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Faculty	Department*	Expertise	Research Output	Economic Importance
J. Brewbaker	TPSS	Plant Breeding	Sweet corn varieties. Grain and silage corn varieties. *Leucaena* varieties for fodder and for wood. Hybrid Koa varieties.	The sweet corn varieties are well established and predominate in the Hawaii market, with mainland winter market potential. Fodder, grain, and silage are important to sustaining livestock production in Hawaii. Koa wood is very high value,
J.K. Wang	MBBE	Products and Processes in Aquaculture	Continuous Production of Marine Diatom *Chaetoceros* SPP. A patent was obtained for "antibacterially active extracts from the marine algae *Chaetoceros* spp. and methods of use."	Compounds extracted from the marine diatom display antibacterial properties. The technology will be used in freshwater and marine ornamental fish industries.
W. Su	MBBE	Bioprocess Engineering	Development of novel processes and products from plants and other biological systems. Large-scale fermentation and cell culture processes. Scaling up fungal bioprocess for producing high-value bioactive compounds.	Creation of new products and processes -- this research has direct collaboration with private firms.
T. Sylva C. Kinoshita	MBBE	Biotreatability Testing Systems and Protocols	Laboratory-scale biotreatibility test systems and testing protocols to assess the feasibility of implementing a biologically-based remediation solution and design the optimal treatment train for that solution.	Removing environmental pollutants will increase the productivity and economic value of land and water resources.
C. S. Tang	MBBE	Floating Growth Medium Modules	A lightweight, floating growth medium package for cultivation of selected terrestrial plants in seawater.	Practice marine agriculture or, agriculture on the sea, that can be used for multiple purposes, ranging from environmental protection to landscaping to crop production.
H. Ako	MBBE	Aquaculture Industry Support	(1) Breeding protocols, larval rearing protocols, and grow-out protocols for aquaculture; cost effective aquaculture water re-circulation system; (2) coqui frog eradication methods.	(1) Reduced cost of aquaculture systems will make the aquaculture industry more competitive. (2) The coqui frog is an alien pest that threatens property values and the tourism industry by producing unacceptable noise levels.

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D. Christopher	MBBE	Plant Biotechnology	(1) Control senescence of Anthuriums, to enhance flower and daughter plant production and post-harvest life of; (2) Use of biotechnology to make pineapple plants that are naturally resistant to nematodes.	(1) Improves value of anthuriums. Reduces post-harvest losses, improves marketability, reduces labor-intensive treatments needed to increase shelf life. (2) Current practices to control nematodes with fumigants will not be available as the chemicals will be banned soon because they pose a threat to the environment.
L. Gautz	MBBE	Coffee Machinery Development	(1) A model for coffee pruning has been developed, to allow comparison of pruning methods both by effects on yields and cost of operations. (2) A sorter of individual beans. (3) High value products from coffee pulp and mucilage.	(1) Increased yields and reduced costs. (2) Coffee pricing is based largely on the place of origin of the beans. (3) Income generation from coffee by products.
Q. Li	MBBE	Environmental Biochemistry	(1) Antibodies specific to pesticides and common environmental pollutants; (2) phytoremediation to remediate chemical-contaminated sites.	Removing environmental pollutants will increase the productivity and economic value of land and water resources.
T. Liang	MBBE	Alternative Uses for Plant Fiber	A low cost machine for partitioning sugarcane into feed and fiber.	Increase the value of sugarcane and lower the feed cost for beef and dairy production
J. Moy	MBBE	Pest Control in Post Harvest Food Commodities	Disinfestation technique as a quarantine treatment. Efficacy of using irradiation to control fruit flies and other pests in post-harvested fresh produce.	Permits entry into markets with quarantine requirements.
R. de la Pena	NREM	Crop Breeding	Breeding for insect and disease resistance in taro. Taro hybrids have been developed.	Taro is a traditional crop in Hawaii with continued economic importance. Also, taro is now being used in new food products.

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J.B. Friday	NREM	Forestry	(1) High-value hardwood tree trials of 6 species; (2) Silvicultural practices for koa; (3) Documentation of ecological risks of plantation forestry from invasion of tropical ash into native forest.	(1) These species would serve as the basis for establishment of a diversified forest industry in Hawaii; (2) Koa can be used to reforest unproductive pasture land; (3) The information will be necessary for development of plantation forestry in Hawaii.
J. Cho	PEPS	Plant Pathology	Disease resistant tomato lines with high yield, good quality, and extended shelf life.	Permits tomato production in disease prone areas, and allows vine ripening of tomatoes so that flavor is improved and a higher price can be received.
M.K. Kawate	PEPS	Pesticide Registration	Field efficacy and residue trials to register pesticides for Hawaii crops.	The registration allows the pesticides to be legally used, and thus reduce crop losses when other methods will not work.
S. Ferreira	PEPS	Plant Pathology	(1) Disease management tools and strategies for crop diseases, to reduce dependence on crop control chemicals. (2) Broadening the strain specific nature of transgenic resistance in commercialized papaya varieties.	Papaya industry, with a value of $15-$18 million/p.a., has been revived after a near catastrophic infection of disease that these strains are now resistant to.
S. A. El-Swaify	NREM	Soil and Water Conservation	(1) Monitoring, predicting, and controlling soil erosion, sedimentation, and non-point source pollution of estuaries. (2) Diagnosis of salinity problems in soil and water, and prescription of remedial measures; (3) Evaluating quality of water supplies for irrigating tropical soils; (4) Technology development for soil and water conservation planning; (5) Solutions to land degradation problems and conservation needs of former plantation lands now changing to diversified agriculture.	The water and land are the basic resources for the agricultural industry, and the sustainability of the industry is inherently linked to the use of these resources.

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A. Alvarez	PEPS	Plant Pathology	(1) Hybridoma cell lines that produce specific antibodies for phytopathogenic bacteria (190 cell lines have been generated and licensed). Technology being used to detect and control pathogenic bacteria in anthuriums, ginger, tomatoes. (2) Characterization of bacterial pathogens that limit exchange of orchid germ plasm between Hawaii and South America. (3) Analysis of bacterial diseases of macadamia; (4) Identification of bacterial species used in bio-remediation of polycycic aromatic hydrocarbons in Hawaii soils.	Revenues, 1999-2000, for affected crops: anthuriums, $6,496,000; ginger, $8,050,000; tomato, $5,610,000; potted orchids, $13,355,000. Bioremediation technology is applicable to use in cleanup of superfund sites.
S.C. Nelson	PEPS	Plant Pathology	Evaluation of: banana varieties for disease resistance and awa varieties for nematode resistance; as well as control of awa disease and determination of disease etiology for disease of awa and noni.	Results from research in disease etiology has prevented farm failures on the Island of Hawaii. Evaluation of varieties can reduce or eliminate cost of fungicide applications.
M.W. Johnson	PEPS	Entomology	Pest management programs, primarily based on biology and cultural techniques, to suppress insect and mite pests in pineapple, broccoli, papaya.	Pest control will reduce crop losses. These management practices reduce outlay for pest control and reduce environmental risk of pesticides.
A. H. Hara	PEPS	Entomology	Efficient and environmentally safe pest management practices and post-harvest treatments for the floriculture and nursery industry.	Higher profitability has been realized due to reduced cost of pest control and elimination of shipment rejections due to quarantine pests.
J. Hu	PEPS	Plant Pathology	Biotechnology to control banana disease. Assays developed in the study are used for detection of disease in stocks. Developed gene constructs and transformed banana plants for resistance to banana bunchy-top disease.	Use of insecticides is reduced, meaning lower production costs and less environmental risk.

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J.K. Grace	PEPS	Entomology	Management of termites. Genetic markers have been developed to determine long-term efficacy of control methods. Application of biotechnology to development of control products (provisional patent granted). Development of wood preservatives, testing of new baits, and testing soil insecticides.	Termites are responsible for annual costs in excess of $100 million/p.a. in Hawaii. Some of the work has application beyond Hawaii.
R.T. Hamasaki	PEPS	Extension	(1) Relationship between oxidation-reduction potential of flooded soil and taro yield. (2) Optimum nitrogen inputs for papaya. (3) A new material for amending metal toxicities in acid soils.	(1) Potential to taro production efficiency with better environmental stewardship due to less nitrogen fertilizer applied. [farm value of taro in 2000: $3.7 million] (2) Better environmental stewardship due to less nitrogen fertilizer applied and higher profitability in papaya production. (3) Lower cost of pineapple production by reducing amount of spraying, as well as increased yield and marketable fruit.
R. Messing	PEPS	Entomology	Biological control of arthropod pests of agricultural crops. A new aphid parasitoid has been introduced that attacks the melon aphid (a pest of cucurbits, citrus, taro, and other crops). Several other parasitoids have been identified and are awaiting permits pending quarantine host range studies.	Reduction in crops losses, and reduced use of pesticides.
R.K. Nishimoto	PEPS	Weed Science/ Management	Weed control practices for agriculture and recreational areas in Hawaii.	Reduced labor and chemical costs for weed control.
J.J. Ooka	PEPS	Plant Pathology	Management of diseases of root crops (ginger, awa, olena, taro) with "green" or near "green" pesticides or cultural means.	Reduced environmental risk and reduced production costs.
K.G. Rohrbach	PEPS	Plant Pathology	Development of pest bait stations in pineapple fields to control an insect pest.	Reduced environmental risk and reduced production costs.

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S.H. Saul	PEPS	Entomology	Non-toxic control techniques for Hawaiian fruit flies, using broad based genetics that integrates traditional and molecular biological approaches.	Reduced environmental risk and reduced production costs.
J. Seifert	PEPS	Pesticide Chemistry	Determination of the toxic effects of organophosphate insecticides.	Reduced environmental risk and reduced production costs.
B.A. Kratky	TPSS	Horticulture	Hydroponic technology (patents have been received.)	Reduced cost of growing high value crops.
A. R. Kuehnle	TPSS	Breeding and Biotechnology of Orchids	Biotechnology protocol for orchid genetic engineering has been improved. Two new varieties of dendrobium orchids were released for production.	Orchids are a major industry in Hawaii and the new varieties will contribute to this industry. The new protocol will benefit orchid researchers.
M. Habte	TPSS	Soil Biology/ Biochemistry	Identification of physical, biological, and chemical variables that influence development of beneficial soil fungi for use in containerized nursery production systems.	Production of nursery seedlings with minimal chemical nutrients and pesticides, and establishment of the seedlings in the field rapidly with minimal chemical inputs.
R.A. Criley	TPSS	Horticulture	Propagation protocols for native plants. Knowledge of tropical ornamentals -- productivity, physiological responses, etc.	Increased market opportunities for landscape industry, including export of plants to the mainland USA.
K. Fleming	TPSS	Farm Management Economics	Cost of production for coffee.	Increased farm profitability; and reduced financial, production and marketing risk for agricultural producers and consequently increased sustainability of agriculture and rural communities.
E. Trujillo	PEPS	Plant Pathology	Development of three taro cultivars which outperform the indigenous Hawaiian cultivars. They are resistant to taro leaf blight.	The taro industry is currently valued at $3.7 million, with the potential to be valued at $50 million if it includes value-added products. Taro is know for its hypoallergenic properties.
C. Weems	HNFAS	Reproductive Physiology	Reduction of embryonic loss in ruminants.	Enhanced productivity in domestic ruminants (sheep).

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M. Nagao	TPSS	Horticulture	Identify new macadamia cultivars (varieties) that have higher yield and quality and are tolerant to pests, diseases and environmental stresses.	Production of macadamia nuts from CTAHR varieties is approximately $29.5 million per year.
H. C. "Skip" Bittenbender	TPSS	Horticulture	(1) Mechanization of coffee harvesting, (2) Kava ('awa)- evaluating production/management practices; determining kava lactone concentration via a less costly method.	Coffee production was valued at $23 million in 2000. The mechanized harvesting method reduces pruning cost by over 10 times. Kava promises to be a multi-million dollar industry if Hawaii can supply a high kava lactone product in the shortest crop cycle.
R. Paull	TPSS	Plant Physiology	Post-harvest research in tropical fruit, vegetables, and flowers. (1) Papaya – evaluate pest and disease control practices to minimize pesticide use. (2) Litchi, rambutan, carambola and atemoya – reduce or avoid injury experienced during insect disinfestation. A procedure has been developed to preserve the skin color yet allow the fruit to withstand the treatment. (3) Tropical flower and foliage – a new treatment has been developed that doubles the vase-life of most anthurium varieties and extends some tropical flowers by 50%. (4) Pineapple – to improve fruit quality through genetic transformation. (5) New hybrid varieties of pineapple. Focus on the acid metabolism of the fruit. (6) Developed slow ripening lines of papaya. These lines take up to 50% longer to soften.	Papaya production is worth $16 million to Hawaii. Potential to expand diversified agriculture. The flower and nursery production is valued at $83 million in 2000. The percent growth increased by 10% from 1999. Pineapple production is the number one agricultural industry. Reduce the costly early flowering induced by low temperatures and shorter days.

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S. Malecha	HNFAS	Animal Science	Developing an all-female sex control technology in marine shrimp using recombinant Androgenic hormone to sex reverse commercial broodstock	Yields in marine shrimp can be increased using all-female production. Aquaculture production was $22 million in 2000, a 22% increase from the previous year.
H. Zaleski	HNFAS	Swine Research	(1) Supports hog farmers in the prevention of porcine reproductive and respiratory syndromes. (2) Livestock water management – develop methods for handling wastes. (3) Artificial insemination (AI)of swine.	Hawaii hog production is valued at $5 million. This disease can reduce half of a farm's gross income. A.I. allows the farmer to improve genetics and reduce inbreeding at lower costs and lower disease risk.
C. N. Lee	HNFAS	Dairy Specialist	(1) Improving reproductive performance in dairy cattle. (2) Reducing heat stress in dairy cattle. (3) Improving embryonic survival in early pregnancy.	Savings to Hawaii's dairy industry are estimated at $2 million per year.
C. Ferguson	NREM	Resource Economics	(1) Irrigation water policy, to assist business planning for use of irrigation systems formerly owned by plantations. (2) Evaluation of papaya industry promotion program.	(1) Efficient use of the extensive irrigation infrastructure on former plantation land is a critical factor in a transition to diversified agriculture. (2) Market expansion and development is critical for sustaining the papaya industry.
G. Vieth	NREM	Resource Economics	Non-market valuation of agricultural land; recreational valuation of resources; and the value of landscaping to the hotel and resort industry.	The non-market value of resources impacts the success of the tourism industry and the long-term stability of agriculture.
C. Evensen	NREM	Livestock Waste (Effluent and Manure) Management	Determination of (1) maximum sustainable application rates of livestock waste; (2) the biochemical reactions of nitrogen and phosphorous in manure-applied soils; and (3) environmentally sound, comprehensive nutrient management plans.	Safe land application and crop utilization of livestock manures and effluent that will reduce environmental impacts of leaching, runoff and discharge of nutrients and pathogens into groundwater and surface waters.

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R. Bowen	NREM	Resource Economics	Economics of (1) composting: (2) water and land use policy in Hawaii: and (3) and Agritourism potential in Hawaii.	(1) Compost is an alternative fertilizer with economic value to suppliers and commercial farmers; (2) water and land use policy affects development potential of these resources; (3) agri-tourism has income generation potential and revenue diversification opportunities for farmers.
J. Yanagida	NREM	Resource Economics	(1) Economics and financial analysis of tree farming in Hawaii; with information publications, and a spreadsheet template for individualized financial calculations. (2) Understanding of business-family interactions, and support systems to increase stability and security of families who own and operate a family business.	The economic value of trees and forestland can be determined using this information.
W. Iwaoka	HNFAS	Value-added product research	Development of food products from local raw, semi-processed crops, or waste and by-products.	Over two dozen possible new products have been developed, and one commercialized. This research has both immediate economic impact and great potential.

*Departments:

NREM Natural Resources and Environmental Management
PEPS Plant & Environmental Protection Sciences
TPSS Tropical Plant and Soil Sciences
MBBE Molecular Biosciences and Biosystems Engineering
HNFAS Human Nutrition, Food and Animal Sciences