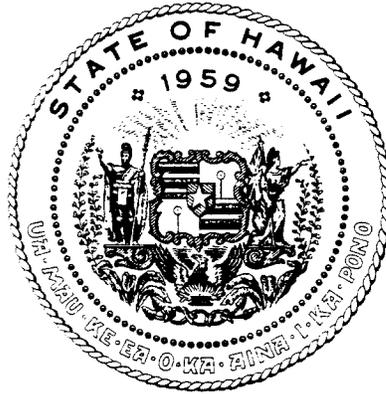


The Hawaii State Plan



AGRICULTURE

STATE FUNCTIONAL PLAN
1991

The Hawaii State Plan



AGRICULTURE

Preparation of this Functional Plan was coordinated by the
DEPARTMENT OF AGRICULTURE
in accordance with Chapter 226, Hawaii Revised Statutes.

Submitted By *Yukio Kitagawa* Date *Dec. 21, 1990*
Yukio Kitagawa, Chairperson

Approved By *John Waihee* Date *May 22, 1991*
John Waihee, Governor, State of Hawaii



EXECUTIVE CHAMBERS
HONOLULU

JOHN WAIHEE
GOVERNOR

FOREWORD

Agriculture -- once the centerpiece of our island economy -- has nourished us and provided the trade and commerce for our communities to prosper. Now, there is mounting pressure to put agricultural land, water, and human resources to use in other sectors of our economy, and our agricultural industries are facing stiff competition in an increasingly global marketplace.

This Plan demonstrates our commitment to assisting our agricultural industries in successfully responding to these challenges. Services to farmers will be improved and expanded to help them tackle problems in agricultural production, marketing, or distribution. We will also increase our efforts to find environmentally sound ways to manage agricultural pests and diseases and to protect the land and water resources needed to sustain agriculture.

Implementation of this Plan will help both agricultural producers and consumers in making the adaptations needed, if agriculture is to remain an important and vital part of our islands' economy.


JOHN WAIHEE

JOHN WAIHEE
GOVERNOR



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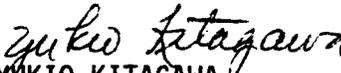
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PREFACE

The mission of the State Agriculture Functional Plan is to increase the overall level of agricultural development in Hawaii, in accordance with the two fundamental Hawaii State Plan objectives for agriculture: continued viability in Hawaii's sugar and pineapple industries, and continued growth and development of diversified agriculture throughout the State.

The organization of agricultural production and distribution to achieve the Plan's mission is accomplished most effectively through agricultural commodity industries, which are associations, cooperatives, corporations, or other groups of agriculturalists committed to working together in their collective best interest.

Preparation and implementation of the State Agriculture Functional Plan is within the statutory responsibilities and duties of the Department of Agriculture. While the immediate emphasis in the recommendations is on projects, services, and actions with statewide impact or for which government agencies have primary responsibility, the "clients" of the Plan are ultimately the people who conduct agricultural activity in Hawaii.


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The State Department of Agriculture received invaluable cooperation from a number of agencies and individuals involved with agriculture and planning at all levels of government and the private sector. In particular, the Department wishes to acknowledge the contribution of the State Agriculture Functional Plan Advisory Committee, whose members are listed in the preface to this document.

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CHAPTER I

INTRODUCTION

The Hawaii State Plan, Chapter 226, Hawaii Revised Statutes, provides a long-range guide for Hawaii's future. It establishes State goals, objectives, and policies and a Statewide Planning System to carry them out. This system requires the development of State Functional Plans (SFP) which are approved by the Governor. The Functional Plans guide implementation of State and County actions in the following areas: agriculture, conservation lands, education, employment, energy, health, higher education, historic preservation, housing, human services, recreation, tourism, transportation, and water resources development.

In 1984 and 1985, the Legislature adopted the first twelve Functional Plans. Revisions to five SFPs related to human needs (education, employment, health, housing, and human services) occurred in 1987 and 1988. The Governor approved the plans in 1989 in accordance with amendments to Chapter 226, Hawaii Revised Statutes, which changed approval responsibility to the Governor. In 1989 and 1990, the SFP revision process has focused primarily on the preparation of seven SFPs relating to physical resource needs and development:

<u>Area</u>	<u>Coordinating Agency</u>
Agriculture	Department of Agriculture
Conservation Lands	Department of Land and Natural Resources
Energy	Department of Business, Economic Development and Tourism
Historic Preservation	Department of Land and Natural Resources
Recreation	Department of Land and Natural Resources
Tourism	Department of Business, Economic Development and Tourism
Transportation	Department of Transportation

PURPOSE OF THE STATE FUNCTIONAL PLANS

In conjunction with County General Plans, State Functional Plans are the primary guideposts for implementing the Hawaii State Plan. While the Hawaii State Plan establishes long-term objectives for Hawaii, the State Functional Plans delineate specific strategies of policies and priority actions that need to be addressed in the short-term.

In addition, there is an increased emphasis on the implementation of programs and actions. Therefore, Functional Plans contain specific, implementable actions that can be directly related to budget items.

The purposes of the State Functional Plans with respect to Chapter 226, Hawaii Revised Statutes, are to:

- * Identify major statewide priority concerns;
- * Define current strategies for the functional area;
- * Identify major relationships among functional areas;
- * Provide the direction and strategies for departmental policies, programs and priorities;
- * Provide a guide for the allocation of resources to carry out various State activities in coordination with County activities; and
- * Assist in reconciling and coordinating State and County roles and responsibilities in the implementation of the Hawaii State Plan.

ROLE OF THE STATE FUNCTIONAL PLANS

Functional Plans primarily address priority actions that should be taken within a two- to six-year period. This time frame coincides with the Biennial Budget and Capital Improvement Program budgetary cycles. The plans primarily affect State operations; however,

recommendations for coordinated actions at the Federal, County and private sector levels are also included.

State Functional Plans are intended to act in a coordinated fashion with County General Plans and Development Plans. Chapter 226, Hawaii Revised Statutes, states that County General Plans and Development Plans shall be used as a basis in the formulation of State Functional Plans. Conversely, the law also states that the Counties shall use approved State Functional Plans as guidelines in formulating, amending and implementing the County General Plans and Development Plans. Thus, State Functional Plans and the County General Plans and Development Plans each draw from the knowledge embodied in the other, and all are essential to implement the Hawaii State Plan. However, State Functional Plans are still not to be interpreted as law or statutory mandates, nor do they mandate County or private sector actions. The Functional Plans assure that problems and issues of statewide importance are addressed, while the County General and Development Plans indicate desired population and physical development patterns for each County, and assure that the unique problems and needs for each County are addressed.

THEME: BALANCED GROWTH

The major theme for these physical Functional Plans focuses on the promotion of a balanced growth approach in the use of our limited resources. This recognizes the need for economic development while preserving our fragile environment and multi-cultural lifestyles throughout our island State. The strategies for each SFP are aimed at initiating desired development, while at the same time limiting or discouraging development which would impact negatively on our resource base. It also means enhancing our natural environment and cultural resources through actions aimed at protecting, preserving and promoting their significance. In order to achieve balanced growth, the Functional Plans address issues through the following interrelated elements: Resource Management which ensures the preservation and conservation of fragile, unique ecosystems and other natural physical and historical/cultural resources from loss or degradation; Resource

Development which ensures the compatibility of development activities with surrounding communities and infrastructure, and ensures the diversification of economic activities to increase the viability and stability of our economic, environmental and social base; and Infrastructure and Service Supports that promote public and private partnerships for effective management and the timely provision of services and physical infrastructure.

STATE FUNCTIONAL PLAN ADVISORY COMMITTEE

Each Functional Plan has an Advisory Committee composed of State officials, County officials, members of the public from each County, and experts in the particular functional area. Members are appointed by the Governor in accordance with provisions of the Hawaii State Plan, Section 226-57, Hawaii Revised Statutes.

The State Functional Plan Advisory Committee plays a major role in advising State Functional Plan agencies in the revision and implementation of the SFPs. The Committee provides an opportunity for other governmental agencies, the private sector, and the public to participate in the revision process. Representation of County officials on each of the State Functional Plan Advisory Committee ensures that the SFPs take into account major concerns in each County. Once the plan has been approved, the Committee meets on a periodic basis to monitor implementation of the Functional Plan.

REVIEW AND REVISION

In order to be responsive to constantly changing needs and conditions, Functional Plans are subject to review and revision at least every two years; the timing of which is linked to the review process of the Hawaii State Plan.

In undertaking these reviews, some of the State Functional Plan agencies have developed Technical Reference Documents and/or other technical studies and resource materials which provide background information and supporting rationale for policies and actions

contained in the Functional Plan. The Technical Reference Document for the State Agriculture Functional Plan is an example of such a resource study.

COORDINATION

This Functional Plan document has been produced by the Department of Agriculture through extensive meetings and consultations with the State Agriculture Functional Plan Advisory Committee, the Office of State Planning, other affected State and County agencies, the private sector, and the general public.

The Functional Plan agencies initiate interagency coordination by identifying areas with complementary and competing interests. The review and monitoring activities conducted by their Advisory Committees provide assurance that areas of complementary and competing relationships continue to be addressed in the implementation process.

While each Functional Plan agency develops a process for public and agency input, overall responsibility for assuring coordination among Functional Plans on a continuing basis rests with the Office of State Planning.

Each of the major participants in the SFP revision process with their corresponding functions are identified in Chart 1.

CHART 1

KEY PARTICIPANTS IN THE STATE FUNCTIONAL PLAN REVISION PROCESS ¹

PARTICIPANT	FUNCTION / ROLE	MANDATE
Governor	• Establishes Advisory Committees.	§226-55
	• Designates Functional Plan Agencies.	
	• Approves State Functional Plans (SFPs).	§226-55
	• Transmits Functional Plans to Legislature, Mayors, County Councils for information and use.	§226-56
Legislature	• Reviews approved Functional Plans to be used as guidelines for resource allocation in implementing State policies.	§226-57
Department of Budget and Finance	• Prepares guidelines for the preparation and revision of SFPs.	§226-56
	• Assures that the approved SFPs are used as guidelines in the budgetary review and allocation process.	§226-52
State Functional Plan Agency	• Responsible for preparing and updating SFP.	§226-52
	• Works with the SFP Advisory Committee, State and County agencies.	§226-55
	• Solicits public views and comments on the SFP.	§226-55
Functional Plan Advisory Committee	• Advises SFP agencies in preparing, implementing, monitoring, and updating SFPs.	§226-55
Office of State Planning	• Provides recommendations to the Governor, State and County agencies.	§226-53
	• Prepares reports and special studies for the Governor.	§226-53
	• Reports on emerging issues for use in the updating of SFPs.	§226-53
General Public	• Serves on SFP Advisory Committees.	§226-55
	• Provides comments, concerns, and input on Functional Plans to SFP agencies through public informational meetings, surveys or other agency contacts.	§226-55

¹ Based on the passage of Act 76, Session Laws of Hawaii 1991, enacted on April 30, 1991, which amended provisions of Part II of the Hawaii State Plan, Chapter 226, H.R.S.

CHAPTER II

APPROACH TO FUNCTIONAL PLAN ISSUES

LONG-TERM PHILOSOPHY STATEMENT

A plan for Hawaiian agriculture, as a "Functional Plan," was born out of the Hawaii State Plan, first enacted as Act 100 of the 1978 Legislature. The Hawaii State Plan represents the country's first comprehensive statewide plan to be adopted into law, and sets goals, objectives, policies, and priority guidelines to provide general direction for the State. The objectives in the State Plan reflect endstates toward which concentrated effort is to be focused. The policies are long-range courses of action to be carried out in order to achieve the related objectives. Priority guidelines, by comparison, are desirable courses of action which may, however, be deviated from without penalty or sanction in resolving major problems requiring more immediate attention. The State's program appropriation, capital improvement project appropriation, budgetary review, and land use decision making processes shall all be in conformance with the overall theme, goals, objectives, and policies contained within the Hawaii State Plan.

The Hawaii State Plan contains three broad goals for the State, with primary emphasis on the first one: (1) a strong, viable economy; (2) a desired physical environment; and (3) physical, social, and economic well-being. The State Agriculture Functional Plan (the Plan) sets forth the policies, programs, and projects for implementing the agricultural and agriculture-related objectives, policies, and priority guidelines contained in the Hawaii State Plan. For agriculture, the two fundamental objectives to be achieved are: (1) continued viability in Hawaii's sugar and pineapple industries, and (2) continued growth and development of diversified agriculture throughout the State. The Plan emphasizes, but does not limit itself to, the delivery of services and the allocation of resources by State agencies. In the latter regard, the Plan's actions provide specific

guidelines for the State's program budgeting and appropriation process.

The mission of the State Agriculture Functional Plan is ultimately to increase the overall level of agricultural development in Hawaii, in accordance with the two fundamental Hawaii State Plan objectives stated above. Agricultural development may be broadly defined as the organization of production and distribution of agricultural commodities to supply the demand within a market territory. The overall goal for the agricultural development process is to ensure the continued growth, diversification and increased self-sufficiency of diversified agriculture and the stability and viability of the sugar and pineapple industries. The organization of agricultural production and distribution to achieve the development goal is accomplished most effectively through agricultural commodity industries, which are associations, cooperatives, corporations, or other groups of agriculturalists committed to working together in their collective best interest.

Preparation and implementation of the State Agriculture Functional Plan is within the statutory responsibilities and duties of the Department of Agriculture. By Section 26-16, Hawaii Revised Statutes, the Department of Agriculture is charged to: "promote the conservation, development, and utilization of agricultural resources in the State; assist the farmers of the State and any others engaged in agriculture by research projects, dissemination of information, crop and livestock reporting service, market news service, and any other means of improving the well-being of those engaged in agriculture and increasing the productivity of the lands; and administer the programs of the State relating to animal husbandry, entomology, farm credit, development and promotion of agricultural products and markets, and the establishment and enforcement of rules on the grading and labeling of agricultural products."

In addition, in accordance with Act 215 of the 1983 Legislature, the general duties of the Department of Agriculture now include the formulation and implementation of general and special plans, including

but not limited to the functional plan for agriculture. Also, Chapters 166 and 167, Hawaii Revised Statutes, respectively charge the Department with responsibility for the agricultural park program and for irrigation water development.

While the immediate emphasis in the State Agriculture Functional Plan's recommendations is on projects, services, and actions with statewide impact or for which government agencies have primary responsibility, the "clients" of the Plan are ultimately the people who conduct agricultural activity in Hawaii.

ISSUES ADDRESSED IN THE AGRICULTURE FUNCTIONAL PLAN

The agricultural system of the United States has provided the people of this country with the greatest, safest, and cheapest food supply in the world.

This Functional Plan is one means to support a "Vision of Hawaiian Agriculture." The future of Hawaiian agriculture is envisioned to have: (a) growth and size of the sugar industry determined by optimal economic efficiency; (b) continued growth in pineapple production with more growth expected in production of fresh pineapple; and (c) greatest growth in diversified crops and products.

Growth in diversified crops and products requires: (a) understanding the characteristics of potential products and markets; and (b) ensuring that factors critical to achieving this growth potential are in place.

Future diversified crops and products are expected to be market niche driven and Hawaii differentiated for export oriented markets. Import replacement will be achieved where feasible, and this will add further value to the local economy. There will be increased complementarity of diversified crops and products with the tourism/recreation industry.

Factors in achieving the potentials of diversified crops and products include independent, diversified farms for production; consolidated marketing activities; linked production, processing, and manufacturing; low chemical inputs; urban/resort compatibility; conservation of resources; exploitation of new agricultural environments; exploitation of Hawaii's comparative advantage and positive image; and industry organizations.

This Functional Plan outlines actions directed at some of the factors and conditions that are keys to achieving the "Vision of Hawaiian Agriculture." The Plan clusters objectives related to these essential factors and conditions under one of four issue areas. The issue areas are organized as follows:

- * Industry Research and Development
 - Production
 - Marketing
 - Consumption
 - Research/Development/Technology Transfer
 - Finance

- * Agricultural Pests and the Environment
 - Pest and Disease Control
 - Environmental Quality

- * Land and Water
 - Land
 - Water

- * Services and Infrastructure
 - Legislation, Information, and Public Image
 - Human Resources
 - Transportation
 - Agricultural Infrastructure

The following sections summarize assessments of these issue areas and outline strategies to achieve agricultural potential.

SUMMARY ASSESSMENT OF ISSUE AREAS

Issue Area: Industry Research and Development

Production. There is a need to increase the production and growth of Hawaii's agricultural commodity industries through cultural and management practices. Specific problems restricting increased agricultural production include individual industry bottlenecks in areas such as crop choices, varieties and propagation techniques, and cultural, management, and harvesting practices.

Marketing. There is need to improve Hawaii's agricultural marketing system through effective product promotion and increased organization of agricultural industries into cooperatives and associations. Presently Hawaii's diversified agriculture suffers from many problems associated with its small-scale operations lacking economies of scale, compounded by fragmented organization, inefficient practices, and remoteness from major markets.

Consumption. There is a need to increase the demand for and consumption of Hawaii's locally produced agricultural commodities and products. Specific needs include support of programs to enhance the attractiveness of locally produced commodities through uniform quality and quantity; and support of consumer education and programs to work with food preparation and service institutions to encourage greater use of local products.

Research/Development/Technology Transfer. There is a standing need to encourage the most optimal possible contribution of agriculture to the State's economy. There is a general need for basic and applied research which can be transferred to agricultural users. The means to do this include the development of new agricultural and aquacultural industries which either exploit the byproducts of sugarcane and pineapple, or which serve as alternative users of resources released by the sugar and pineapple industries; as well as development of local energy resources based on agricultural materials as alternatives to imported petroleum. There is an immediate need for development of new

diversified crops and products, and techniques to recover useful products from agricultural wastes.

Finance. There is a continuing need for adequate capital, and knowledge of its proper management, for agricultural development. A specific problem is the need to expand the capital base for agricultural development, particularly from private sources of loan funds and venture capital.

Issue Area: Agricultural Pests and the Environment

Pest and Disease Control. There is a need to increase the production and growth of Hawaii's agricultural commodity industries through pest and disease controls. Specific problems restricting increased agricultural production include the general constraint caused by the introduction and presence in Hawaii of destructive and harmful insects, plants, diseases, animals, and other pests. Fruit flies in particular inhibit the export of the Hawaiian agricultural products which are fruit fly hosts.

Environmental Quality. There is a need to achieve more effective protection of Hawaii's land, water and air quality without jeopardizing agricultural production. Specific problems include the urgent need to re-establish registrations of pesticides for use on minor crops; the absence of detailed knowledge of the movement of pesticides into groundwater aquifers; incomplete information on the distribution of endangered species in areas under cultivation; and need for better alternative techniques to control sediments and other pollutants in mill waste water discharges.

Issue Area: Land and Water

Land. There is a need to increase the productive agricultural use of lands most suitable and needed for agriculture. Specific problems affecting many of the commodity industries, as indicated by the agricultural industry analyses, are the following:

- * Suitable land is not available for agricultural industries to expand or otherwise improve and modernize their operations.
- * Many farmers are threatened by loss of their farm leases or are handicapped by having only short-term leases.
- * Land otherwise suitable and available for new or expanding agricultural uses is too costly, particularly for the new farmer.

Water. There is continuous need for the efficient and equitable provision of an adequate supply of water for agricultural use. Specific problems affecting certain agricultural industries include an inadequate supply of water at reasonable cost in all locations in which agricultural activity is, or might be, conducted; and incomplete information on the cost and methods of application of efficient irrigation technology, systems, and practices.

Issue Area: Services and Infrastructure

Legislation, Information, and Public Image. There is a need generally to maximize the benefit to the public from resources allocated to assist agriculture, and to achieve a more positive public image of agriculture in Hawaii. Specific problems include the urgent need for Congress to re-enact the sugar support program in the 1990 Food Security Act; the need to provide more effective analytical tools for understanding Hawaii's agricultural industries and resources; and the need to foster increased public awareness and understanding of the contribution and benefits of agriculture as a major sector of Hawaii's economy.

Human Resources. There is a continuous need for an adequate supply of properly trained labor for agricultural enterprises. Practical training, particularly in business and financial management, is critical for many independent farmers who may lack formal education in these subjects. The most urgent problem facing many of Hawaii's agricultural industries at the present time is the shortage of willing and able workers.

Transportation. There is a general need for adequate transportation services and facilities to meet the needs of agriculture. Specific problems include coordination of agricultural shipments with scheduled common carrier services; and insufficient covered holding areas and refrigerated storage space, and inability to handle palletized cargo, at certain airports.

Infrastructure. There is a general need for adequate support services and infrastructure to meet the needs of agriculture. Specific problems include need for expanded and upgraded facilities at the State vacuum cooling plants; need for additional marshalling yard facilities; and the requirement that the Department of Agriculture plan simultaneously for relocating its Ilalo Street facility and for providing an analytical laboratory.

AGRICULTURE FUNCTIONAL PLAN STRATEGIES

Note that not all of the following strategy items become priority actions in Chapter III of this Plan.

Issue Area: Industry Research and Development

Production. In order to achieve increased agricultural production and growth in Hawaii, current programs of problem-specific research should continue to be supported. This strategy will require: (a) continued allocation of resources through the industry analysis process to alleviate bottlenecks; and (b) reorganization of State support programs for agriculture and aquaculture under one departmental administration. Actions to assist the aquaculture industry are specified in the Conservation Lands Functional Plan.

Marketing. In order to achieve a more orderly agricultural marketing system in Hawaii, current programs to promote Hawaii's agricultural products both locally and overseas should be continued, expanded, and better targeted; and increased emphasis should be placed on developing the agricultural industry organizations themselves. This strategy will require: (a) assistance in introducing and promoting Hawaiian

agricultural products to consumers; (b) strategic planning to identify markets for which Hawaii's diversified agricultural industries can profitably compete; (c) provision of services to remove foreign trade barriers to Hawaii's agricultural exports; and (d) encouragement of the establishment of successful agricultural cooperatives, associations, and marketing orders.

Consumption. Current programs need to be continued which protect individuals from unfair commercial practices, prevent distribution of substandard animal products, ensure standards are met for other agricultural commodities through the monitoring and enforcement of related regulations, increase consumer awareness, and ensure nutritious foods free from disease and substance hazards. This strategy will require: (a) revised rules relating to grades, standards, labeling, and related matters; (b) creation of a consumer unit in food technology and safety; (c) an expanded data base on Hawaiian and Pacific food nutrition and toxic composition; and (d) education of food handlers and consumers in food sanitation and safe purchasing and preparation.

Research/Development/Technology Transfer. In order to achieve a more optimal contribution by agriculture to the State's economy, basic and applied research must be encouraged and transferred to develop new industries based on byproducts of sugarcane and pineapple, and alternative crops, as well as local energy resources derived from agriculture; additional capabilities should be developed to produce new value-added products from Hawaiian agricultural commodities; and beneficial products should be recovered from agricultural wastes. This strategy will require: (a) conducting research on agricultural systems, technologies, practices, organisms, crops, and products; (b) expanded economic field trials of alternative crops which can utilize lands no longer needed for sugarcane or pineapple; (c) establishing biomass production facilities; (d) contingency planning for the preferred disposition of resources in the event of a plantation closure; (e) supporting low input sustainable agriculture; (f) improving technology transfer to small farmers; (g) stimulation of small business development of value-added agricultural products;

(h) research and development of technologies to derive useful products from agricultural wastes; and (i) obtaining better data on the health risks and other impacts of sugarcane smoke from open field burning.

Finance. In order to achieve more adequate capital and knowledge of its proper management for agricultural development, the capital base must be expanded, and basic farm and financial management information, knowledge and skills should be provided to farm operators. This strategy will require: (a) additional funds, in particular from private sources, for agricultural and aquacultural development; (b) greater use of the Hawaii Agricultural Products Program to provide grants and allowances for new crops and products; (c) a quasi-public corporation to seek and provide venture capital to stimulate new agricultural enterprises; and (d) loan guarantees for Native Hawaiian lessees.

Issue Area: Agricultural Pests and the Environment

Pest and Disease Control. In order to achieve increased agricultural production and growth in Hawaii, the introduction of destructive and harmful insects, plants, diseases, and animals should be prevented; existing pest populations should be managed and reduced; and barriers to exportation of fruit fly host commodities should be eliminated. This strategy will require: (a) education of the public not to introduce destructive and harmful plant pests into the State, and adequate staffing to intercept contraband materials at all points of entry into Hawaii; (b) expansion of Integrated Pest Management (IPM) programs and projects; (c) improvement of the animal quarantine facilities and the prevention of animal diseases in the State; (d) eradication of fruit flies; and (e) development of effective treatment methods for fruit fly host commodities.

Environmental Quality. In order to achieve more effective protection and improved quality of Hawaii's environment, pesticides should be used effectively but safely, so as to minimize their possible adverse impacts; and current programs to minimize the adverse impacts of agricultural practices should be augmented. This strategy will

require: (a) providing additional staff and research support for the State pesticides program; (b) mapping the distribution of endangered species which need to be protected from pesticide application in cropland areas; (c) identification of areas where groundwater contamination from field application of pesticides and nutrients may occur; and (d) implementation of the nonpoint source pollution management plan.

Issue Area: Land and Water

Land. In order to achieve more productive agricultural use of lands most suitable and needed for agriculture, lands in public ownership must be provided for agricultural use at reasonable cost and with long-term tenure; and the private lands most suitable for agriculture must be conserved and protected from urbanization in accordance with Constitutional intent. This strategy will require: (a) new leases of public lands to diversified agricultural activities; (b) continued development of agricultural parks; (c) enactment of standards and criteria to conserve and protect important agricultural lands; (d) removal of golf course development as a permitted use of agricultural land; and (e) administration of lands zoned for agricultural use so as to promote diversified agriculture and ensure the continued availability of suitable lands for that purpose.

Water. In order to achieve more efficient and equitable provision of water for agricultural use, water resources for agriculture must be expanded statewide, and the management of agricultural water resources must be improved. This strategy will require: (a) continued development and improvement of the State irrigation systems; (b) increased efforts to use non-potable water for irrigation; (c) giving priority to the maintenance of adequate water sources, supplies and facilities for agriculture; (d) increased State support of the Soil and Water Conservation Districts; and (e) an inventory of the sources, irrigation methods, and uses of water by diversified agriculture.

Issue Area: Services and Infrastructure

Legislation, Information, and Public Image. In order to achieve the maximum degree of public understanding and support of agriculture in Hawaii, legislation beneficial to Hawaii's agricultural industries should be enacted and retained; existing agricultural information gathering and analysis services should be augmented; the most suitable locations for increased agricultural production must be systematically determined; and increased public awareness and understanding of the contribution and benefits of agriculture as a major sector of Hawaii's economy should be fostered. This strategy will require: (a) maintaining the Federal sugar support program in the 1990 Food Security Act; (b) requiring the use of ethanol blended fuels in Hawaii; (c) expansion of reporting of neighbor island commodity arrivals and forecasting of objective yields; (d) periodic studies to determine diversified agricultural costs of production and value added; (e) implementation of a statewide geographic information system; (f) updated mapping of lands in agricultural use; (g) development of an educational outreach program to inform the public on the activities and services offered by agencies which assist agriculture; and (h) developing linkages between the tourism and agricultural industries.

Human Resources. In order to achieve an adequate supply of properly trained labor to meet agriculture's needs, their basic knowledge and skills should be increased, and attractive employment and housing opportunities must be encouraged for agricultural workers. This strategy will require: (a) improving and expanding agricultural training programs; (b) retraining and hiring displaced plantation workers into alternative agricultural employment; (c) permitting the immigration of willing and able alien agricultural workers where necessary; and (d) providing needy agricultural workers with housing assistance.

Transportation. In order to achieve adequate support transportation for agriculture, adequate, timely, and reasonably priced services should be provided; and air and surface terminal facilities need to be improved and expanded with agricultural needs in mind. This strategy

will require: (a) improved transportation scheduling to meet the requirements of Hawaii's agricultural products and processed goods; and (b) development of additional covered transfer areas and agricultural cargo handling facilities at airports.

Infrastructure. In order to achieve adequate support services and infrastructure for agriculture, adequate staffing and facilities should be provided to meet agricultural needs. This strategy will require: (a) provision of additional personnel and related resources; (b) construction of improvements at the vacuum cooling plants, and additional marshalling yards; (c) development of an analytic laboratory for the Department of Agriculture; and (d) study of the feasibility of providing support facilities (such as a slaughterhouse) for the livestock industry on Molokai.

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CHAPTER III

OBJECTIVES, POLICIES, AND ACTIONS

The following are the objectives, policies, and actions for the State Agriculture Functional Plan. The actions are those of the highest priority, in that they meet one or more of the following criteria:

- * Response to Constitutional mandate;
- * Implementation of a policy or priority guideline of the Hawaii State Plan;
- * Administration initiative for organizational/management activity; facility or physical infrastructure development, or program and service improvement; and/or
- * Legislative proposal.

The total budget estimates for each action are the amounts required by each agency, subject to the availability of funds. The actual amounts requested in the Governor's executive budget for FB 1991-93 may differ.

ISSUE AREA: INDUSTRY RESEARCH AND DEVELOPMENT

- * PRODUCTION
- * MARKETING
- * CONSUMPTION
- * RESEARCH/DEVELOPMENT/TECHNOLOGY TRANSFER
- * FINANCE

OBJECTIVE A: ACHIEVEMENT OF INCREASED AGRICULTURAL PRODUCTION AND GROWTH THROUGH CULTURAL AND MANAGEMENT PRACTICES.

POLICY A(1): Stimulate agricultural commodity industries to expand their production and growth by supporting problem-specific research and other direct assistance.

ACTION A(1)(a): Alleviate individual agricultural industry bottlenecks in accordance with priorities set by the industry analyses. [GOV 102]

Lead Organization(s): GACC
Assisting Organization(s): All GACC member agencies; HSPA; Private Industry
Starting Date: 1991-93
Target Location: Statewide
Total Budget Estimate: \$14,768,582 (for GACC)

Comment: The funds appropriated for research assistance to agricultural industries, including sugar (exclusive of market development and promotion) were \$5,526,421 in FY 1989-90, and \$5,246,624 in FY 1990-91, including \$2,500,000 per year for support of the HSPA research and development program. The funds required specifically address critical bottlenecks identified by the agricultural industry analyses, particularly in the areas of cultural and management practices and research on plant varieties and propagation techniques. Priority for support of industry funding requests should be in accordance with each industry's economic significance and market growth potential, as described in the Technical Reference Document. In general, there needs to be more attention paid to research on "transcendental" problems affecting more than one industry, such as clearance and registration of pesticides for use on "minor" crops.

OBJECTIVE B: ACHIEVEMENT OF AN ORDERLY AGRICULTURAL MARKETING SYSTEM THROUGH PRODUCT PROMOTION AND INDUSTRY ORGANIZATION.

POLICY B(1): Promote effective marketing of Hawaii's agricultural commodities.

ACTION B(1)(a): Expand assistance to producers and distributors in introducing and promoting Hawaiian agricultural products to consumers, in Hawaii and in export market areas. [AGR 151, AGR 192]

Lead Organization(s): DOA
Assisting Organization(s): GACC, DBEDT, CTAHR, CA,
Private Industry

Starting Date: 1991-93

Target Location: Statewide, mainland, foreign

Total Budget Estimate: \$1,000,000 (for DOA)

Comment: DOA's Market Development Branch has developed, executed, and monitored promotional programs for a variety of agricultural commodities including pineapple, papaya, guava, eggs, milk, macadamia nuts, avocados, cut flowers and nursery products, manufactured food products, and taro. DOA initiated the "Island Fresh" campaign in 1986 to promote local produce. In 1988, the campaign was expanded to include local meat, poultry, and dairy products. In the future, more emphasis is needed on non-specific rather than commodity-targeted product

promotion funds, as well as foreign promotion, greater use of television advertisements, and campaigns to encourage greater use of local produce in school lunch programs.

The Market Development Branch's proposed program plan calls for a budget of \$500,000 for each of the two fiscal years, as follows: (1) promotion of high value added processed foods (\$100,000); (2) Island Fresh program (\$50,000); (3) Hawaii Farm Bureau Farm Fair exhibit (\$50,000); (4) national and international trade shows and trade missions (\$100,000); (5) export directories, catalogues, brochures and press kits (\$100,000); and (6) consultant services to conduct feasibility and market research studies (\$100,000). In FY 1992, the Branch proposes to hire a consultant to do a strategic plan for Hawaiian agriculture. There is a need to determine where agriculture will be in the next decade; where the potential areas for development are; what the competition will be like in other competing areas; how the State can direct its agricultural resources to best meet the needs of the changing world; as well as to develop a plan to achieve these objectives.

POLICY B(2): Encourage the development of Hawaii's agricultural industries.

ACTION B(2)(a): Encourage the establishment of successful agricultural cooperatives, associations, and marketing orders. [UOH 102, GOV 102, AGR 151]

Lead Organization(s): USDA, CTAHR
Assisting Organization(s): GACC, CA, DOA, DBEDT, DHHL,
Private Industry

Starting Date: 1991-93

Target Location: Statewide

Total Budget Estimate: \$15,000 (for CA)

Comment: USDA opened a Hawaii field office of its Agricultural Cooperative Service in 1983 to provide technical assistance to cooperatives. CTAHR's Cooperative Extension Service is the State agency primarily assisting in cooperative formation. CTAHR is actively pursuing a program in this area with its current base budget and has redirected some resources to pursue this important area.

GACC is supporting the formation of vegetable commodity groups to exchange information on the scheduling of production and harvest, with attention to the availability of each commodity from mainland sources. DOA is responsible for establishing and operating State marketing orders and agreements, estimated to cost \$8,000 per order.

OBJECTIVE C: ACHIEVEMENT OF INCREASED CONSUMPTION OF AND DEMAND FOR HAWAII'S AGRICULTURAL PRODUCTS THROUGH CONSUMER EDUCATION AND PRODUCT QUALITY.

POLICY C(1): Protect individuals from unfair commercial practices; prevent distribution of substandard animal products, and ensure standards are met for other agricultural commodities through the monitoring and enforcement of related regulations.

ACTION C(1)(a): Expand and revise standards to meet current needs and concerns. [AGR 151, AGR 810, AGR 812, HTH 611]

Lead Organization(s): DOA

Assisting Organization(s): CTAHR, DOH, Private Industry

Starting Date: 1991-93

Target Location: Statewide

Total Budget Estimate: \$491,455 (for DOA)

Comment: The DOA's proposal to establish a revolving fund, into which receipts from the game inspection program can be deposited and used to pay expenses directly related to the program, was not accepted by the 1990 Legislature. Therefore, the Meat Inspection Branch is requesting funds (\$26,493) in FB 1991-93 for a temporary Meat Inspector and operating expenses, for exotic animal game meat inspection, primarily on Lanai. The DOH Sanitation Branch routinely inspects markets for food establishment sanitation.

The DOA Commodities Branch is currently reviewing and revising the rules and laws that it enforces to meet industry's current needs and concerns. Meetings are being held with industry groups and, as required, standards subcommittees are being established to facilitate the review and revisions. This process should continue through FB 1991-93.

The DOA Commodities Branch is currently working with the shell egg industry and the Veterinary Laboratory Branch to develop a method of evaluating the sanitation of shell egg processing plants. Once the laws and

rules have been changed, personnel, operating costs, and laboratory equipment will have to be secured.

The DOA Commodities Branch is currently working with the developing macadamia nut and coffee industries in Maui and Kauai Counties to assure that the quality of their products meets the minimum quality requirements desired for an export product. Expanded service will require an additional Agricultural Commodities Marketing Specialist on Maui (\$66,877); Kauai will require a similar position at a later date. In FB 1991-93, funds (\$100,000) are requested for repair and maintenance of the Department's coffee testing facility in Kona.

The DOA Measurement Standards Division requires funds in FB 1991-93 for two new professional positions at the Branch Chief level, with operating expenses, equipment, and vehicles (\$214,070) for its weighing and measuring and packaging and labeling programs, to better implement new legislation such as the made-in-Hawaii law. The Division also requires funds for two Inspectors, with expenses and equipment (\$84,015), for its large capacity scale testing team.

OBJECTIVE D: ACHIEVEMENT OF OPTIMAL CONTRIBUTION BY AGRICULTURE TO THE STATE'S ECONOMY.

POLICY D(1): Encourage the conduct of basic and applied research on agricultural systems, technologies, practices, organisms, crops, and products, and encourage the transfer of research information to agricultural users.

ACTION D(1)(a): Expand the assessment, including economic field trials, of alternative agricultural activities to sugarcane and pineapple in Hawaii. [BED 120, GOV 102, UOH 102, LNR 153]

Lead Organization(s): HSPA, GACC, CTAHR, DLNR
Assisting Organization(s): DBEDT, DOA, CA
Starting Date: 1991-93
Target Location: Statewide
Total Budget Estimate: \$350,000 (for GACC), \$1,768,060 (for CTAHR), plus \$4,000,000 (CIP for DLNR)

Comment: HSPA has been conducting research on coffee (insect and weed pest control, drought sensitivity, and water use efficiency of cultivars); hardwoods and nonwood fiber crops as paper pulp sources; and sucrochemistry to

develop value-added products (polymers) from sucrose.

DBEDT and GACC have been assisting HSPA in research on steam explosion techniques for extracting pulp, lignin, and other byproducts from bagasse and eucalyptus as sources of biomass. HSPA has received a commitment of \$133,500 from GACC toward the additional funds needed for this pilot project (\$83,500 in FY 1990-91 and \$88,500 in FY 1991-92). It is recommended that after completing the preliminary evaluation of the pilot project, the State should contract for a small commercial scale (85 liter) steam explosion plant at an existing sugar factory, estimated to require \$800,000 for equipment, installation supervision, and operations training (State's share of a matching fund effort with the private sector to be determined). Development of a steam explosion refinery for production of renewable transportation fuels, fuel additives, and related high value chemicals from agricultural products may cost \$15 million.

CTAHR is completing a five-year project whose intent is to develop a methodology for identifying alternative crops for Hawaii. This project includes economic as well as horticultural screening procedures for over 1,000 potential crops; the assessment needs to be expanded to include economic field trials. The Council for Agricultural Products Expansion (CAPE) has been formed as an ad hoc group under the GACC, with \$350,000 required for alternative agricultural activities. CTAHR requires \$1,768,060 for additional researchers, the trade development program, and the Agricultural Diagnostic Service Center.

A new large-scale pond research, training, and demonstration facility is needed for aquaculture development. DLNR received \$500,000 in planning and design funds in 1989 to upgrade the Mariculture Research and Training Center at Hakipuu, Oahu, for this purpose; an estimated \$4,000,000 will be required for construction.

ACTION D(1)(b): Establish biomass production at appropriate locations. [BED 120, LNR 172, GOV 102]

Lead Organization(s): DBEDT, DLNR, GACC
Assisting Organization(s): HSPA, CTAHR, HNEI, US-DOE,
USFS, US-SCS, Private Industry
Starting Date: 1991-93
Target Location: Hawaii
Total Budget Estimate: \$150,000 (for DBEDT/HSPA);
\$1,000,000 (for GACC)

Comment: DBEDT contracted with HSPA to study the biomass production potential of sugarcane, napiergrass cultivar Banagrass, and trees at five test locations on four islands. It appears that Banagrass compares favorably for total biomass, but it would not be economically feasible to grow this crop just for its energy potential, given the current value of liquid petroleum fuels and sugar. HSPA needs \$120,000 for this project in FY 1990-91 and an additional \$150,000 in FY 1991-92, to perform the harvesting of the mature trees and to obtain final data and costs and prepare a final report.

The DLNR continued its propagation of eucalyptus seedlings at the Kamuela Central Tree Nursery and planting of tree seedlings. The Legislature appropriated \$200,000 to improve nurseries throughout the State.

GACC recently provided partial support of the continuation and expansion of BioEnergy Development Corporation's biomass research demonstration project, "Eucalyptus Plantations for Energy Production in Hawaii," in FY 1989-90; this project needs an additional \$450,000 in FY 1991-93. In addition to supporting biomass production, incentives are needed to encourage the use of local biomass products. The GACC will be undertaking a Forestry Products Industry Analysis in FY 1990-91, in which biomass will be a component; an estimated \$550,000 will be required.

ACTION D(1)(c): Determine alternative agricultural uses of the land, water, infrastructure, and human resources presently committed to sugarcane and pineapple production. [GOV 103, BED 102, AGR 192]

Lead Organization(s): OSP
Assisting Organization(s): GACC, DBEDT, DOA, DLNR,
DLIR

Starting Date: 1991-93
Target Location: Statewide
Total Budget Estimate: \$250,000 (for OSP)

Comment: With the future of the Federal sugar support program in doubt, contingency planning by the State is in order; the State should develop proactive rather than reactive policies regarding the contraction of this mature industry. For example, the State should develop a unified and coherent strategy of actions to assist the affected workers, companies, and landowners to achieve an orderly transition to other agricultural activities in the event of a plantation closure. In particular, there should be a preferred disposition of the resources released at the time of a plantation closure, and a clear idea of the State's role and responsibility in reallocating these resources to alternative agricultural uses. The OSP estimates the cost of this project at \$250,000. The publication by DBEDT of "Hawaii's Sugar Industry and Sugarcane Lands: Outlook, Issues and Options" (April, 1989) provides a useful baseline assessment.

ACTION D(1)(d): Support research and development of non-traditional agricultural uses and cultural practices, including natural and organic methods. [GOV 102, UOH 102, AGR 151]

Lead Organization(s): CTAHR, DOA, Private Industry
Assisting Organization(s): GACC
Starting Date: 1991-93
Target Location: Statewide
Total Budget Estimate: \$4,000,000 (for CTAHR)

Comment: Certain aspects of low input sustainable agriculture (LISA) have been in practice for a number of years. The 1989 Legislature funded a \$200,000 research program to study ways of minimizing the use of synthetic pesticides, without increasing costs and while maintaining profitable production. The test site will be at MacFarms of Hawaii, with the aim of improving its experiments for use elsewhere in Hawaii. The CTAHR is under contract to GACC to assess the cost benefit of organic vs. standard fertilization practices, conduct pheromone trials, determine effectiveness of parasites to control the stink bug, determine the effect of insect feeding on premature nut drop, and evaluate

the use of sheep to maintain optimal orchard conditions (weed control).

Due to the drastic reduction in the numbers of chemical pesticides available for agricultural use, all crop industries are now requesting the development of comprehensive crop management technologies that minimize or eliminate chemical use. Because Hawaii has unique pests, crops, and environments, it must develop such technologies with little assistance from other states. There is an urgent need for low chemical-input technologies for the survival of many of Hawaii's crops. Systems for four crops could be developed each year at an average cost of \$500,000 each.

ACTION D(1)(e): Improve the transfer of research and technology in usable form to small farmers. [UOH 103]

Lead Organization(s): CTAHR
Assisting Organization(s): GACC
Starting Date: 1991-93
Target Location: Statewide
Total Budget Estimate: \$1,442,520 (for CTAHR)

Comment: There is concern that needed knowledge and information is not always passed on to farmers as rapidly or understandably as they would like. As one example, the recent Vegetable and Melon Industry Analysis identifies lack of information as a bottleneck in areas such as cultivar varieties, vertebrate pest control practices, disease management, fertilizer use, cultural practices, mechanization, and educational programs. Also, farmers on the island of Hawaii want to know more about the effects of "vog" and acid rain on agriculture and what countermeasures to take. Possible solutions include additional County Agent positions in the Cooperative Extension Service, as well as video tapes demonstrating improved techniques (such as cultural practices which can be used to control anthurium blight).

POLICY D(2): Develop capabilities to convert Hawaii-grown crops into potential new value-added products for the local, visitor industry, and export markets.

ACTION D(2)(a): Stimulate business development based on value-added food and fiber products. [BED 102, BED 120, UOH 102, AGR 151]

Lead Organization(s): DBEDT
Assisting Organization(s): CTAHR, CA, DOA
Starting Date: 1991-93
Target Location: Hawaii
Total Budget Estimate: \$30,000 (for DBEDT)

Comment: One possible application is the use of geothermal steam to sterilize waste biomass as a growing medium and to facilitate spawn production of gourmet mushrooms. The interest in dryland taro production is also growing and the potential markets may be worldwide. For example, Japan has shown interest in buying processed white taro flour from Hawaii as a base from which to make a hypo-allergenic rice substitute. Additional research may be necessary to assess the economic feasibility of large scale white taro production and processing into hypo-allergenic food products, vis-a-vis the market prospects for these products.

POLICY D(3): Recover economically and environmentally beneficial products from agricultural waste.

ACTION D(3)(a): Support the conversion of agricultural field trash and mill waste water to usable byproducts as alternatives to open burning and disposal. [HTH 849, UOH 102]

Lead Organization(s): DOH, County Public Works
Departments
Assisting Organization(s): HSPA, CTAHR, OEQC, US-EPA
Starting Date: 1991-93
Target Location: Statewide
Total Budget Estimate: \$1,200,000 (for DOH)

Comment: Additional research may be necessary to alleviate environmental concerns in these areas, as well as to develop alternative harvesting and processing techniques (\$200,000 by way of a contract with HSPA). The feasibility of shredding and chipping vegetative matter should be studied so that it can be recycled as a soil amendment rather than dumped into landfills. DOH requires \$1,000,000 to implement its Integrated Solid

Waste Management Plan through assistance to the Counties in finding ways to convert waste material such as yard trash and animal waste to usable resources.

OBJECTIVE E: ACHIEVEMENT OF ADEQUATE CAPITAL, AND KNOWLEDGE OF ITS PROPER MANAGEMENT, FOR AGRICULTURAL DEVELOPMENT.

POLICY E(1): Expand the capital base for agricultural development.

ACTION E(1)(a): Provide additional funds as required to assist agricultural and aquacultural industries and their development in general. [AGR 101, AGR 102]

Lead Organization(s): DOA
Assisting Organization(s): Private Industry, DHHL,
DLNR

Starting Date: 1991-93
Target Location: Statewide
Total Budget Estimate: \$0

Comment: Since 1959, the State Agricultural and Aquaculture Loan Programs have approved 6,975 loans with a total amount outstanding of \$32,437,394 as of June 30, 1990. The program has adequate resources to continue ongoing financial credit support programs to meet the demand for capital in the growing agricultural and aquacultural industries.

ACTION E(1)(b): Utilize the Hawaii Agricultural Products Program to develop new crops and agricultural products which create further market opportunities for Hawaiian agriculture. [AGR 101]

Lead Organization(s): DOA
Assisting Organization(s): CTAHR, CA, DBEDT, Private
Industry

Starting Date: 1991-93
Target Location: Statewide
Budget Estimate: \$0

Comment: Chapter 153, Hawaii Revised Statutes, established a revolving fund and authorizes the BOA to participate in joint ventures and make grants or allowances for the purposes of the Hawaii Agricultural Products Program. Act 347 of the 1989 Legislature provides that, for a period of three years, up to \$1,000,000 per year may be transferred to or from the Hawaii agricultural products revolving fund and the agriculture loan revolving fund or the aquaculture loan revolving fund.

ACTION E(1)(c): Propose establishment of a Hawaii Agricultural Development Corporation. [AGR 192, AGR 101]

Lead Organization(s): DOA
Assisting Organization(s):
Starting Date: 1993-95
Target Location: Statewide
Total Budget Estimate: \$1,500,000 (for Corporation)

Comment: There is need to stimulate, formulate, and finance new agricultural development enterprises in cooperation with existing farm credit programs and the Hawaii Agricultural Products Program of DOA. A quasi-public corporation to facilitate joint public/private ventures in development, commercialization, and marketing of new crops is recommended by the Alternative Crops Industry Analysis. Legislation to establish such a corporation failed to pass in 1989 and 1990, but a study on the feasibility of this concept has been prepared in response to a concurrent resolution; funding of \$1,500,000 is recommended to establish the corporation. In 1990 the Legislature did pass Act 110 creating the Hawaii Strategic Development Corporation, to encourage and foster the development of small and emerging businesses, which may include agricultural enterprises.

ACTION E(1)(d): Establish an agricultural loan guarantee program for Native Hawaiian lessees. [HHL 602, AGR 101]

Lead Organization(s): DHHL
Assisting Organization(s): DOA, FmHA
Starting Date: 1991-93
Target Location: Statewide
Total Budget Estimate: \$0

Comment: Native Hawaiian farmers, as homestead lessees, are currently not eligible for State or Federal agricultural loans, which require that the land must be attached as collateral. In order for Native Hawaiian homestead lessees to receive agricultural loans for diversified agriculture and small-scale ranching, there is need for the DHHL/HHC to guarantee these loans. The DHHL is working with the DOA Agricultural Loan Division to prepare a cooperative agreement and has set aside approximately \$2 million for loan guarantees.

ISSUE AREA: AGRICULTURAL PESTS AND THE ENVIRONMENT

- * PEST AND DISEASE CONTROL
- * ENVIRONMENTAL QUALITY

OBJECTIVE F: ACHIEVEMENT OF INCREASED AGRICULTURAL PRODUCTION AND GROWTH THROUGH PEST AND DISEASE CONTROLS.

POLICY F(1): Manage present populations, and prevent further introductions, of destructive and harmful insects, plants, animals, plant and animal diseases, and other pests in the State.

ACTION F(1)(a): Educate the public not to introduce destructive and harmful insects; plants, plant and animal diseases, illegal non-domestic animals, non-quarantined domestic animals, and other pests into the State; and intercept those pests and diseases in transit into, through, and out of the State. [AGR 122]

Lead Organization(s): DOA

Assisting Organization(s): USDA, CTAHR, CA, DBEDT, DOT

Starting Date: 1991-93

Target Location: Statewide, mainland, foreign

Total Budget Estimate: \$1,243,424 (for DOA)

Comment: Public awareness of the dangers from smuggling in feral animals (e.g. snakes, lizards, spiders, fish, etc.) should be enhanced through means such as an airline video emphasizing the importance of filling out the agricultural declaration form and the consequences of non-compliance. There is some public support for making the declaration form mandatory for all in-bound passengers and cargo. However, previous attempts to amend the law in this regard have been defeated in the Legislature. Hawaii residents should also be educated to the dangers of importing prohibited items; production of additional videos for television broadcast is estimated to cost \$50,000 each.

DOA's Plant Quarantine Branch maintains surveillance at all ports of entry into the State to detect and intercept certain plants and non-domestic animals; and certifies horticultural materials and agricultural products for export from Hawaii. Priority should be given to tightening the inspection of all persons and material from Guam to prevent introduction of the brown tree snake into Hawaii.

In FB 1991-93, the Plant Quarantine Branch requires additional funds to strengthen the import and export inspection programs (such as nursery export certification, beagle dog detection, and declaration form compliance inspection) with (1) 5.5 new permanent Plant Quarantine Inspector and five temporary Pest Control Aide positions, plus equipment, vehicles, and operating expenses (\$653,219); and (2) five temporary Plant Quarantine Inspectors and five temporary Pest Control Aide positions plus operating expenses to be funded through the Airport Special Fund (\$590,205).

ACTION F(1)(b): Expand integrated agricultural pest and disease management capabilities statewide. [AGR 122, UOH 102]

Lead Organization(s): DOA
Assisting Organization(s): CTAHR, CA, USDA
Starting Date: 1991-93
Target Location: Statewide
Total Budget Estimate: \$555,574, and \$84,000 CIP
(for DOA), \$80,000 (for CTAHR), \$30,000 (for CA)

Comment: The DOA's Plant Pest Control Branch has been coordinating with Federal, State, and private interests for several years in using integrated chemical, mechanical, and biological control methods (Integrated Pest Management, or "IPM") to reduce gorse in pasture lands. Other current projects include the introduction of natural enemies that attack pests of sugarcane, pineapple, pasture grasses, banana, and koa trees. In FB 1991-93, the Plant Pest Control Branch requires funds to strengthen the pest control programs (such as survey and detection, taxonomy, insectary, and plant pathology) through the addition of six Entomologists, one Plant Pathologist, and five Pest Control Aides and related operating expenses (\$439,821). In addition, funds are required for two temporary laborers in the banana bunchy top disease program (\$82,129); temporary Plant Pest Control Aides for the seed certification program (\$33,624); as well as a CIP project for the expansion of the quarantine and propagation insectary buildings (\$84,000). Funding is also required for the Agricultural Action Alliance at CTAHR (\$80,000) and for a position at CA (\$30,000).

ACTION F(1)(c): Educate the public not to introduce destructive and harmful animal diseases, illegal and quarantined domestic animals, and other pests into the State; and intercept those pests and diseases in transit into, through, and out of the State. [AGR 131, AGR 132]

Lead Organization(s): DOA
Assisting Organization(s): USDA, CTAHR, CA, DBEDT, DOT
Starting Date: 1991-93
Target Location: Statewide, mainland, foreign
Total Budget Estimate: \$805,744, and \$4,152,000
CIP (for DOA)

Comment: An interim task force convened in 1989 to review the adequacy of the DOA Animal Quarantine Station, its management practices in preventing the spread of rabies and other infectious diseases among quarantined animals, and the care, maintenance and treatment of the quarantined animals; and has identified a number of shortcomings that require immediate attention. The DOA requires additional personnel to improve staff supervision and monitoring of operations, including care of confined animals, and improvement of sanitation programs including flea and tick control. In FB 1991-93, funds are required for Quarantine Animal Caretaker positions (four permanent, eight temporary) and two Clerk Typists, plus operating expenses (\$286,852); seven temporary Livestock Inspectors for the Airport Animal Holding Facility (\$271,833); as well as a Building Maintenance Worker (\$54,830).

In FB 1991-93, the DOA Animal Industry Division requires \$4,152,000 (CIP) for planning, design, and construction of renovations and improvements to the Animal Quarantine Station. These improvements will consist of addition, replacement, and renovation of animal kennels, improvements to infrastructure, new teamleader worksheds, renovation of lighting and public address system, improved landscaping, renovation of sewage treatment plant and backup generator, and other improvements. The Division also requires \$86,000 for renovations to its maintenance facility.

The DOA Livestock Disease Control Branch is responsible for preventing the spread of animal diseases that may have an adverse economic impact on animal populations or be a

public health threat in Hawaii. It is proposed to develop a more proactive livestock disease surveillance program which will remove both diseases of economical importance to daily livestock production, and those which prohibit Hawaii's industries from developing export markets. For this purpose, \$106,229 is required in FB 1991-93 for an Animal Health Technician, Clerk Typist, and operating expenses and equipment.

POLICY F(2): Eliminate fruit flies as a barrier to the uninhibited export of host commodities from Hawaii in accordance with Federal quarantine requirements.

ACTION F(2)(a): Test the feasibility of eradicating fruit flies from Hawaii on a pilot project basis. [UOH 102, AGR 122]

Lead Organization(s): USDA, GACC
Assisting Organization(s): CTAHR, CA, DOA
Starting Date: 1991-93
Target Location: Kauai
Total Budget Estimate: \$759,100 (for GACC)

Comment: Congress has provided funds to US-APHIS and the UH to research genetic engineering methods for eradicating fruit flies. A facility to breed mass quantities of sterile male Mediterranean flies in Waimanalo, Oahu, was dedicated in January, 1990. A pilot project began in 1989 on Kauai to release sterile male medflies and establish a fruit fly free zone through chemical and biological means such as bait traps, border crop traps, and egg-destroying parasites.

The Hawaii Fruit Fly Committee was formed by the Governor in October, 1987, to determine what it will take to eradicate pestiferous fruit flies from Hawaii and then maintain a fruit fly-free status. The DOA Plant Pest Control Branch contracted with the Committee in 1989 for a fruit fly species survey to determine all species existing in Hawaii, and also for the registration of various chemical combinations for fruit fly eradication, the monitoring of the impact of eradication technologies on non-target organisms, and an educational program for informing the public about fruit fly eradication. In FB 1991-93, the Committee proposes to continue its work on species surveys, environmental studies, and education programs with funds to be requested through the GACC budget (\$759,100).

ACTION F(2)(b): Support the concept of demonstration plants to treat fruit-fly host commodities for export. [UOH 102, BED 102, AGR 122]

Lead Organization(s): Private Industry
Assisting Organization(s): DBEDT, US-DOE, USDA,
CTAHR, DOA

Starting Date: 1991-93
Target Location: Kauai, Hilo
Total Budget Estimate: Not applicable

Comment: The 1990 Legislature appropriated \$500,000 to the Department of Business and Economic Development for the plans, design, and construction of a tropical fruit disinfestation facility on the island of Kauai, provided that DBEDT shall enter into a contract with a qualified organization of the State to fulfill the stated purpose.

The US-DOE and DBEDT entered into a cooperative agreement to build a demonstration irradiation plant, with \$4 million in Federal funds and \$1.2 million in matching State funds. This project has been indefinitely deferred due to the low bid for construction costs exceeding available funds by \$1.7 million. Future funding should be earmarked for alternative disinfestation methods.

OBJECTIVE G: ACHIEVEMENT OF EFFECTIVE PROTECTION AND IMPROVED QUALITY OF HAWAII'S LAND, WATER, AND AIR.

POLICY G(1): Ensure the effective, efficient, and safe use of pesticides, and minimize their possible adverse impacts on the public and the environment.

ACTION G(1)(a): Provide additional staff and research support required to continue to investigate, license, register, and enforce the lawful use of pesticides essential for viable agricultural industries. [AGR 846, UOH 102]

Lead Organization(s): DOA, CTAHR
Assisting Organization(s): US-EPA, DOH, OEQC, HFBF
Starting Date: 1991-93
Target Location: Statewide
Total Budget Estimate: \$220,000 (for DOA from US-EPA),
\$1,000,000 (for CTAHR)

Comment: Under the Agreement between the State of Hawaii and Region IX of the US-EPA, the DOA is responsible for enforcing certain provisions of the Federal Insecticide,

Fungicide, and Rodenticide Act (FIFRA) in Hawaii. The DOA receives from \$100,000 to \$160,000 annually under this cooperative agreement. The principal duties of the DOA's Pesticides Branch pursuant to the Agreement are to regulate the sales and use of pesticides in Hawaii; register pesticides for special local needs; issue experimental use permits; and certify pesticide applicators. The CTAHR is responsible for the pesticide applicator training program and to help develop pesticide clearances. The OEQC participates in the Continuing Education Program Review Committee in evaluating programs for recertification credit. The DOH Food and Drug Branch monitors pesticides on raw agricultural products at the market level, including on the Neighbor Islands.

Due to the recent cancellation of the interim registrations for pesticide uses on minor crops by the US-EPA, farmers in many states, including Hawaii and the American Pacific, are faced with the serious problem of not having pesticides for use to protect their crops. The DOA has requested Federal funding to expedite field studies for collecting residue data to support petitions for the establishment of pesticide tolerances through the IR-4 program. CTAHR requires funding for pesticide efficacy and provision of residue samples (\$1,000,000).

ACTION G(1)(b): Determine the distribution of endangered species to be protected from pesticide application in cropland areas. [AGR 846, UOH 102]

Lead Organization(s): DOA, CTAHR
Assisting Organization(s): DLNR, US-FWS, US-EPA
Starting Date: 1991-93
Target Location: Statewide
Total Budget Estimate: \$53,000 (for DOA from US-EPA),
\$162,536 (for CTAHR)

Comment: The distribution of endangered species needs to be mapped together with areas in crop cultivation, so that the pesticides registered for use on those crops may be evaluated for their impacts on the endangered species, and necessary use restrictions can be implemented. The DOA will implement this program with funds from the EPA cooperative agreement. In 1990, CTAHR shifted one full-time researcher position and is utilizing a new Federal grant for this

project. Additional funds for fruit fly research are required in support of this action (\$162,536).

POLICY G(2): Minimize the adverse impacts of agricultural practices on Hawaii's ground water, surface water, air quality, and endangered species.

ACTION G(2)(a): Identify areas where groundwater contamination resulting from the field application of pesticides and nutrients is most likely to occur. [AGR 846, HTH 849, UOH 102, UOH 103]

Lead Organization(s): DOA, CTAHR
Assisting Organization(s): WRRRC, USDA, US-EPA
Starting Date: 1991-93
Target Location: Statewide
Total Budget Estimate: \$93,000 (for DOA from US-EPA),
\$653,584 (for CTAHR)

Comment: The DOA coordinated with CTAHR to develop a computer program that will predict the movement of pesticides through Hawaiian soils. The DOA will implement this research with funds provided under the EPA cooperative agreement. WRRRC has actively researched groundwater contamination by field applied pesticides, including the recently found DBCP, EDB, TCP, and atrazine contamination of the Pearl Harbor aquifer. Inclusion of Hawaii in the pesticides data base to be developed by USDA in support of its water quality initiative would greatly assist this effort. CTAHR requires funds for long-term ecological research.

ACTION G(2)(b): Implement the Nonpoint Source Pollution Management Plan as the State's mechanism for addressing agriculturally related nonpoint source pollution. [HTH 849, LNR 404]

Lead Organization(s): DOH, DLNR
Assisting Organization(s): OEQC, HACD, SWCD,
USDA, US-EPA
Starting Date: 1991-93
Target Location: Statewide
Total Budget Estimate: \$500,000 (for DOH),
\$275,000 (for DLNR, SWCD)

Comment: The DOH is currently implementing a Nonpoint Source Program (NPS) funded by Federal grant monies. DOH requires permanent State funding to implement its Nonpoint Source Management Plan (\$500,000), as well as ongoing resources to carry out monitoring activities and

analyze water samples for the groundwater protection strategy and to support and implement its revised coastal water quality monitoring program (including toxins monitoring, biomonitoring, and biosurveys). Emphasis needs to be placed and resources need to be provided so that other agencies, in particular the SWCD assisted through the DLNR, can collaborate on providing assistance to the agricultural sector in controlling its nonpoint sources of pollution. In FB 1991-93, DLNR requires funds (\$275,000) for an Executive Director, Secretary, office space, equipment, supplies, training, and travel to service the HACD in this regard.

ISSUE AREA: LAND AND WATER

- * LAND
- * WATER

OBJECTIVE H: ACHIEVEMENT OF PRODUCTIVE AGRICULTURAL USE OF LANDS MOST SUITABLE AND NEEDED FOR AGRICULTURE.

POLICY H(1): Provide suitable public lands at reasonable cost and with long-term tenure for commercial agricultural purposes.

ACTION H(1)(a): Complete agricultural park projects presently committed, and develop additional projects in accordance with the Ad Hoc Agricultural Park Site Selection Committee. [AGR 192, AGR 141]

Lead Organization(s): DOA
Assisting Organization(s): DLNR, HFBB, HFDC, Maui
County Economic Development Department
Starting Date: 1991-93
Target Location: Oahu, Molokai, Kauai, Hawaii
Total Budget Estimate: \$58,101, and \$10,100,000
CIP (for DOA)

Comment: Construction of an agricultural park at Waianae was completed in 1989-90; construction of Waiahole, Kahuku, and Phase II at Waimanalo is expected to be completed in 1990-91. CIP funds were appropriated in FB 1989-91 for drainage and security improvements (\$396,000) and installation of the electrical power lines (\$200,000) at Kahuku. Additional CIP funds of \$6.5 million are required in FB 1993-95 for fee simple acquisition of the Kahuku lands. Funds (\$150,000) to install electrical and telephone lines at the Molokai Agricultural

Park, Phase II, were appropriated in FY 1990-91.

A new agricultural park is needed on Oahu to provide for the relocation of dairies and other livestock operations. The estimated cost of the first 600-acre phase of this project is \$60 million, of which \$9.3 million would be public funds required for infrastructure development, excluding land acquisition costs. CIP funds of \$6.4 million were appropriated in FB 1989-91 for planning, design, and initial land acquisition of the livestock agricultural park; \$100,000 was appropriated in FY 1990-91 for a feasibility study of an anaerobic digester. Additional CIP funds of \$7.6 million are required in FB 1991-93 for land acquisition, when a site is selected, and \$9.3 million will later be required for construction.

A new agricultural park is also needed on Kauai, for vegetable and orchard production and/or nursery and foliage production, pending site selection. CIP funds of \$500,000 were appropriated for planning and design in FY 1990-91. Additional CIP funds of \$2 million are required for construction in FB 1991-93.

CIP funds of \$500,000 are required in FB 1991-93 for planning and design of priority new agricultural parks on the island of Hawaii, for which potential locations include Hamakua, Waimea, North Kohala, and expansion of existing projects at Keahole and Paho.

With the increase in number of agricultural parks, additional funds will be required for staff personnel and current expenses of lease administration, operations and maintenance, and related management costs. In FB 1991-93, the DOA Agricultural Resource Management Division requires \$58,101 for an additional Land Agent.

POLICY H(2): Conserve and protect important agricultural lands in accordance with the Hawaii State Constitution.

ACTION H(2)(a): Propose enactment of standards and criteria to identify, conserve, and protect important agricultural lands and lands in agricultural use. [GOV 103, AGR 192]

Lead Organization(s): OSP
Assisting Organization(s): DOA

Starting Date: 1991
Target Location: Statewide
Total Budget Estimate: Not applicable

Comment: Article XI, Section 3 of the Constitution mandates that important agricultural lands shall not be reclassified or rezoned without meeting standards and criteria established by the Legislature.

The Final Report of the LESA Commission (February, 1986) recommended that the State Legislature enact the proposed LESA system including standards, criteria and procedures to redesignate parcels of "important agricultural lands" to "urban" or "other use" upon a demonstrated change of economic or social conditions, and where the requested redesignation will provide greater benefits to the general public than its retention in the IAL district. The LESA Commission also recommended streamlining the present land use regulatory system by reclassifying the Agricultural District into approximately 700,000 acres of "Important Agricultural Lands" and approximately 1.3 million acres of "Other Lands." State agencies, including DOA, would have a role in administering the permitted uses of lands in the IAL District.

The State Administration prepared legislation which was introduced in 1989. This bill used the land evaluation rating system to identify important agricultural lands; provided guidelines for reclassification of such lands when overriding public interest exists; included land in productive agricultural use as part of the IAL District; and established a new Open District for open space lands which are not of high value as agricultural or conservation resources and not appropriate for inclusion in the Urban or Rural Districts. State and County roles and responsibilities in land use regulation were maintained without change.

As of the 1990 Session, the Legislature has taken no action on the LESA Commission recommendations or on the alternative proposal by the State Administration, except to fund computer mapping of the LESA criteria. In 1987-88, OSP contracted with CTAHR to test the feasibility of digitizing the site assessment (SA) criteria, and with

typically being maintained and increased on marginal lands.

Applications for County plan amendments, zoning changes, subdivisions, and special permits affecting important agricultural lands should be forwarded to the DOA for review to ensure representation of the State's interest in promoting optimal use of this critical resource. At the present time, applications are sent to DOA for review and comment on a voluntary basis by the Counties.

OBJECTIVE I: ACHIEVEMENT OF EFFICIENT AND EQUITABLE PROVISION OF ADEQUATE WATER FOR AGRICULTURAL USE.

POLICY I(1): Expand agricultural water resources statewide.

ACTION I(1)(a): Develop new, expanded, or improved water source and delivery systems in support of agriculture and aquaculture, as needed and economically feasible. [AGR 141, LNR 404]

Lead Organization(s): DOA

Assisting Organization(s): DLNR, DHHL, US-SCS, County Water Departments, Private Industry

Starting Date: 1991-93

Target Location: Molokai; Waimea, Hawaii; Waimanalo

Total Budget Estimate: \$189,500 and \$1,349,000 CIP
(for DOA)

Comment: Act 306, SLH 1987, transferred the State irrigation systems at Waimanalo, Waimea, and Molokai from the DLNR to the DOA, effective July 1, 1989. In order to maintain favorable water rates for system users, infrastructure improvements are funded as a CIP expenditure rather than from current operating revenues. In FY 1991-93, the DOA Division of Agricultural Resource Management requires additional funds for routine maintenance expenses (\$189,500).

Improvements to the Maunawili Ditch collection system have been completed, and replacement of the Waimanalo Irrigation System distribution ditches with a closed pipeline system and construction of a new reservoir are awaiting Federal funds. The Puu Pulehu Reservoir will be regraded and made watertight, and the Upper Hamakua Ditch collection system of the Waimea Irrigation System will be renovated. New groundwater source wells have been drilled in Waikolu Valley to supply the Molokai Irrigation

System. CIP funds were appropriated in FB 1989-91 for the Waimanalo (\$1.4 million), Waimea (\$6.9 million), and Molokai (\$1.4 million) systems to fund these improvements as well as telemetry and supervisory controls for each system.

Coordination is needed between DOA and DHHL to provide irrigation water to DHHL homestead areas at Waimea, Hawaii, and Hoolehua/Paialau, Molokai, including installation of distribution pipelines and tapping DHHL's surface water resources.

In FB 1991-93, additional CIP funds are required as follows: for the Waimea Irrigation System, (1) \$295,000 for office additions, (2) \$90,000 for planning and design of improvements to the Lalamilo Section distribution system, (3) \$700,000 for planning and design of Upper Hamakua Ditch improvements, and (4) \$24,000 for design of Waimea Homestead pipeline addition. For the Molokai Irrigation System, \$240,000 for Kualapuu Reservoir security fencing.

In the future, further CIP funds will be required as follows: for the Waimea Irrigation System, (1) \$1,400,000 for construction of improvements to the Lalamilo Section distribution system, (2) \$4,500,000 for construction of Upper Hamakua Ditch improvements, (3) \$845,000 for miscellaneous improvements to Puu Pulehu Reservoir, (4) \$535,000 for construction of Waimea Homestead pipeline addition, and (5) \$450,000 for the Waimea-Paauilo Watershed Project distribution system. For the Molokai Irrigation System, (1) \$385,000 for the Kalae water source addition and distribution network improvements, (2) \$1,362,000 for miscellaneous source improvements, (3) \$650,000 for Kualapuu Reservoir intake extension, (4) \$230,000 for Naiwi pipeline extension, (5) \$1,500,000 for water source development project, and (6) \$405,000 for Kalamaula transmission pipeline. For the Waimanalo Irrigation System, \$430,000 for Cooke Tunnel and Piaoake Spring rehabilitation.

Development of any new water sources for the Molokai Irrigation System should minimize adverse impacts on pristine watersheds, and should not be subject to the reservation of

two-thirds of the water for DHHL lands which applies to the first stage sources in Waikolu Valley pursuant to Section 168-4, HRS.

Annual appropriations by Congress to US-SCS need to be increased for agricultural water projects so that Hawaii can receive its allotments for authorized projects on a timely basis.

ACTION I(1)(b): Monitor, evaluate, and increase efforts to use non-potable water for agricultural irrigation. [HTH 849]

Lead Organization(s): DOH, US-SCS
Assisting Organization(s): WRRRC, CTAHR, DOA, DLNR, County Water Departments, County Public Works Departments, Private Industry
Starting Date: 1991-93
Target Location: Statewide
Total Budget Estimate: Not applicable

Comment: The feasibility of reusing treated effluent for agricultural irrigation is investigated at the planning stage by the DOH for every publicly owned wastewater treatment plant to be certified for funding. The DOH Wastewater Branch is working on appropriate amendments to the Wastewater Management Administrative Rules to incorporate or establish animal wastewater pond criteria and standards. Funds for implementation will be sought after the rules are in place by FY 1993 or 1994. Studies are also required to determine the feasibility of irrigating crops and turf with brackish water.

POLICY I(2): Improve agricultural water resource management.

ACTION I(2)(a): In implementing the State Water Code, give priority consideration, where justified for the benefit of Hawaii's people, to the maintenance of adequate water sources, supplies, and facilities for continued existing and planned beneficial agricultural uses. [LNR 404]

Lead Organization(s): CWRM
Assisting Organization(s): DLNR, County Water Departments, Private Industry
Starting Date: 1991-93
Target Location: Statewide
Total Budget Estimate: Not applicable

Comment: Agricultural water users have been affected by problems of water shortage, meter size restrictions, diversion of irrigation

water to urban use, decreased streamflow, and increasing salinity of low-elevation wells. New urban development should be restricted in areas where water supply is insufficient for both agricultural and domestic uses. In 1989, however, the CWRM acted to cut Oahu Sugar Company's water allocation 32 percent by 1995, to 62.4 MGD.

ACTION I(2)(b): Increase State support of the Soil and Water Conservation Districts. [LNR 404]

Lead Organization(s): DLNR
Assisting Organization(s): US-SCS, DOA, HACD
Starting Date: 1991-93
Target Location: Statewide
Total Budget Estimate: \$985,000 (for DLNR)

Comment: The SWCD's need greater State support of their efforts to expand and renovate agricultural water systems, rehabilitate eroded lands, and reduce nonpoint source pollution from erosion and residual pesticide contamination of runoff water. These programs foster stewardship of natural resources and promote voluntary compliance with regulatory requirements. In addition, SWCD's are called upon to review and approve the conservation plans of agricultural park lessees, who are required to attain cooperator status with an SWCD to install and maintain appropriate land protection practices. Although free technical assistance is available through US-SCS, DLNR requires matching funds (\$985,000) for 16 Soil Conservationists to support assistance provided by US-SCS to the SWCD's. A review of Chapter 180, HRS, should be conducted by the HACD to clarify the duties and responsibilities of the SWCD's and assisting State agencies and to propose any necessary legislative amendments.

ACTION I(2)(c): Inventory the sources, irrigation methods, and uses of water by diversified agriculture. [LNR 404, AGR 189]

Lead Organization(s): CWRM
Assisting Organization(s): DLNR, DOA
Starting Date: 1991-93
Target Location: Statewide
Total Budget Estimate: \$100,000 (for CWRM)

Comment: While a fair amount of data are available on ground water withdrawals for agricultural use, much less is known about surface water use, particularly where stream diversions are commonplace for diversified agriculture. Surveying surface water use is difficult and expensive, but was attempted by DOA on a limited basis in 1981 at the request of DLNR. The unreported and undetermined quantities and qualities of surface water used for agriculture in areas such as Windward Oahu should be certified. A survey of surface water use could be done for approximately \$100,000 if farmers know the amounts of water used and if the quality does not have to be tested.

Projections are needed of near and long term diversified agricultural water use on each island, based on an inventory of irrigated acreage, method of irrigation, source of water, and quantity and quality of water used. Actual water use varies with rainfall, land and water availability, and market and economic conditions. The inventory and projections should be a component of the overall Hawaii Water Plan required by the State Water Code.

ISSUE AREA: SERVICES AND INFRASTRUCTURE

- * LEGISLATION, INFORMATION, AND PUBLIC IMAGE
- * HUMAN RESOURCES
- * TRANSPORTATION
- * INFRASTRUCTURE

OBJECTIVE J: ACHIEVEMENT OF MAXIMUM DEGREE OF PUBLIC UNDERSTANDING AND SUPPORT OF AGRICULTURE IN HAWAII.

POLICY J(1): Seek the enactment and retention of Federal and State legislation that benefits Hawaii's agricultural industries.

ACTION J(1)(a): Maintain Federal support to provide stable sugar prices high enough to allow profitable operations in Hawaii. [GOV 102, AGR 192]

Lead Organization(s): HSPA
Assisting Organization(s): ILWU, GACC, DOA, HFBB
Starting Date: 1989
Target Location: Statewide
Total Budget Estimate: Not applicable

Comment: The sugar support program of the Food Security Act should be re-enacted in 1990 to provide a stable price for producers and consumers. The sugar crop, like other essential commodities, may be used as collateral for USDA Commodity Credit Corporation loans. Congress intended that the sugar program operate at no cost to the Treasury. In order to ensure that the sugar is marketed, rather than forfeited to the government, the domestic price is maintained through the use of import quotas.

POLICY J(2): Augment the existing agricultural information gathering and analysis services to provide more effective tools for understanding Hawaii's agricultural industries and resources.

ACTION J(2)(a): Report neighbor island agricultural commodity arrivals, and expand the objective yield forecasting program. [AGR 151]

Lead Organization(s): DOA
Assisting Organization(s): USDA, Private Industry
Starting Date: 1991-93
Target Location: Statewide
Total Budget Estimate: \$83,636 (for DOA)

Comment: End-users of data on diversified agricultural commodities, including producers, processors, distributors, and government agencies, would benefit from more detailed inter-island agricultural product movement data to give a better idea of total supply and demand, including locally produced and imported commodities on each island. Objective yield forecasts, in formats (e.g. graphs, maps, charts) that are more readily understandable to both producers and policy makers for estimating the timing and quantity of future harvests, would cost \$100,000 per year. The DOA Hawaii Agricultural Statistics and Market News Services jointly require an additional Research Statistician in FB 1991-93 (\$83,636) to collect diversified agricultural statistics for Maui, Molokai, and Lanai as well as inshipment data for Maui County and inshipment and wholesale price data for Hawaii County.

ACTION J(2)(b): Conduct periodic studies to determine the cost of production inputs and value added in processing of diversified commodities. [UOH 102, AGR 192]

Lead Organization(s): CTAHR
Assisting Organization(s): DOA, GACC, CA

Starting Date: 1991-93
Target Location: Statewide
Total Budget Estimate: \$320,000 (for CTAHR)

Comment: Data is needed on farmers' actual use of, and the cost of, production inputs such as land, water, farm machinery and equipment, labor, seed, fertilizer, and pesticides, so that the net return to each commodity can be calculated. Data on the value added in processing locally produced commodities are also needed, since currently available figures indicate only the value of commodity sales at the farm gate (except for sugar and pineapple). As a result, the true contribution of diversified agriculture to Hawaii's economy is not known. CTAHR would require \$160,000 per year to conduct five cost of production or value added studies per year on a five-year cycle.

ACTION J(2)(c): Design and implement a statewide geographic information system. [GOV 103, BUF 131, AGR 192, UOH 103]

Lead Organization(s): OSP
Assisting Organization(s): B&F, DOA, OEQC, DLNR,
CTAHR, County Planning Departments
Starting Date: 1991-93
Target Location: Statewide
Total Budget Estimate: \$62,000 (for DOA), \$190,000
(for CTAHR)

Comment: In 1988, OSP began implementation of a statewide Geographic Information System (GIS) for storing, managing, retrieving, and integrating map and tabular data to facilitate analyses of proposed land uses. In FY 1989-91, OSP received \$680,000 to continue implementation of the GIS by developing necessary data bases and communication networks to make the system accessible to all interested agencies on a statewide basis.

DOA staff require formal training as well as in-house assistance in the use of ARC/INFO, the GIS software program chosen as the basis for the State GIS system. In FY 1991-93, \$62,000 is required for consultant services and expenses for GIS education and data base development.

The Hawaii Natural Resources Information System (HNRIS) developed by the CTAHR incorporates submodels to predict potential

ground water contamination from chemicals and to map LESA factors and criteria. In FB 1991-93, CTAHR requires \$190,000 to refine the HNRIS model by updating the soils data for areas previously not surveyed in detail, and by adding aquifer and well data. Also, the use of satellite data for land use inventory will be explored. In addition, HNRIS will provide information required for the detailed determination of land use district boundaries in the LESA process.

POLICY J(3): Systematically determine the most suitable locations for increased agricultural production.

ACTION J(3)(a): Update maps showing existing agricultural and aquacultural land use, and crop ecological zones suitable for such uses, at quad map scale. [AGR 192, UOH 102]

Lead Organization(s): DOA, US-SCS
Assisting Organization(s): OSP, GACC, CTAHR, DLNR
Time Frame: 1991-93
Target Location: Statewide
Budget Estimate: \$135,000 (for DOA)

Comment: The DOA agricultural land use mapping project funded by the GACC in 1982 provides baseline data for the 1978-80 period, based on orthophoto quad maps, but has not been updated since then. A one-time project to provide updated air photo coverage for Hawaii in 1990, at a cost of \$117,000, has been organized by US-SCS and several other agencies. Additional funds (\$135,000) are required in FB 1991-93 to convert the working aerial photographs into usable products such as orthophoto quad sheets. Then a new set of agricultural land use maps can be prepared. In the long run, US-SCS should support non-contiguous areas, including Hawaii, in the National Aerial Photography Program.

Mapping crop ecological zones requires soil survey maps, soil characteristic data, and information on crop requirements for soil and other environmental characteristics. A sample project locating suitable areas for macadamia nut and cacao production has been completed by CTAHR.

POLICY J(4): Foster increased public awareness and understanding of the contribution and benefits of agriculture as a major sector of Hawaii's economy.

ACTION J(4)(a): Develop an educational outreach program to inform the public on the activities and services offered by agencies which assist agriculture. [AGR 192, UOH 103, GOV 102]

Lead Organization(s): DOA, CTAHR, CA, GACC
Assisting Organization(s): All GACC member agencies
Starting Date: 1991-93
Target Location: Statewide
Total Budget Estimate: \$20,000 (for CA), \$100,000 (for GACC)

Comment: An education outreach program on agriculture could involve developing television programs, video tapes, and presentations to schools and community organizations. This would require increased staffing and resources. The Governor authorized the establishment of a Communications Officer position within the DOA for FY 1990 to provide increased public relations and communications between the Department and the public.

ACTION J(4)(b): Develop linkages between the tourism and agricultural industries. [BED 113]

Lead Organization(s): DBEDT, Private Industry
Assisting Organization(s): GACC, DOA
Starting Date: 1991-93
Target Location: Statewide
Total Budget Estimate: Not applicable

Comment: Affinity groups with an interest in Hawaiian agriculture should be able to capitalize on unique experiences such as farm tours. Greater emphasis should be placed by the visitor industry on the benefit of green open space as a passive promotional item, which will provide greater impetus to keep prime agricultural lands in use. The Tourism Functional Plan calls for programs to encourage continued development of a diverse range of tourism products, and enhanced programs focusing on niche marketing, or promotion of special interest tourism in established base markets such as western Canada and the United States.

OBJECTIVE K: ACHIEVEMENT OF ADEQUATE SUPPLY OF PROPERLY TRAINED LABOR FOR AGRICULTURAL NEEDS.

POLICY K(1): Increase the basic knowledge and skills of agricultural workers.

ACTION K(1)(a): Improve and expand agricultural training programs at the secondary and post-secondary school levels. [UOH 101, UOH 211, UOH 214, UOH 501, UOH 505, EDN 105]

Lead Organization(s): CTAHR, CA, UHCC, DOE
Assisting Organization(s): DOA, DLIR, DHHL,
Private Industry

Starting Date: 1991-93

Target Location: UH Manoa Campus; UH Hilo Campus;
Maui Community College; Molokai Farm Facility

Total Budget Estimate: \$1,142,780 (for DOE), and
\$34,105,000 CIP (for CTAHR, CA,
UHCC)

Comment: The CTAHR, CA and UHCC have developed brochures which describe the agricultural fields, career opportunities, and academic training available at the University of Hawaii for all of its agricultural programs. Faculty development is an area of high priority for CTAHR, and efforts to improve its academic program through existing resources are continuing. The DOE's Vocational Education Multi-Year Plan resulted in the enrollment of 1,500 students in agricultural classes. The DOE is requesting additional funds for agricultural education in FB 1991-93.

The CTAHR will develop Phase III of its Agricultural Sciences Facility, for which it requires \$24,500,000 in CIP funds in FB 1991-93. The CA will further develop its Agricultural Farm Laboratory at Panaewa (\$2,129,000 in FB 1991-93), and will construct Phase II of its Hilo Campus Agricultural Facility (\$6,250,000 in FB 1991-93). Maui Community College is planning an Agricultural Facilities Addition (\$1,226,000 in FY 1992-93) and an addition to the Molokai Farm Facility (\$229,000 in FY 1993-94).

ACTION K(1)(b): Retrain displaced plantation workers for hire into alternative agricultural employment. [LBR 131]

Lead Organization(s): DLIR
Assisting Organization(s): USDL, Private Industry,
ILWU, DBEDT

Starting Date: 1991-93
Target Location: Statewide
Total Budget Estimate: \$200,000 (for DLIR)

Comment: The DLIR administers and coordinates employment and training programs with appropriate State agencies, County governments, and private non-profit organizations to provide program services such as temporary, full-time and part-time subsidized employment, employability development and assistance.

POLICY K(2): Satisfy agriculture's labor requirements by encouraging attractive agricultural employment and housing opportunities.

ACTION K(2)(a): Provide housing assistance to new and displaced farmers, farm workers, and needy rural communities. [HMS 220]

Lead Organization(s): FmHA, HHA
Assisting Organization(s): US-HUD, HFDC, DOA, Private Industry

Starting Date: 1991-93
Target Location: Statewide
Total Budget Estimate: Not applicable

Comment: Federal rural development funds should be sought to provide rural housing assistance. Particular needs include housing quality improvements in some plantation communities, and low-cost housing for new farmers, in particular recent immigrants.

OBJECTIVE L: ACHIEVEMENT OF ADEQUATE TRANSPORTATION SERVICES AND FACILITIES TO MEET AGRICULTURAL NEEDS.

POLICY L(1): Provide adequate, timely and reasonably priced air and surface transportation to meet present and future agricultural needs.

ACTION L(1)(a): Improve interisland and export transportation service for agricultural products and processed goods. [TRN 995]

Lead Organization(s): Private Industry
Assisting Organization(s): DOT, GACC, CTAHR, DOA
Starting Date: 1991-93
Target Location: Statewide
Total Budget Estimate: Not applicable

Comment: It is the obligation of common carriers to reliably provide scheduled services. Shippers of perishable or fragile

agricultural products should coordinate their shipments around scheduled transportation services, possibly through a shippers' cooperative or similar organization. DOT was instrumental in establishing the Big Island Transportation Committee for this purpose.

POLICY L(2): Provide adequate air and surface terminal facilities to meet present and future agricultural needs.

ACTION L(2)(a): Develop and improve airport and harbor terminal facilities required for agricultural commodity industries, such as covered/uncovered transfer areas and special provisions for handling refrigerated, palletized, and containerized cargo. [TRN 995]

Lead Organization(s): DOT
Assisting Organization(s): DOA, GACC, CTAHR, CA,
County Economic Development Departments,
Private Industry
Starting Date: 1991-93
Target Location: Statewide
Total Budget Estimate: \$55,700,000 CIP (for DOT)

Comment: Problems appear to center on air cargo terminal facilities. There is a lack of covered holding areas, refrigerated storage space, and capability to handle palletized cargo. The DOT Harbors Division is improving inter-island and overseas transportation handling and storage facilities at Nawiliwili, Hilo, Kawaihae, Kahului, Kaunakakai, and Honolulu harbors. In support of agriculture and agricultural industries, the State Transportation Functional Plan is proposing new cargo and cargo handling facilities for Honolulu International Airport (\$30,000,000), General Lyman Field (\$6,000,000), Kahului Airport (\$4,900,000), Keahole Airport (\$6,500,000), and Lihue Airport (\$8,300,000).

Updates of the Master Plans for General Lyman Field (Hilo), Lihue, Molokai, and Lanai Airports are underway; Keahole Airport expansion is in the design stage; and Kahului Airport expansion is under construction. 2010 Master Plans for Hilo and Kawaihae Harbors have been completed. Part of the master planning effort is directed at incorporating the findings and recommendations on agricultural concerns. In particular, provision needs to be made for expanded plant and animal quarantine inspection facilities as airports are upgraded.

OBJECTIVE M: ACHIEVEMENT OF ADEQUATE SUPPORT SERVICES AND INFRASTRUCTURE TO MEET AGRICULTURAL NEEDS.

POLICY M(1): Provide adequate staffing, facilities and equipment to support public services on behalf of agriculture.

ACTION M(1)(a): Provide additional personnel and related resources to increase services to the public and provide a more efficient and effective delivery of services. [AGR 192]

Lead Organization(s): DOA
Assisting Organization(s):
Starting Date: 1991-93
Target Location: Honolulu
Total Budget Estimate: \$783,159 (for DOA)

Comment: Over the years, the DOA has grown through the transfer of programs such as Market Development, Agricultural Parks, and Irrigation Systems, the expansion of existing programs, and initiation of new programs and is expected to grow as a result of increasing demands for services and information and the introduction of new technology. This growth in Departmental programs and activities requires additional support personnel to assist in effectively and efficiently carrying out these programs. Funds of \$457,698 for four new support positions (Automotive Mechanic Helper, two Data Processing System Analysts, and Clerk Typist for Maui) and operating expenses, and \$43,182 for a Clerk Typist and equipment for the Planning and Development Office, are required in FB 1991-93. In addition, funds of \$282,279 are required in FB 1991-93 for various computer application development projects identified in the DOA's Distributed Information Processing and Information Resource Management (DIPIRM) plan, and for electronic data processing resources to increase the Department's EDP capabilities. In future years, \$1,613,000 will be required for renovation and improvements to the DOA Main Complex.

ACTION M(1)(b): Construct appropriate facilities to improve the production, harvesting, storage, handling, and packaging of agricultural commodities. [AGR 141, AGR 151, AGR 812, LNR 101]

Lead Organization(s): DOA, DLNR
Assisting Organization(s): CTAHR, CA, DOH, DBEDT,
Private Industry

Starting Date: 1991-93
Target Location: Maui, Kauai, Hawaii
Total Budget Estimate: \$240,000 CIP (for DOA)

Comment: DOA is expanding and improving the vacuum cooling plants on Hawaii and Maui by providing a new reefer room at Kamuela and a hydro-cooler and ice machine and storage bin at Kula. This will facilitate the delivery of high-quality vegetable produce to off-island markets and encourage the growth of vegetable production in the Kula and Waimea areas. DOA is also providing supplemental construction funds to the County of Maui for a forced air cooling facility on Molokai.

DLNR has constructed the Kona marshalling yard in phases, beginning with site improvements completed in 1987, and continuing with a covered structure and additional improvements completed in 1990.

DOA received CIP funds for the design and construction of a renovated and rerouted domestic water line for the Poamoho Experiment Station (\$250,000) in FY 1989-90.

DOA's Agricultural Resource Management Division requires \$200,000 in CIP funds in FY 1991-93 to plan and design a marshalling and processing facility at Panaewa, with \$1,100,000 construction cost required in the future. In FY 1990-91, \$45,000 was appropriated for a feasibility study of an agricultural product packaging and distribution plant at Keahole.

Relocation of the facility housing the Measurement Standards Division and the Plant Quarantine Branch will eventually be required to accommodate the Kakaako Redevelopment Project. The DOA is working with HCDA and DAGS to identify program requirements, possible relocation sites, and other relocation assistance. CIP Funds of \$583,000 were appropriated in FY 1990-91 for planning and design of the new facilities, and an additional \$40,000 is required in FY 1992 for design of this project. Future CIP funds (\$12 million) will be required for construction of these facilities.

ACTION M(1)(c): Establish an analytic laboratory program for the Department of Agriculture. [AGR 192, AGR 846, AGR 151, AGR 812, AGR 122, HTH 901]

Lead Organization(s): DOA
Assisting Organization(s): CTAHR, HCDA, DAGS, DOH
Starting Date: 1991-93
Target Location: Oahu
Total Budget Estimate: \$664,395 (for DOA)

Comment: An analytic laboratory program is required for the performance of the regulatory functions of analysis of pesticide residues and formulations, and analysis of animal feed for adulterants and nutrient guarantees. CTAHR has made a commitment to provide these services on a contract basis only through FY 1994-95. In-house testing will provide better direct response and control over procedures and timing of results. The analytical laboratory program will temporarily be located in the Measurement Standards facility, for which funds of \$664,395 are required in FB 1991-93 for three Chemists, a Laboratory Assistant, equipment, and operating expenses. Future CIP funds will be required to initiate planning for a permanent analytical laboratory facility in conjunction with the relocation of the Ilalo Street facility in Kakaako. Additional personnel, equipment, and operating funds will also be required when the permanent analytical laboratory is established.

ACTION M(1)(d): Provide infrastructure for agricultural and rural development on Molokai, as recommended by appropriate feasibility studies. [BED 102, AGR 192, AGR 810, HHL 602]

Lead Organization(s): DBEDT
Assisting Organization(s): DOA, DHHL, US-EDA, USDA
Starting Date: 1991-93
Target Location: Molokai
Total Budget Estimate: \$125,000 (for DBEDT)

Comment: An economic evaluation for a Molokai slaughter facility was done in 1990, and the Legislature appropriated \$250,000 to DBEDT for renovation or replacement of the existing Molokai slaughterhouse. A feasibility study is needed to identify additional public works projects on Molokai, such as water, transportation, processing and marketing facilities, to redevelop the livestock industry and develop other agricultural industries on the island. Now that bovine

tuberculosis has been eradicated from Molokai, the island has the ideal environment to develop a significant food animal industry. A Federal technical assistance grant may be sought for the study (up to \$75,000).

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APPENDIX

LIST OF ACRONYMS

B&F	- Department of Budget and Finance
CA	- College of Agriculture (University of Hawaii at Hilo)
CTAHR	- College of Tropical Agriculture and Human Resources (University of Hawaii)
CWRM	- Commission on Water Resource Management
DAGS	- Department of Accounting and General Services
DBEDT	- Department of Business, Economic Development and Tourism
DHHL	- Department of Hawaiian Home Lands
DLIR	- Department of Labor and Industrial Relations
DLNR	- Department of Land and Natural Resources
DOA	- Department of Agriculture
DOE	- Department of Education
DOH	- Department of Health
DOT	- Department of Transportation
FmHA	- Farmers Home Administration (USDA)
GACC	- Governor's Agriculture Coordinating Committee
HACD	- Hawaii Association of Conservation Districts
HCDA	- Hawaii Community Development Authority
HFBF	- Hawaii Farm Bureau Federation
HFDC	- Housing Finance and Development Corporation
HHA	- Hawaii Housing Authority
HNEI	- Hawaii Natural Energy Institute (University of Hawaii)
HSPA	- Hawaiian Sugar Planters' Association
ILWU	- International Longshoremen's and Warehouseman's Union
LUC	- Land Use Commission
OEQC	- Office of Environmental Quality Control
OSP	- Office of State Planning
SWCD	- Soil and Water Conservation Districts
UHCC	- University of Hawaii Community Colleges
US-APHIS	- U.S. Animal and Plant Health Inspection Service (USDA)
USDA	- U.S. Department of Agriculture
USDL	- U.S. Department of Labor
US-DOE	- U.S. Department of Energy
US-EDA	- U.S. Economic Development Administration
US-EPA	- U.S. Environmental Protection Agency
USFS	- U.S. Forest Service (USDA)
US-FWS	- U.S. Fish and Wildlife Service (USDI)
US-HUD	- U.S. Department of Housing and Urban Development
US-SCS	- U.S. Soil Conservation Service (USDA)
WRRC	- Water Resources Research Center (University of Hawaii)