruminants in the tropics, particularly considering that most tropical forage have low protein contents. Varieties of leucaena that contain pallida and leucocephala breeding will also show the highest selectivity by grazing ruminants. Goats appeared to serve as better models for selectivity studies compared to simple stomach herbivores, such as rabbits and guinea pigs. This

data will help livestock producers in their selection of suitable forages for livestock production operations in the tropics.

- c. Source of Federal Funds. Hatch.
- d. Scope of Impact. State Specific.

#### Key Theme – Animal Production Efficiency

- a. Description of activity. To produce a database of production efficiency evaluation of Hawaii farms and to report individual and comparative results to swine producers. Production efficiency will include reproductive, growth and feed efficiency. To produce a database for economic analysis of Hawaii swine production and to report comparative costs and returns under varying production conditions to swine producers. (14-211)
- b. Impact/Accomplishment. Producers participating in the PigCHAMP program consistently produce two more pigs per sow per year than the industry average. Producers have made management changes including adopting artificial insemination, changing boar usage, modifying vaccination programs, improving baby pig management, culling unproductive sows, basing gilt selection on the productivity index of the dam, etc. Lenders such as the Farm Service Agency and the Hawaii Agricultural Loan Division are using our data to assist borrowers. Data on the impact of the disease PRRS (porcine reproductive and respiratory syndrome) on production and farm income was instrumental in the approval of a statewide PRRS testing program and the certification of negative herds.
- c. Source of Federal Funds. Smith-Lever 3 (b) and (c).
- d. Scope of Impact. State Specific.

#### Key Theme – Aquaculture

- a. Description of activity. Develop a foam fractionation device to concentrate marine diatoms. Determine minimum revolution per minute (RPM) required to further remove the ocean water from the condensed algae foam. Produce, isolate and purify an algal antibiotic in sufficient quantity for further efficacy testing. (543H & 571G)
- b. Impact/Accomplishment. The full-scale open continuous algae production system completed in 1999 has been used in an experiment to determine the optimal operating conditions of the system under actual production conditions. The study has found that for the marine diatom, *Chaetoceros* sp., harvest efficiency of up to 90% can be achieved and that an outdoor production column (45.74 cm in diameter and 122 cm high) can produce up to 800 wet weight grams of *Chaetoceros* when subjected to 13,000 rpm of centrifuge de-watering treatment, or about 160 grams dry weight of *Chaetoceros*. This represents a great improvement over current production technology. Our first round tests showed that a number of compounds, extracted from the marine diatom *Chaetoceros* display antibacterial properties. Based on these test results, a patent was obtained (Antibacterially Active extracts from the Marine Algae *Chaetoceros* spp. and Methods of Use, U.S. Patent #5,866,150. February 2, 1999). Novel antibiotics effective against methicillin-resistant *Staphylococcus aureus* and vancomycin-resistant *Enterococcus* are urgently needed because the emergence of new resistant strains of these bacteria. The compounds patented have shown definitive effectiveness against these pathogens.
- d. Source of Federal Funds. Hatch and Grant.
- e. Scope of Impact. State Specific.

## Key Theme – Aquaculture

- a. Description of activity. Develop sea cage culture technology so that production occurs at efficiencies equal to or better than that observed in land-based tanks. Goals include a desirable feed conversion ration, negligible disease problems due to optimization of fish health and an attractive landed feed cost. Diversify finfish aquaculture in the area of ornamental fishes. Make improvements in larval rearing, growout, and fecundity, also included in this objective is solution of a deformity problem and color optimization. (631H)
- b. Impact/Accomplishment. Successfully investigated live zooplankton culture as a method to feed baby fish and made progress in identifying the fatty acids that are key to maturation diets. Reported on the first successful open net cage culture in the United States. The continued growth of both freshwater and marine ornamental fish industries may be attributed to farmers and our efforts as we are only active research group in Hawaii. A new business started by one of our clients may be seen at [www.oceanrider.com](http://www.oceanrider.com).
- d. Source of Federal Funds. Hatch.
- e. Scope of Impact. State Specific.

## Key Theme: Innovative Farming Techniques

- a. Description of activity. To adapt and improve passive non-circulating hydroponic technology. To develop, improve and test crop shelters and their materials. To develop, improve and test alternative growing methodologies and nutritional regimes of crop production. To improve irrigation systems and to monitor the quantity and quality of deep seepage waters. (872H)
- b. Impact/Accomplishment. The non-circulating hydroponic method for growing lettuce has demonstrated a yield advantage over a common float bed horticultural practice for growing lettuce. A number of commercial farms have adopted the practice of growing hydroponic lettuce by the suspended pot technique. This method is also being used by various elementary and high school programs. Growing watercress by this method eliminates the possibility of contamination by water-borne pathogens. This information improves the economic viability of producing hydroponic watercress. Growing cucumbers in plastic trash containers has been adopted by several growers and elementary and high school programs. In fact, in a presentation to an American Society for Plasticulture audience, several of the researchers were quite excited about the possibility of demonstrating root growth by this technique to elementary and high school students and teachers in their respective states.
- c. Source of Federal Funds. Hatch.
- d. Scope of Impact. State Specific.

## Key Theme – Invasive Species

- a. Description of activity. Train land managers in the application of herbicide technology to manage noxious alien plant infestations. Initiate the networking of the university, state, federal and private agencies with noxious alien plant management responsibilities. Identify funding sources for alien plant management projects. (13-106)
- b. Impact/Accomplishment. Vegetation management workshops were held to train ranchers, foresters, and conservationists to increase their efficiency and effectiveness. Previous workshops have increased the efficiency and efficacy of weed management for agencies such as the Kokee Museum, which has secured a grant to attack invasive weeds in the Kokee State Park using methods recommended by the college; and

DOFAW, Kauai Branch, has abandoned their traditional weed management methods and switched over to the college-recommended methods. A workshop participant from the Yap Department of Agriculture, whose attendance was sponsored by DOFAW, has since reported excellent efficacy and very low labor requirements with the method in Yap. In addition, cooperation between agencies with weed management responsibilities is increasing as indicated by the future slate of activities in publishing weed management manuals and conducting weed management workshops.

- c. Source of Federal Funds. Smith-Lever 3 (b) and (c).
- d. Scope of Impact. State Specific.

#### Key Theme – Plant Health

- a. Description of activity. Develop and/or evaluate PCR protocols for detection and identification of bacterial plant pathogens. Develop and evaluate immuno-capture systems to use in combination with PCR or enhance the sensitivity of detection with a two-step assay. Determine the sensitivity of assays (bio-PCR, IFC and enrichment ELISA) that combine bioenrichment with molecular and/or immunodiagnostic methods for detection and identification of bacterial plant pathogens. (734H)
- b. Impact/Accomplishment. International cooperation has resulted in improved immunodiagnostic and DNA-based methods for detection and rapid identification of plant pathogenic bacteria that can satisfy the requirements of zero tolerance in international trade.
- c. Source of Federal Funds. Hatch.
- d. Scope of Impact. State Specific.

#### Key Theme – Plant Production Efficiency

- a. Description of activity. Identify and/or develop disease resistant vegetable crops for the major and potentially important disease problems associated with Hawaii's vegetable industry that are suitable for commercial production. Develop feasible control strategies for major diseases affecting vegetable crop production in Hawaii. (798H)
- b. Impact/Accomplishment. Fifty-seven experimental hybrid "beefsteak-type" tomato lines were developed and evaluated in a field trial on Maui. Tomato growers from all counties were invited to assist in the evaluation of the experimental hybrids. The criteria for evaluation included fruit size, fruit shape, fruit set and whether growers would grow any of the hybrids commercially. Two hybrids were selected as being superior and had commercial potential. Seeds of the two superior hybrids are currently being generated for on-farm trials.
- c. Source of Federal Funds. Hatch.
- d. Scope of Impact. State Specific.

#### Key Theme – Plant Production Efficiency

- a. Description of activity. Determine the selectivity of herbicides or herbicide combinations in horticultural crops. Develop mechanisms to increase the herbicidal activity of foliar-applied herbicides. Characterize the alternating temperature stimulation of purple nutsedge tuber sprouting. Determine the effect of fluctuating temperature on goosegrass seed germination. (802H)

- b. Impact/Accomplishment. Seashore paspalum is an aggressive weed in bermudagrass turf, with no known strategies for its control. Turf managers can now recognize that several selective herbicide treatments, such as asulam + MSMA, or MSMA + Confront (clopyralid + triclopyr) can suppress seashore paspalum in bermudagrass turf, but with little prospects for eradication, even when applied repeatedly. These findings provide turf managers with realistic expectations, and decisions can be made on strategies for seashore paspalum control. For eradication, turfgrass managers can use a higher than normal rate of glyphosate by itself to eradicate seashore paspalum. Our findings also provided turfgrass managers with knowledge that they can replace sod as early as 14 days following the glyphosate application.
- c. Source of Federal Funds. Hatch.
- d. Scope of Impact. State Specific.

#### Key Theme – Plant Production Efficiency

- a. Description of activity. Project aim is to test two hypotheses related to taro (*Colocasia esculenta* L. Schott var. *esculenta*) yield. The first hypothesis is that in paddy-cultured taro with low water-flow exhibiting yield reduction, the rhizosphere redox potential is causing the yield decline. The second hypothesis is based on the premise that the damaging effects of stagnant waters can be minimized by periodically draining the paddy. The hypothesis is that draining the paddy will oxygenate the rhizosphere sufficiently to bring down the concentration of elements to safer levels. Based on these hypotheses, the two objectives of this project are to: (1) show that rhizosphere redox potential and its consequences, i.e., Fe and/or Mn toxicity, are highly correlated to yield in farmers paddies and (2) demonstrate that pre- and post-planting draining is effective in raising redox potential and taro performance. (103H)
- b. Impact/Accomplishment. Redox potential, oxygen content, pH, temperature, and salinity were measured in areas where taro grew well and poorly. The results showed that taro growth is related to redox and oxygen content in the water. In areas where taro grew well, the redox potential averaged 585 mV and oxygen content averaged 7.0 mg/L. In contrast, the redox potential averaged 399 mV and oxygen content averaged 2.5 mg/L in the places where taro grew poorly.
- c. Source of Federal Funds. Hatch.
- d. Scope of Impact. State Specific.

#### Key Theme – Rangeland/Pasture Management

- a. Description of activity. Annually compile information on weed management from related research projects, the literature, and scientific meetings. Publish extension publications and newsletters and prepare workshop lectures. Disseminate weed management information to extension agents, ranchers and others via workshops, extension publications, newsletter articles and direct contacts. (20-080)
- b. Impact/Accomplishment. This project assisted ranchers in dealing with their weed problems by funneling technical information to them in lay language from diverse sources. Accurate information allows ranchers to manage weeds most economically and with minimum impact on the environment. A ranch on Hawaii has now treated several thousand acres of pastures infested with *Ulex europaeus* using methods recommended by the college.
- c. Source of Federal Funds. Smith-Lever 3 (b) and (c).
- d. Scope of Impact. State Specific.



### Key Theme – Rangeland/Pasture Management

- a. Description of activity. Develop and conduct one cooperative pilot project each on Kauai, Maui and Hawaii per year to manage weeds in pastures and forests. (13-108)
- b. Impact/Accomplishment. By using information provided by CTAHR, the priority trails of Division of Forestry and Wildlife (DOFAW), Kauai Branch, are now clear. Hikers on Kauai now experience pleasant and safer hikes. Furthermore, DOFAW is able to manage vegetation on trails at 3% of the cost of their traditional practices.
- c. Source of Federal Funds. Smith-Lever 3 (b) and (c).
- d. Scope of Impact. State Specific.

### Key Theme – Rangeland/Pasture Management

- a. Description of activity. Evaluate weed management strategies for noxious weeds of pastures and forests by conducting trials on weed species representative of the problems typically encountered by ranchers and foresters. Determine the impact of sequential or split applications of herbicides on efficacy and efficiency of treatments. Evaluate the efficacy of crop oil adjuvants and carriers in foliar applications on herbicides on weeds tolerant of herbicides with water carrier and standard surfactants. Evaluate the long-term efficacy of herbicides with preemergence activity. Evaluate the efficacy of very-low volume basal bark treatments. (130H)
- b. Impact/Accomplishment. Twenty-nine trials were conducted on Kauai, Maui and Hawaii to develop effective and efficient methods of management of major weeds of pastures and natural areas. The results of these trials have been and will be used by ranchers, conservationists and volunteer groups to clear invasive weeds that restrict the use of lands for production, recreation and cultural purposes. A heiau on Kauai was cleared of weeds by volunteers in the first step toward restoration. Volunteers have begun working on a coastal area of Kohanaiki on Hawaii. A large ranch on Hawaii continues its program to clear pastures of *Ulex euroaeus*. A large ranch on Maui is planning to clear their pastures of *Schinus terebinthifolius*. Other ranchers have been advised on their most effective and efficient methods of weed management.
- c. Source of Federal Funds. Hatch.
- d. Scope of Impact. State Specific.

### Key Theme – Risk Management

- a. Description of activity. Develop and test self-assessment education materials for agricultural producers to reduce risks of pollution from storage and use of agrichemicals (pesticides and fertilizers), petroleum products, livestock waste, soil erosion and other potential environmental contaminants. Develop and test self-assessment education materials for rural and urban homeowners to prevent pollution risks from household wastes, domestic use of chemicals, and home water systems (such as cisterns). Work with government and private partners to encourage the use of these educational materials. (13-107)
- b. Impact/Accomplishment. A localized version of the national Farm\*A\*Syst/Home\*A\*Syst (FAS/HAS) educational and pollution assessment materials was developed, produced and pilot tested. Twenty-six worksheets for Farms and Homes have been developed and are available on the college web page. Ten agencies or private organizations have expressed interest in using these materials. Some of the materials will be adapted and disseminated for use in the Pacific Islands.

c. Source of Federal Funds. Smith-Lever 3 (b) and (c).

d. Scope of Impact. State Specific.

#### Key Theme – Risk Management

a. Description of activity. To develop educational programs to increase efficiency and productivity of new and current papaya farmers. To provide educational programs to certify producers (commercial and home) to purchase the new transgenic papaya varieties. To install cooperater trials of transgenic varieties to observe fruit quality under different environmental conditions. To provide production information and projections to marketers (PAC, HDOA, shippers, etc.). (20-021)

b. Impact/Accomplishment. The article, “Papaya Production in Hawaii” was completed. It provides production information for commercial papaya growers and home owners. Educational classes have been provided to certify 50 commercial growers and 450 home owners to grow the genetically modified varieties of papaya, Rainbow and SunUp. The success of the certification program is reflected in the acreage of papaya currently being harvested (53%) and planted (40%) to genetically modified varieties of Rainbow and SunUp.

c. Source of Federal Funds. Smith-Lever 3 (b) and (c).

d. Scope of Impact. State Specific.

#### Key Theme – Small Farm Viability

a. Description of activity. To provide educational and training programs to improve the Hawaiian Home Lands (HHL) farmers’ knowledge of agricultural production and farm management practices. To upgrade agricultural skills of farmers. To develop and promote community and leadership development programs for HHL farmers. (20-094)

b. Impact/Accomplishment. Provided training for native Hawaiian homesteaders through workshops and informational meetings in the areas of grafting and air layering tropical fruit trees, awa production, constructing low cost rainshelter, animal waste management, controlling plant diseases, and controlling insect pests. Developed a video on beef carcass quality that helped to form the Homestead Beef Marketing Alliance. The Alliance made it possible for the homesteaders to coordinate their effort to consistently supply quality homestead beef to the expanding forage-finished beef market. Assisted the Makuu Homestead Association farmers to formulate their plans to develop a community farmers market.

c. Source of Federal Funds. Smith-Lever 3 (b) and (c).

d. Scope of Impact. State Specific.

#### Key Theme – Small Farm Viability

a. Description of activity. Provide educational programs in pest management for coffee, macadamia nut, and specialty fruit crops. Determine the feasibility of composting macadamia leaves in the field. Demonstrate methods of pruning coffee. Generate an extension videotape and update existing bulletins on pruning. Develop a database of growers to aid in identifying clientele and their needs. Develop an extension bulletin on variety selection and cultural requirements of temperate and tropical fruits. (20-070)

b. Impact/Accomplishment. Coffee Talk, a monthly open discussion on any aspect of coffee production, has been well attended. Topics over the past year include weed identification and control, insect identification

and control, pruning, planting a dew orchard, soil and lead analysis and fertilizer requirements, organic production, labeling requirements, grades and standards, and moisture meter calibration. The first certified Landscape Technician program in the state (this is a national program) is spearheaded by the Hawaii Island Landscape Association. The specialist participated in the Advisory Committee, as an instructor, in test preparation, and as a Judge's Technical Advisor during the rigorous, hands-on exam. Three landscape maintenance professionals have become Certified Landscape Technicians.

- c. Source of Federal Funds. Smith-Lever 3 (b) and (c).
- d. Scope of Impact. State Specific.

#### Key Theme – Small Farm Viability

- a. Description of activity. Visit farmers that request production assistance. On-farm trials to be implemented to help determine best alternative or solution to production problem. Develop “ball park” type information on production difficulties so specialists can confirm and publish information. (22-050)
- b. Impact/Accomplishment. Approximately 350 farm visits were made. A significant number of visits were made to new farms in the Mililani and Waialua areas on the Island of Oahu. There may be as many as 890 new full- and part-time farmers in these areas. Approximately 300 acres are being farmed. Most visits with new farmers tend to deal with basic and general concerns such as markets and marketing, post harvest handling, soil management, irrigation and irrigation supplies, crop management (cultural) and pest management, “support businesses” such as seed sources, farm loan, farm organizations, alternatives in obtaining information, etc.
- c. Source of Federal Funds. Smith-Lever 3 (b) and (c).
- d. Scope of Impact. State Specific.

#### Key Theme – Small Farm Viability

- a. Description of activity. To assist farmers by developing their leadership skills to identify, develop plans, and implement plans that will improve their economic conditions and to develop and transfer production technologies to clients, enabling them to increase their farm efficiency and competitiveness. (21-031)
- b. Impact/Accomplishment. Sub-surface irrigation as an alternative to sprinkler irrigation in sweet potato production was demonstrated on a farmer's field. The yield data showed that that drip irrigation plots produced significantly more sweet potatoes than sprinkler irrigation plots. As a result of the demonstration, the sweet potato farmer is converting his sprinkler irrigation system to drip. To date, approximately 20 acres have been converted to drip irrigation. He plans to convert all his 80 acres to drip irrigation. In addition to higher yield, the recent increase in water price and decrease in water supply heightened the farmer's interest in water management. A taro nursery was established to provide planting materials to farmers. A total of 50,000 planting materials were distributed to interested farmers.
- c. Source of Federal Funds. Smith-Lever 3 (b) and (c).
- d. Scope of Impact. State Specific.

#### Key Theme – Tropical Agriculture

- a. Description of activity. To conduct ‘industry analyses’ or ‘strategic planning’ sessions. To convene the College multi-disciplinary macadamia and coffee groups annually. To undertake as identified in the above

the development and application of sustainable production technology to on-farm conditions. To create materials for extension agents and the industry which aid the adoption of technology. (18-816)

- b. Impact/Accomplishment. The first major revision of the college's coffee extension bulletin since 1955 was published. To date, 334 copies have been sold. Work is underway to put this bulletin with over 70 illustrations on the College website under the Farmer's Bookshelf. Presentations on nematodes and soil problem were made at the Hawaii Coffee Association Annual Meeting. Two 1-day strategic planning sessions were conducted to identify and prioritize issues facing the coffee industry.
- c. Source of Federal Funds. Smith-Lever 3 (b) and (c).
- d. Scope of Impact. State Specific.

## **GOAL 2: A SAFE AND SECURE FOOD AND FIBER SYSTEM**

### Overview:

A report for Goal 2 will not be provided. The Hawaii POW for Goal 2 contains the following statement: "Hawaii's program under Goal 2 will be the Smith-Lever 3d Targeted program in Food Quality and Safety."

## **GOAL 3: A HEALTHY, WELL-NOURISHED POPULATION**

### Overview:

Extension clientele were offered workshops on: (1) understanding of the relationship of their overall diet and specific food behaviors to health; (2) identifying selected dietary guidelines in food selection, food preparation and meal planning; and (3) understanding the limitations of food labels in planning healthful diets. Participants reported that after attending the workshops they feel more confident in their knowledge of how to select and prepare low fat and low sugar foods for themselves and their families. Majority of the participants (85%) reported that they intended to make healthy changes in their food selection, preparation and consumption. Twenty-four (24) Family and Community Education volunteers receive training through the Project Leader Training report. The 24 volunteers shared the training they received with their respective clubs (12). At least half of the members from the 12 FCE clubs intend to share the information gained with relatives and neighbors.

A nutrition education kit for teachers of lower elementary students, with an emphasis on consuming more fruits and vegetables, was compiled. This kit corresponds to the Hawaii Department of Education performance standards and will be field-tested this fall. A statewide consumer response system called Food and Nutrition Helpline was developed to answer questions on local fruits and vegetables, food safety, and general nutrition. During the first nine weeks, the Helpline team responded to 56 inquiries. Fifteen to twenty calls/inquiries are received each week. Inquiries are being answered within a day or two, and callers have expressed their appreciation for the assistance provided. The increase in calls indicates that this type of service is needed in Hawaii.

As expected, the accomplishments during the first year of the 5-Year Plan of Work were not very extensive. Also as expected, there were more extension accomplishments and fewer research accomplishments after the first year. In the future, accomplishments are expected in the research areas of: (1) determining the nutrient composition of Hawaiian and Pacific foods and (2) determining the factors influencing the intake of calcium rich foods among adolescents. In extension, programs related to diet, nutrition and health should provide documented outputs and outcomes showing benefits to clientele and stakeholders.

ALLOCATED RESOURCES -- GOAL 3

Fiscal Year	Research Hatch Funds (\$)	Research State Funds (\$)	Research Other Fed & Non Fed Funds (\$)	Research Total Funds (\$)	Research Scientist Years (SY)
2000	13,600	136,957	0	150,557	1.4

Fiscal Year	Extension Smith-Lever Funds (\$)	Extension State Funds (\$)	Extension Other Funds (\$)	Extension Total Funds (\$)	Extension Faculty Years (FY)
2000	47,772	131,119	0	178,891	3.2

Key Theme – Human Health

- a. Description of activity. Extension clientele will demonstrate improved understanding of the relationship of their overall diet and specific food behaviors to health. Extension clientele will be able to identify selected dietary guidelines in food selection, food preparation and meal planning. Extension clientele will be able to understand the proper uses and limitations of food labels in planning healthful diets. Extension clientele will be able to identify a well-balanced diet including the identification of the major foods low in fat, sodium and sugar. Nutrition education that focuses on overall dietary balance rather than reducing the risk of a single disease will be emphasized. (22-095)
- b. Impact/Accomplishment. Participants report that after attending the workshops that they feel more confident in their knowledge of how to select and prepare low fat and low sugar foods for themselves and their families. Majority of the participants (85%) reported that they intended to make healthy changes in their food selection, preparation and consumption. Twenty-four (24) Family and Community Education volunteers receive training through the Project Leader Training report. The 24 volunteers shared the training they received with their respective clubs (12). At least half of the members from the 12 FCE clubs intend to share the information gained with relatives and neighbors.
- c. Source of Federal Fund. Smith-Lever 3 (b) and (c).
- d. Scope of Impact. State Specific.

Key Theme – Human Nutrition

- a. Description of activity. Family and Community Education (FCE) participants completing the nutrition education short course will improve their consumption of fruits and vegetables. 4-H participants completing a nutrition education project will improve their consumption of fruits and vegetables. (20-310)
- b. Impact/Accomplishment. A nutrition education kit for teachers of lower elementary students, with an emphasis on consuming more fruits and vegetables, was compiled. This kit corresponds to the DOE performance standards and will be field-tested this fall. A statewide consumer response system called Food and Nutrition Helpline was developed to answer questions on local fruits and vegetables, food safety, and general nutrition. During the first nine weeks, the Helpline team responded to 56 inquiries. Fifteen to twenty calls/inquiries are received each week. Inquiries are being answered within a day or two, and callers have expressed their appreciation for the assistance provided. The increase in calls indicates that this type of service is needed.

- c. Source of Federal Fund. Smith-Lever 3 (b) and (c).
- d. Scope of Impact. State Specific.

**GOAL 4: GREATER HARMONY BETWEEN AGRICULTURE AND THE ENVIRONMENT**

Overview:

Hawaii encompasses tremendous biological, physical, and social diversity within our small island ecosystems. CTAHR’s research and extension mission for goal 4 is “to develop, transfer, and promote the adoption of efficient and sustainable agricultural, forestry, and other natural resources conservation policies, programs, technologies, and practices that allow ecosystems to achieve a sustainable balance of agricultural activities and biodiversity. Smith-Lever 3(d) funded programs are integral part of our program in this goal area but are not reported here. These reports were filed as separate submissions to the appropriate national program leader. Most of our current portfolio of projects funded by formula or other funds has ground water protection, environmental pollutants, and sustainable forestry themes.

Waste management and remediation. Commercial livestock activities generate considerable solid and liquid wastes. Research continued on wastewater treatment for odor and nutrient control evaluated performance of an activated reactor for removal of odor, carbon and nitrogen. The humic substance added EMMC (Entrapped-Mixed-Microbial-Cell) technology enhanced simultaneous removal of organics, nitrogen, and odor causing sulfides and resulted in higher removal efficiency. The results suggested that both domestic and agricultural wastewater could be remediated using this technology.

Extension livestock faculty created curricula and delivered six statewide workshops for the local livestock industry. The producers were made aware of federal and state environmental laws and guidelines for best management practices (BMP’s). Hands-on training was provided on the basics of operating waste management systems, pollution prevention plans (PPP’s), and BMP’s for lagoon management, effluent irrigation, dry litter systems and composting.

Water quality research and extension. Because of the loss of formula-based Smith-Lever 3(d) funds, work on water quality planning, coordinating and staff development work ended. Grant proposals for competitive funding of the program were not successful.

Nonpoint-source pollution. Research continued on predicting and controlling soil erosion and nonpoint-source pollution. Polyacrilamide (PAM) showed varying effects on two Oxisols. One of the soils had a high clay content, was highly weathered, and well-structured. The other was lighter in texture and poorly aggregated. PAM was generally more effective with the latter. Hawaii Department of Transportation is interested in using PAM for stabilizing exposed road cuts.

ALLOCATED RESOURCES -- GOAL 4

Fiscal Year	Research Hatch Funds (\$)	Research State Funds (\$)	Research Other Fed & Non Fed Funds (\$)	Research Total Funds (\$)	Research Scientist Years (SY)
2000	150,171	495,934	536,416	1,182,521	4.3

Fiscal Year	Extension Smith-Lever Funds (\$)	Extension State Funds (\$)	Extension Other Funds (\$)	Extension Total Funds (\$)	Extension Faculty Years (FY)

2000	14,870	388,579	0	403,449	4.1
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Key Theme – Other (Harmony Between Agriculture and the Environment)

- a. Description of activity. Statewide Livestock Nutrient Management Education Project. 1) To plan, organize and deliver educational programs (including workshops, producer surveys, field research, on-farm demonstrations, a video, a producer manual, a website, and publications) for targeted livestock industry audiences. Producers will be made aware of the federal and state environmental laws and guidelines, best management practice options, comprehensive nutrient management plans, on-farm monitoring and utilization options. 2) To help targeted producers (dairy, swine, poultry, beef and slaughter industry segments) develop procedures for writing Pollution Prevention Plans (PPP) for livestock nutrient management. 3) Adoption of BMP's (lagoon management, effluent irrigation, dry litter system, composting) and/or new technologies by producers as a result of the educational curriculum and field demonstrations. Six statewide hands-on workshops were conducted from February 8 to 17, 2000. The objective of the program was: a) to update all livestock producers on the latest water quality laws. b) Have producers learn the basics of understanding and operating a waste management system, c) have producers initiate waste management plans with NRCS and DOH and finally d) have an educational program for producers to share farm experiences via producer to producer forum and field research. A total of 119 producers attended these workshops. (20-031)
  
- a. Impact/Accomplishment. The livestock producers workshops (6) accomplished the following: a) helped producers (119) understand the law as to compliance with the Clean Water Act and Coastal Zone Management; b) what is a comprehensive waste management plan (CWMP); c) a basic farm assessment and, d) a current update of waste management activity and best management practices occurring on farms in the state. 100% of the dairy and poultry industry and 55% of the larger swine producers attended the workshop. 1) The poultry industry (12) has already started on the waste management plans. A large-scale flagship, composting facility has been constructed on the Big Island that will serve as a demonstration model and hopefully clarify DOH rulings to compost making in Hawaii. 2) All large dairy farms (3) CAFO's (1000 animal units) have obtained their NPDES permit and other smaller dairies (7) have implemented their comprehensive waste management plans (CWMP's). One agent is currently working with six hog farmers and one goat dairy in implementing their CWMP with NRCS. The educational workshop series program has been funded another year with the NRCS EQIP program. Because of these workshops the livestock industry has been kept current and now knows how to comply with the new federal regulations. More field demonstrations using best management practices have been installed and the team is currently working on a collaborative study with Colorado State University.
  
- a. Source of Federal Fund. Smith-Lever 3 (b) and (c) and NRCS.
  
- a. Scope of Impact. State Specific.

Key Theme – Other (Harmony Between Agriculture and the Environment)

- a. Description of activity. Added Value Compost Cooperative. The project goals were 1) to establish a marketing cooperative for compost by agricultural producers. 2) To conduct a survey of imported compost presently on the market in order to determine standard composition and establish baseline information. 3) To conduct preliminary field trials by at least three different cooperators using locally produced compost. (20-030)
  
- a. Impact/Accomplishment. The program produced significant outcomes. A compost producer association was formed to develop locally produced compost instead of relying on imports. The association included row crop vegetable farmers (6) and livestock producers (4). A statewide survey of potential

markets and consumers (over 500) suggested that an island-produced product could compete with imports provided there were quality standards, adequate quantity and competitive pricing. Analyses of available imported products showed that they were not compliant with Hawaii Department of Health (HDOA) standards. HDOA is currently re-evaluating their regulations as to locally produced as well as imported compost products. Our goal of getting the livestock industry involved with large scale on farm composting as a best management practice is gaining support using an educational newsletter and hands-on workshops. Producers are learning the compost production technology and their products are competing well with imported products.

- a. Source of Federal Fund. Smith-Lever (b) and (c).
- a. Scope of Impact. State Specific.

#### Key Theme – Other (Harmony Between Agriculture and the Environment)

- a. Description of activity. Economic Impacts of Groundwater Pollution from Agricultural Chemicals in Hawaii. Research centered during this first year of the project on Objective 1. It involved three aspects: (a) identification of appropriate economic valuation techniques to determine the health effects of drinking water contamination; (b) Conceptualization of the identified approaches: averting behavior, cost-of-illness, and contingent valuation, and (c) review of primary and secondary data sources needed for implementation of selected approaches. Work on (a) is completed and work is continuing on (b) and (c). Preliminary discussions were also held with a number of individuals to clarify different issues pertaining to the three aspects noted above. (422H)
- a. Impact/Accomplishment. There are no significant accomplishments to report at this time.
- a. Source of Federal Fund. Hatch.
- a. Scope of Impact. State Specific.

#### Key Theme – Other (Harmony Between Agriculture and the Environment)

- a. Description of activity. Analysis and Fate of Environmental Pollutants. There are two objectives. The first is to develop low cost analytical methods that minimize organic solvent use. The second is to monitor pesticide contamination in Hawaii ground water and non-point source pollution in three watersheds. (617H)
- a. Impact/Accomplishment. Research continues on developing ‘solvent-free’ analytical methods. The methods include immunoassay, immunosensor, and supercritical or pressurized fluid extraction for polychlorinated biphenyl’s, polycyclic aromatic hydrocarbons, and pesticides. New contamination sites were identified and characterized in the Hawaiian Islands National Wildlife Refuge. Data on pesticide-fate in groundwater and agricultural fields are now being used for best management practices for pesticide use.
- a. Source of Federal Fund. Hatch
- a. Scope of Impact. State Specific.

#### Key Theme – Other (Harmony Between Agriculture and the Environment)

- a. Description of activity. Predicting and Controlling Soil Erosion and Nonpoint-Source Pollution in Hawaii. Soil erodibility is an intrinsic but dynamic property that can be manipulated by a variety of



methods, most commonly by changing land use, tillage scheme, and/or organic matter recycling. One of the emerging technologies for reducing erodibility and controlling soil loss in sediment source areas is treatment with soil conditioners. Polyacrilamide (PAM) is among such conditioners whose use has steadily expanded on the mainland U.S. Laboratory evaluations were performed on two Oxisols. (135H)

- a. Impact/Accomplishment. PAM was more effective on one of the two Oxisols. PAM's persistence against consecutive erosive simulated rainstorms and solar radiation seemed to exceed that reported in literature. The application of this complementary technologies may provide dramatic reduction in sediment load into the estuaries.
- a. Source of Federal Fund. Hatch.
- a. Scope of Impact. State Specific.

#### Key Theme – Other (Harmony Between Agriculture and the Environment)

- a. Description of activity. Animal Manure and Waste Utilization, Treatment, and Nuisance Avoidance for A Sustainable Agriculture. Develop and evaluate constructed wetlands, riparian zones, and other vegetative systems for treating animal wastewaters. Develop and refine physical, chemical, and biological treatment processes and engineering systems for management of manures and other wastes. Develop and refine methodology, technology and management practices to reduce odors, gases, airborne microflora, particulate matter and other airborne emissions in animal production systems. (518R)
- a. Impact/Accomplishment. The humic substance added EMMC (Entrapped-Mixed-Microbial-Cell) technology was investigated for simultaneous removal of organics, nitrogen and odor causing compound (sulfide) in a single reactor vessel. Both synthetic and actual domestic wastewater were investigated at room temperature of  $25 \pm 2$  °C. It was found that the removal efficiencies of COD, nitrogen, and sulfite were 97 %, 90 % and 92 %, respectively. For synthetic wastewater under the operational condition of HRT = 12 hours, 1 hour aeration and 1 hour non-aeration. For actual domestic wastewater, the removal efficiencies of COD, nitrogen, and sulfite were 75, 53.4, and 95.1 %, respectively. The lower removal efficiency for nitrogen is due to low ratio of COD/N contained in the actual domestic wastewater. Integrating EMMC technology for simultaneous removal of carbon, nitrogen and odor producing compounds contained in the wastewater provides a single and an effective way for wastewater treatment and reuse. Because of its easiness of developing a pre-fabricated package plant, it minimizes technical transfer procedures between the planners, designers and operators.
- a. Source of Federal Fund. Hatch MRF
- a. Scope of Impact. Multistate research.

#### **GOAL 5: ENHANCED ECONOMIC OPPORTUNITY AND QUALITY OF LIFE FOR AMERICANS**

##### Overview:

"Extension On-Line", Hawaii's State Strengthening Project, responds to the needs of children, youth, and families "at risk" through eight community-based sites. Computer literacy educational programs have been provided at all sites. The knowledge and skills gained from the "Extension On-Line" project enabled the Kau community to apply for and receive a three-year \$585,000 grant from the U.S. Office of Education for a 21st Century Community Learning Center project.

Over 600 copies of Hawaii Family Touchstones have been distributed to social service providers, funders, educators, legislators and policy-makers and national organizations. The publication reports on 36 indicators of family well-being, with indicators categorized as follows: (1) Portrait of Hawaii's families, (2) Financial Security, (3) Health and Safety, (4) Education and Achievement, (5) Social Conditions and Community Engagement, and (6) Family Relationships. Approximately 75% of the indicators are also posted on the Data Center on Children and Families. The web-based data center is located at the Center on the Family website (<http://uhfamily.hawaii.edu>).

The Agricultural Leadership Program (ALP) has 96 alumni. Most of the alumni continue to be active in the agriculture industry as well as their rural communities. In many instances, alumni are serving in leadership positions (e.g. in the Farm Bureau, Commodity Advisory Group, commodity organizations, agri-business, on government boards, in the legislature or county councils).

On Oahu, the Urban Garden Center made 15,191 contacts through various activities including non-formal classes, Harvest Fest for students, garden consultations, demonstrations, tours and plant sales. A total of 11,368 man-hours were volunteered by 103 people to plan, construct, enhance and maintain 18 different garden sites. Some of the topics covered in the programs offered include: growing houseplants, tropical fruits, vegetables, culinary herbs, citrus, ornamentals, and turf; controlling insects, diseases, and weeds; organic farming; landscape design; gardening with a handicap; composting; growing native Hawaiian plants; cultural practices (plant nutrition, pruning and plant propagation). On Maui, over 1,500 people were reached through clinics and various presentations and activities related to urban gardening. USDA Secretary Dan Glickman named Norman Nagata as Hawaii's Community Gardening Coordinator. Three newspaper articles written for the Sunday edition of The Maui News potentially reach 26,000 people. On Kauai, educational programs were offered on various urban gardening and entomology topics such as soil management, composting, fertilizers, insects, plant diseases, crop production and basic botany. A total of 2,146 people were reached through classes, demonstrations, displays, mail outs, and telephone and person-to-person consultations.

Three resource management programs made an impact on peoples' lives. In December 1999, participants in the "Money 2000" program reported having saved \$53,906 and reduced debt by \$4,980. In June 2000, the participants reported having saved \$7,540 and reduced debt by \$2,100. Twenty Oahu residents participated in a "Take Charge of Your Money" Telecourse. Nine feedback forms were received with the following response: 56% reported that "Take Charge of Your Money!" made them aware of what they can do to make changes in their life and 78% reported that the course made them think about how they currently do things. A survey of the 130 agencies which have utilized the "Food & Money Basics ... Choices & Decisions" [FMB] program showed that: (1) approximately 1,600 clients participated in FMB; 85% of the agencies responded that FMB improved their agency staff ability to assist client with managing their resources.

A series of lectures and workshops provided pertinent information and hands-on experiences that enabled 30 men and women in West Hawaii to gain an understanding of money management and to make informed financial decisions. It is estimated that 80% of those directly reached through this project (Take Charge of Your Money) have intentions of adopting one or more of the recommendations presented at the lectures and workshops and half would actually change/improve their money management behavior.

A total of 241,250 households and 469,760 persons were impacted with financial information and education provided via mass media. 3,284 persons were impacted via direct instruction, counseling, and/or resource materials. If 10% of the 469,760 total people reached via mass media read and responded in a way that produces a favorable value of \$10, the economic impact of the articles would be \$469,760. If 50% of the 3,284 individuals impacted directly respond to the information and education provided and the minimum favorable result is \$20 per person, the minimum economic impact is \$32,840. These very conservative estimates are provided to gain some sense of the minimal impact of this program. Actual data from selected financial counseling cases would indicate that lifetime economic benefits of \$10,000-\$20,000 per client are not uncommon.

On Oahu, the “Read to Me” project organized 100 youth and a couple of celebrity volunteers to read aloud to young children for National Book Week. Supplies were provided for a hands-on activity for the 1,000 youth who participated in the sessions. On Read Across America day, a total of 700 youth volunteers read to approximately 10,000 young children. On Kauai, 11 4-H members volunteered to participate in the Read To Me program and reached 160 K-2 children through the A+ after school program.

In the “4-H Feeding the Hungry” program, a calendar that featured artwork from students in grades K-6 and facts about hunger in Hawaii was produced. Proceeds from the sale of the calendar will be given to the Hawaii Foodbank. Other activities included making the public aware of hunger in Hawaii through 3 newspaper articles and activities at the State Farm Fair. Canned food and monetary donations were collected for the Hawaii Foodbank.

On Oahu, more than 200 items were added to the 4-H Educational Resource Library (ERL). Informational flyers describing the various programs in the ERL was distributed to schools. 3,495 contacts with school students were made through the ERL. 1,600 third graders throughout Oahu participated in Harvest Fest, a hands-on agriculture and science education program. Twenty educational stations were developed to enhance agricultural education provided to students. On Oahu, 450 7th and 8th graders from high risk communities participated in 4-H Agricultural-Environmental Science Day that was specifically developed for youth from high risk communities. On Kauai, school enrichment programs reached 190 students using the “Embryology and Watershed Exploration” curriculum. On Kauai, seven classroom presentations on Conservation Awareness Education reached 160 middle and high school students. These presentations taught students the importance and relationship of agriculture to food and how conservation of natural resources prevents environmental degradation. On Kauai, a program on “Agricultural Awareness Education” reached 1,200 Kauai students.

In a survey of 4-H youth the following was found: 72% of youth in 4-H clubs improved their overall fitness level through the establishment of correct eating, exercising, relating and coping habits; 72% of youth in 4-H clubs practiced and further developed decision-making skills; 62% of 4-H club members report a greater appreciation for learning as a result of their 4-H involvement; 82% of club members gained skills in working as a member of a group and worked on developing positive relations with others; 69% of 4-H club members learned and practiced positive ways to manage their resources; 61% of youth in 4-H practiced and improved communication skills. Over 2,000 4-H club youth increased their understanding of citizenship through their participation in service projects in their community.

As expected, the accomplishments under Goal 5 during the first year of the 5-Year Plan of Work were not very extensive. Also as expected, there were more extension accomplishments and fewer research accomplishments after the first year. In the future, more extensive accomplishments are expected in the Hawaii research and extension program areas of: (1) Community and Economic Development, (2) Data Collection and Reporting System for Children and Families, (3) Life Skills and Leadership, and (4) Family Education Programs.

ALLOCATED RESOURCES -- GOAL 5

Fiscal Year	Research Hatch Funds (\$)	Research State Funds (\$)	Research Other Fed & Non Fed Funds (\$)	Research Total Funds (\$)	Research Scientist Years (SY)
2000	52,362	452,721	172,856	677,939	4.4

	Extension Smith-Lever	Extension	Extension	Extension	Extension Faculty
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Fiscal Year	Funds (\$)	State Funds (\$)	Other Funds (\$)	Total Funds (\$)	Years (FY)
2000	321,436	836,077	0	1,157,513	19.1

Key Theme – Community Development

- a. Description of activity. To improve the state-wide capacity to support community-based programs for children, youth, and families "at risk." To improve the quality and quantity of comprehensive community-based programs for children, youth, and families at risk. (20-312).
- b. Impact/Accomplishment. "Extension On-Line", Hawaii's State Strengthening Project, responds to the needs of children, youth, and families "at risk" through eight community-based sites. Computer literacy educational programs have been provided at all sites. Many of the sites have offered assistance to adults to help them to prepare resumes and to search the Web for employment opportunities. The Community Site Facilitator in Waipahu applied for a community grant for a "RAPP" ("Read and Play for Pre-schoolers") project and received funding for \$3,000. "Kindergartners Are Most Precious" ("KAMP"), a "day camp" for kindergartners and their parents designed to provide a positive transition from home to school and to encourage parental involvement in their child's learning experiences at school has been implemented at each community site. The Kau community applied for and received a three year \$585,000 grant from the U.S. Office of Education for a 21st Century Community Learning Center project. Hawaii was selected as one of the sites for a "Youth Collaboration Project" involving Hickam Air Force Base and the 4-H Youth Development program. An educational theatre project, "Act 2 Act" involving 18 teens at Radford High School was developed. The students produced a play, "A Teen-ager Is..." which addressed every risky issue facing teens today. Two public performances reached over 1,000 teens and parents. Two Cloverbud 4-H clubs were established, one in Waipahu and the other in Kaneohe. These sites have not had traditional 4-H club programs in over 15 years.
- c. Source of Federal Fund. Smith-Lever 3 (b) and (c). Smith-Lever State Strengthening Grant
- d. Scope of Impact. State Specific.

Key Theme – Community Development

- a. Description of activity. Offer educational programs on various urban horticulture and entomology topics such as soil management, composting, fertilizers, insects, plant diseases, crop production and basic botany. Assist schools to establish gardens to be used in school curriculum. Develop an education program for the community on urban structural pests with emphasis on termites. (23-042)
- b. Impact/Accomplishment. A total of 2,146 people reached through classes, demonstrations, displays, mail outs, and telephone and person-to-person consultations. Two newspaper articles were written and posters and fact sheets were presented at the Agricultural Awareness event attended by 1,500 students. Through demonstrations and displays, a large number of the 40,000 people that attended the Kauai County Farm Bureau Fair were contacted.
- c. Source of Federal Fund. Smith-Lever 3 (b) and (c).
- d. Scope of Impact. State Specific.

Key Theme – Community Development

- a. Description of activity. Increase the knowledge of the volunteers that participate in the Master Gardener training program and enable volunteers to enhance their networking opportunities. Increase the opportunities for the residents of Hawaii to have access to gardening knowledge and to improve the opportunities for the residents to receive answers to their gardening questions. (22-036)
- b. Impact/Accomplishment. Maui. Over 200 people received help with their gardening questions at the plant clinic at the Maui Association of Landscape Professional's "Third Annual Lawn & Garden Fair." More than 150 people were helped at the plant clinic held at the Haiku Flower Festival. In total, it is estimated that over 1,500 people were reached through various activities, clinics, and presentations such as: Soil Conservation Awareness contest for students; growing papayas; on plant diseases; establishing a kitchen garden project to display useful plants that can be grown in a home garden; and grafting. USDA Secretary Dan Glickman named Norman Nagata as Hawaii's Community Gardening Coordinator. The Natural Resource Conservation Service provided a grant of \$3,000 to implement a community gardening project on the islands of Maui and Kauai. Three newspaper articles were written for the Sunday edition of The Maui News, which has a circulation of 26,000. Oahu. Approximately 3,000 people were reached through various activities, clinics, and presentations such as: growing houseplants; controlling insects, diseases and weeds; growing vegetables and fruits; planting a tree for Arbor Day; growing citrus; native Hawaiian plants and ecosystems; culinary herbs; growing orchids and other ornamentals; information on termites; plant nutrition; pruning and plant propagation; organic farming; dyeing Easter eggs with natural dyes; growing and maintaining turfgrass; landscape design and maintenance; growing lei flowers; gardening with a handicap; and composting.
- c. Source of Federal Fund. Smith-Lever 3 (b) and (c).
- d. Scope of Impact. State Specific.

#### Key Theme – Community Development

- a. Description of activity. Develop and maintain the Urban Garden Center. Develop and maintain garden plots for urban food production using environmentally sound practices for low income families and youth. Provide practical research and demonstration activities relating to urban horticulture. Develop publications and educational materials related to urban horticulture. Provide intensive training and hands-on educational programs and outreach activities. (22-040)
- b. Impact/Accomplishment. Through various non-formal classes, Harvest Fest for students, garden consultations, demonstrations, tours and plant sales 15,191 contacts were made with stakeholders. A total of 11,368 man-hours were volunteered by 103 people to plan, construct, and maintain 18 different garden sites. To enhance the various garden sites, 300 cultivars of hybrid hibiscus were planted in the hibiscus garden; garden trials of vegetable soybeans, lettuce, and radish were conducted; 57 new species/cultivars of garden plants were planted for evaluation and possible addition to the germplasm collection; 6 Poinsettia cultivars were planted in garden bowls and evaluated for capability to withstand exterior growing conditions. Four students ranging from intermediate to college students participated in the Summer Garden internship program.
- c. Source of Federal Fund. Smith-Lever 3 (b) and (c).
- d. Scope of Impact. State Specific.

#### Key Theme –Leadership Training and Development

- a. Description of activity. Provide workshops on using "Learning to Lead Collaboratively (LLC)." LLC enables groups to do collaborative problem solving. Provide workshops on using "Facilitating Strategic

Thinking and Planning (FSTP)." FSTP builds on the skills from the LLC workshop by providing additional tools and another framework that they can use to do strategic thinking and planning. (06-356)

- b. Impact/Accomplishment. The Agricultural Leadership Program (ALP) will have 96 alumni when Class VIII graduates in January 2001. Most of the alumni continue to be active in the agriculture industry as well as their rural communities. In many instances, alumni are serving in leadership positions (e.g. in the Farm Bureau, on Commodity Advisory Groups, in commodity organizations, in agri-businesses, on government boards, in the legislature or county councils). Five 2-day workshops on "Learning to Lead Collaboratively (LLC)" were provided across the State to generic audiences. As a result of one of these workshops, the administrator from Queen Lili'uokalani Children's Center arranged to have a special training provided for his Big Island staff. Two 2-day workshops on "Facilitating Strategic Thinking and Planning (FSTP)" were provided across the State to generic audiences. Two workshops on "Learning to Lead Collaboratively" were provided for most of the administrators, department heads and student leaders at Farrington High School.
- c. Source of Federal Fund. Smith-Lever 3 (b) and (c).
- d. Scope of Impact. State Specific.

#### Key Theme – Youth Development/4-H

- a. Description of activity. 4-H youth and families will learn livestock management, leadership skills, planning skills, organizational skills and competitiveness through county wide and state livestock shows. High school and district level vocational agricultural students will learn about the production value of agricultural lands. (23-021)
- b. Impact/Accomplishment. Six livestock shows were planned and conducted in the county reaching an estimated audience of 500. Seven classroom presentations on Conservation Awareness Education reached 160 middle and high school students. These presentations taught students the importance and relationship of agriculture to food and how conservation of natural resources prevents environmental degradation. Agricultural Awareness Education reached 1,200 Kauai students.
- c. Source of Federal Fund. Smith-Lever 3 (b) and (c).
- d. Scope of Impact. State Specific.

#### Key Theme – Youth Development/4-H

- a. Description of activity. Organized 4-H club members will participate in workshop and training sessions to gain knowledge in subject matter, develop leadership ability, and engage in program expansion and delivery. Youth, families and other members of the community will gain new knowledge and become involved in youth related activities. (23-053)
- b. Impact/Accomplishment. Twelve teens participated in an officer-training workshop covering teamwork, officer duties and parliamentary procedures. They learned how committees work together and were challenged to practice the skills learned in their various roles during the year. Thirty-four 4-H members did demonstrations at various events throughout the year. Eleven 4-H members volunteered to participate in the Read To Me program and reached 160 K-2 children through the A+ after school program. School enrichment programs reached 190 students using the Embryology & Watershed Exploration curriculum. Upon completion of the unit, one class participated in a national impact study on 4-H school programs.
- c. Source of Federal Fund. Smith-Lever 3 (b) and (c).
- d. Scope of Impact. State Specific.

## Key Theme – Youth Development/4-H

- a. Description of activity. To teach young people life skills which will enable them to be more self-confident and to think independently and interdependently as they accept responsible social roles. To expand the role of Extension programs by increasing efforts to recruit and train youth volunteers. To build the volunteer ethic in communities, particularly among youth with higher risk factors where research shows the need for volunteer assistance is greatest. To broaden client access to extension information through a variety of formats and media. (22-060)
- b. Impact/Accomplishment.

4-H Read to Me. For National Book Week, a total of 100 youth and a couple of celebrity volunteers read aloud to young children. Supplies were provided for a hands-on activity for the 1,000 youth who participated in the sessions. Hawaii State Teachers Association with 20 youth volunteers and 3 adult volunteers took part in their Read Across America day promotion at the Governor's Mansion by reading aloud to young children. A total of 700 youth volunteers read to approximately 10,000 young children on this one day. The project has provided opportunities for 250+ youth who do not have ties with 4-H clubwork to provide service to their community as well as becoming familiar with the 4-H program. Of the 108 youth participants who returned an evaluation survey, 77 percent indicated that they had a good to excellent experience with this project. In their comments, the youth volunteers indicated that the aspect that they enjoyed the most was working with the young children. Following their Read to Me experience, 85% of the participants indicated that they plan to continue their volunteerism in some way.

4-H Feeding the Hungry. A team of 12 youth and 6 adults initiated a plan to increase the awareness of hunger in Hawaii. The following activities were implemented: (1) Sponsored an art contest open to all K-6 students on Oahu. (2) A calendar featuring the 12 winning entries plus facts about hunger in Hawaii was produced. Proceeds from the sale of the calendar to be given to the Hawaii Foodbank. (3) Hunger Awareness activities were sponsored at the State Farm Fair. (4) Media support generated resulted in 3 articles in the local newspapers, an appearance on a local television show and flyers being displayed at businesses in the community. (5) Collection of canned food and monetary donations for the Hawaii Foodbank. 92 percent of the youth participants felt that their efforts made a difference in the community. 96 percent reported that they had a greater understanding of community needs after the completion of the project.
- c. Source of Federal Fund. Smith-Lever 3 (b) and (c).
- d. Scope of Impact. State Specific.

## Key Theme – Youth Development/4-H

- a. Description of activity. The 4-H Educational Resource Library (ERL) will have 200 educational items added to its inventory. Educators or volunteer leaders will utilize the ERL materials and/or services to provide educational programs for 5-19 year old youths. A curriculum and activity schedule for the Urban Garden Center (UGC) as an outdoor classroom will be developed and implemented for grades K-6. (22-063)
- b. Impact/Accomplishment. More than 200 items were added to the 4-H Educational Resource Library. The ERL catalog was revised and updated. Informational flyers describing the various programs in the library were distributed to schools. 3,495 contacts with school students were made through the ERL.
- c. Source of Federal Fund. Smith-Lever 3 (b) and (c).
- d. Scope of Impact. State Specific.

### Key Theme – Youth Development/4-H

- a. Description of activity. Expand the youth outreach programs to meet the needs of youth at risk. Collaborate and coordinate with community agencies and organizations to develop programs to address the specific needs of the youth. Develop and deliver programs for the most susceptible youth that build strengths and treat causes rather than symptoms. Implement youth programs to develop the following: life skills, self-esteem, leadership skills, communication skills and organizational capability. Coordinate Agricultural/Environmental Science Programs for youth. (22-070)
- b. Impact/Accomplishment. 1,600 third graders throughout Oahu participated in Harvest Fest, a hands-on agriculture and science education program. Twenty educational stations were developed to enhance the agricultural education provided to students. Evaluations received from students revealed that 93% of students in attendance gained knowledge about agriculture. Teachers' evaluations indicated that the learning stations were informative and students were interested in the programs. 450 7th and 8th graders from high-risk communities participated in 4-H Agricultural-Environmental Science Day. This program was specifically developed for youth in high-risk communities. At one elementary school, 167 kindergartners, parents, school staff, and volunteers participated in "Kindergartners Are Most Precious" (KAMP). KAMP is a school transition day camp for kindergartners and their parents to promote school readiness and enforcing parental involvement. 480 fifth graders participated in an educational, fun and interactive water celebration through the 4-H Keiki Water Festival-National Project, WET Education Day.
- c. Source of Federal Fund. Smith-Lever 3 (b) and (c).
- d. Scope of Impact. State Specific.

### Key Theme – Youth Development/4-H

- a. Description of activity. Create a functioning comprehensive volunteer instructor personnel system for 4-H youth development. Create a functional statewide database of volunteer 4-H instructors. (04-053)
- b. Impact/Accomplishment. The value of the volunteer time is measured by number of volunteer hours times \$14.00. The average volunteer spends 220 hours per year (or \$3080 in dollars per leader), drives an average of 400 miles in personally owned car and spends an average of \$300 of his/her own money. Hawaii will record over 2,500 volunteers for this year. 90% of volunteers teach or coordinate the teaching of at least six lessons in a standard 4-H project to at least three 4-H members. 80% of volunteers prefer to be short-term volunteers.
- c. Source of Federal Fund. Smith-Lever 3 (b) and (c).
- d. Scope of Impact. State Specific.

### Key Theme – Youth Development/4-H

- a. Description of activity. Participating youth will improve their overall fitness level through the establishment of correct eating, exercising, relating and coping habits. Participating youth will increase their financial and time resource management skills. Participating youth will know the essential components of planning for their future and improving their decision-making skills with regards to future education, career, family and lifestyle. Participating youth will value the family as the primary unit of society. Participating youth will improve their abilities to relate in the family unit. (04-051)



- b. Impact/Accomplishment. 72% of youth in 4-H clubs improved their overall fitness level through the establishment of correct eating, exercising, relating and coping habits. 72% of youth in 4-H clubs practiced and further developed decision-making skills. 62% of 4-H club members report a greater appreciation for learning as a result of their 4-H involvement. 82% of club members gained skills in working as a member of a group and worked on developing positive relations with others. 69% of 4-H club members learned and practiced positive ways to manage their resources. 61% of youth in 4-H practiced and improved communication skills. Over 2,000 4-H club youth increased their understanding of citizenship through their participation in service projects in their community. Over 2,500 youth were involved in career exploration and or/developed resumes, skills in interviewing, and other job skills. 82% of 4-H youth know the essential components of planning for their future and improving their decision-making skills with regards to future education, career, family and lifestyle. 82% of 4-H youth value the family as the primary unit of society. 72% of 4-H youth improved their abilities to relate in the family unit.
- c. Source of Federal Fund. Smith-Lever 3 (b) and (c).
- d. Scope of Impact. State Specific.

Key Theme – Family Resource Management

- a. Description of activity. Extension clientele will: (1) Improve their understanding of family issues which threaten their well-being and develop strategies to take control of their lives. (2) Increase their knowledge of financial planning and management skills. (3) Enhance their knowledge of basic family management skills necessary to become competent and contributing members of society. (20-350)
- b. Impact/Accomplishment. A series of lectures and workshops provided pertinent information and hands-on experiences that enabled 30 men and women in West Hawaii to gain an understanding of money management and to make informed financial decisions. It is estimated that 80% of those directly reached through this project (Take Charge of Your Money), have intentions of adopting one or more of the recommendations presented at the lectures and workshops and half would actually change/improve their money management behavior.
- c. Source of Federal Fund. Smith-Lever 3 (b) and (c).
- d. Scope of Impact. State Specific.

Key Theme – Family Resource Management

- a. Description of activity. Participants will increase their knowledge of personal financial planning. Participants will learn skills to determine problem areas in their spending habits. Participants will learn techniques in family resource management that will result in improved utilization of their available resources. Participating children will learn techniques in family resource management and they will develop strategies to meet their goals. Agency personnel will receive training to improve their ability to assist clientele in managing their available resources. (22-092)
- b. Impact/Accomplishment.
  - Money 2000. Progress reports are solicited from registered participants twice a year. In December 1999, participants reported having saved \$53,906 and reduced debt by \$4,980. In June 2000, participants reported having saved \$7,540 and reduced debt by \$2,100. The Website received 1,409 hits.
  - Take Charge of Your Money. Twenty Oahu Residents participated in a Telecourse. Nine feedback forms were received with the following information: (1) 56% reported that "Take Charge of Your Money!" made them aware of what they can do to make changes in their life and (2) 78% reported that the course made them think about how they currently do things. The Website received 992 hits.

Food & Money Basics ... Choices & Decisions. An evaluation survey of the 130 agencies that have utilized "Food & Money Basics ... Choices & Decisions" [FMB] since conception of the program (private non-profit community services, elderly housing, financial institution, senior association, private non-profit, social service agencies, schools, churches, and government agency) was conducted. There was a 40% response rate. Approximately 1,600 clients participated in FMB. 31% of the agencies used FMB between 3-4 times. 27% used FMB 6 or more times since initial training. 85% responding felt FMB improved their agency staff ability to assist client with managing their resources. Agencies were asked to rate their clients' abilities to do the following after completing FMB (fair to good): Write a goal--88%, Establish a budget--92%, Save money--76%, Make money last to the end of the month--86%, Plan meals using the Food Guide Pyramid--89%.

c. Source of Federal Fund. Smith-Lever 3 (b) and (c).

d. Scope of Impact. State Specific.

### Key Theme –Family Resource Management

a. Description of activity. Enhance the consumer/financial development of older youth/young adults. Improve the resource utilization skills of limited resource individuals and families. Improve the retirement knowledge, preparation and decision making of older adults. Enable family members to clarify, understand and resolve important financial issues affecting their financial progress and security. (06-357)

b. Impact/Accomplishment.

A total of 172 family resource centers were established and/or strengthened with the training and resources provided. Observable/documented impacts are: (1) participants are able to perform financial education and counseling tasks; (2) participants in spot check reported that average use of abilities acquired is in excess of 60 times per participant per year at minimum; (3) estimated savings to clients estimated to exceed \$500 per client at minimum in terms of losses avoided or gains achieved. Estimated economic impact of 140 total counselor trainees now in practice and with only half of their 60 annual counseling contacts resulting in a client benefit of \$500 or more, the result would be over 2 million dollars per year conservatively.

A total of 241,250 households and 469,760 persons were impacted with financial information and education provided via mass media. 3,284 persons were impacted via direct instruction, counseling, and/or resource materials. The estimated economic benefit based on letters, faxes and personal communications indicate that the mass-media articles were well-received by readers of the Honolulu Advertiser and Financial Connections. If 10% of 469,760 total persons reached by these articles read and responded in a way that produces a favorable value of \$10, the economic impact of the articles would be \$469,760. Of the 3,284 persons impacted directly, the estimated value would be commensurately higher. At least 50% of these individuals respond to the information and education provided (actual positive response is above 99% as indicated on evaluation instruments) and the minimum favorable result is estimated to be at least \$20 per person (actual cases indicate it is frequently much more), resulting in a minimum economic impact of \$32,840. These very conservative estimates are provided to gain some sense of the minimal impact of this program. Actual data from selected financial counseling cases would indicate that lifetime economic benefits of \$10,000-\$20,000 per client are not uncommon. As an example, an individual that decides to initiate a game plan to get out of debt usually saves thousands of dollars in interest in the short-term and frees significant income for increased spending, saving, and investment in the long-term. A widow or divorcee who is enabled to revise her financial position in keeping with changed needs and reduced resources is often able to save thousands in expenses that would have continued unchecked and resources that would have been misdirected. A retiree who is enabled to see the pitfalls of transferring resources unwisely, entering into costly but irreversible exchanges, or neglecting needed financial protections can frequently save thousands or tens of thousands in resources that would have been swallowed by unnecessary fees, taxes, surrender charges, and the like.

- c. Source of Federal Fund. Smith-Lever 3 (b) and (c).
- d. Scope of Impact. State Specific.

Key Theme – Other (Data Collection and Reporting System for Children and Families)

- a. Description of activity. To review and refine the initial set of indicators developed by the Hawaii family policy academy. To develop print and electronic reports on the well-being of Hawaii's families. To disseminate reports on the well-being of Hawaii's families and educate policy makers, community leaders, program managers, and others on the findings. (06-353)
- b. Impact/Accomplishment. Hawaii Family Touchstones was published in November 1999. Over 600 copies of Hawaii Family Touchstones have been distributed to social service providers, funders, educators, legislators and policy-makers, and national organizations doing similar work. In addition, project staff have made presentations on Hawaii Family Touchstones to local and national audiences. The publication reports on 36 indicators of family well-being, with indicators categorized as follows: (1) Portrait of Hawaii's families, (2) Financial Security, (3) Health and Safety, (4) Education and Achievement, (5) Social Conditions and Community Engagement, and (6) Family Relationships. Approximately 75% of the indicators are also posted on the Data Center on Children and Families. The web-based data center is located on the Center on the Family website (<http://uhfamily.hawaii.edu>).
- c. Source of Federal Fund. Smith-Lever 3 (b) and (c).
- d. Scope of Impact. State Specific.

**STAKEHOLDER INPUT PROCESS**

In the Plan of Work for 2000-2004, Hawaii indicated that it would employ a variation of the long-standing "CTAHR Industry Analysis" process to obtain input from stakeholders. In the past, this process was effective in transferring stakeholder input into research and extension programs that addressed stakeholder issues.

While plans were being developed to implement the Industry Analysis process, it became obvious that CTAHR would have a new Dean. Since the Industry Analysis process is very time consuming and labor intensive, the implementation of the Industry Analysis process was put on hold until the new Dean was hired. It would be appropriate for the new Dean to have major input in developing the stakeholder input process for Hawaii. How stakeholder input is obtained and how stakeholder input is used may be major factors in determining how successful the new Dean will be as the leader of the Hawaii research and extension programs.

The Hawaii "Stakeholder Input Process" will be developed in FY 2001. A revision of the Hawaii POW will be submitted to describe stakeholder input process that will be used.

**PROGRAM REVIEW PROCESS**

There is no significant changes in the "Program Review Process" that will be used in Hawaii.

**EVALUATION OF THE SUCCESS OF MULTI AND JOINT ACTIVITIES**

In FY 2000, program planning and implementation of new multi and joint activities were essentially put on hold as Hawaii made the transition from an Interim Dean, Interim Associate Dean for Research, and Interim Associate Dean for Extension to a permanent Dean and permanent Associate Deans. Existing multi and joint programs were continued in FY 2000. These programs include: (1) continuing research and extension

integrated projects that are listed in the POW; (2) the Hatch Multistate Regional Projects that are listed in the POW; (3) the Agricultural Development in the American Pacific (ADAP) project that involves American Samoa Community College, The University of Guam, The College of Micronesia, Northern Marianas Community College and The University of Hawaii; and (4) the Tropical and Subtropical Agriculture Research program that involves University of Hawaii, University of Guam, University of Florida, University of Puerto Rico, and University of the Virgin Islands.

With a Dean and Associate Deans for Research and Extension in place, Hawaii will initiate planning and implementation of new multi and joint activities. Hawaii will be in a better position to provide an evaluation of multi and joint activities in the POW Annual Report for FY 2001. Because of Hawaii's geographical location, it is unlikely that Hawaii will have a significant level of extension multi-state activities.

### **MULTISTATE EXTENSION ACTIVITIES**

Form CSREES-REPT (2/00) is attached (hawaii multi activities.doc).

### **INTEGRATED RESEARCH AND EXTENSION ACTIVITIES**

Form CSREES-REPT (2/00) is attached (hawaii multi activities.doc).