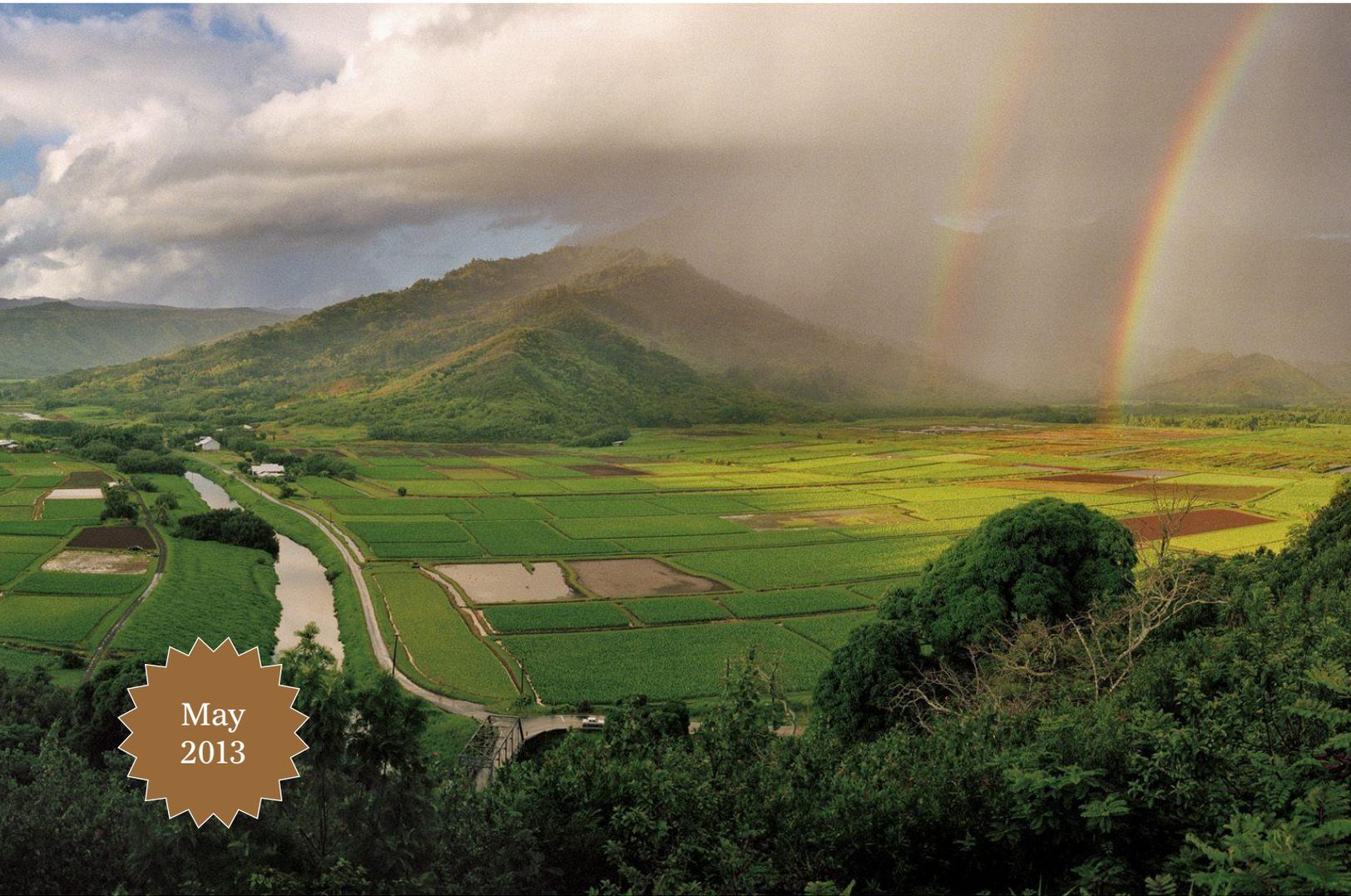


# Hawaii Agriculture Skill Panel Report

Addendum to the Comprehensive  
State Plan for Workforce Development  
2009–2014



May  
2013

Workforce Development Council | 830 Punchbowl Street, Room 417 | Honolulu, Hawaii 96813

**Neil Abercrombie, Governor** | **State of Hawaii**

**NEIL ABERCROMBIE**  
GOVERNOR



**MARIAN E. TSUJI**  
CHAIRPERSON

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ACTING EXECUTIVE DIRECTOR

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May 7, 2013

The Honorable Neil Abercrombie  
Governor, State of Hawaii  
Executive Chambers, State Capitol  
Honolulu, Hawaii 96813

Dear Governor Abercrombie:

I am pleased to submit the *Hawaii Agriculture Skill Panel Report* sponsored by the Department of Labor and Industrial Relations (DLIR), Workforce Development Council (WDC), the Department of Agriculture (DOA), and supported by the Hawaii Farm Bureau and the efforts of the Local Workforce Investment Boards of Oahu, Kauai, Hawaii and Maui. These initial findings and recommendations represent the work of over 600 stakeholders statewide and its results are based on broad based participation by both public and private sectors.

In keeping with the "New Day" objectives regarding the development of a vibrant agriculture industry, this overview of issues and discussion of possible solutions will assist the State in creating an industry that truly helps Hawaii become self-sustaining. All parties, from industry partners to education entities to government regulators, agree that more must be done to help develop a vibrant and sustainable agriculture industry that is not only attractive for the next generation but also becomes a strong economic pillar in the state.

As with other Skill Panels that the WDC has held since mid-2010, a number of follow-up activities have occurred to help bring to life the ideas that were presented in the various forums. Various vested interests, from the University of Hawaii to the Hawaii Farm Bureau, continue to formulate ideas with other parties to bring about the renaissance of the industry in Hawaii.

We know that these efforts are being met with an equal, if not more determined focus by your administration to help develop the state's agriculture industry. While specific policy decisions were debated in the various forums, it was widely agreed by all parties that government should take a leadership role. Action on a number of the short term recommendations presented in this report will reaffirm the commitment by government to be a partner in developing sustainable agriculture in Hawaii.

We look forward to your review and feedback.

Sincerely,

MARIAN E. TSUJI  
WDC Chairperson



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May 6, 2013

Aloha Hawaii Agricultural Industry Stakeholders:

I would first like to thank all of you who gave of your time and energy to attend the Sustainable Agriculture Skills Panel Forums that were held at five venues across the state. Through your participation, we were able to bring together over 600 stakeholders from the public and private sector with the expressed aim of building up a capable and competent workforce that would re-establish agriculture as an essential component for the well-being of our island community.

When Governor Abercrombie kicked off the first Sustainable Agriculture Skills Panel Forum, he emphasized his commitment to agriculture and the prominent role that agriculture has within his New Day Plan; the Governor also made a commitment to implement the recommendations that were generated from this collaborative effort.

It was made clear in all of the forums across the state that an educated workforce is needed to address the entire spectrum of skill sets required to support the agricultural industry. Agriculture is a business, and marketing, sales, and financial acumen are equally as important as those of agronomy, horticulture, and animal husbandry. Efforts are already underway to identify agriculture related training programs and to create more opportunities for the growth and development of the agricultural workforce. Additionally, while the focus of these forums was the development of the agricultural workforce, important agricultural issues were raised around topics such as land, water, and biosecurity that require further discussion and will be addressed in other forums.

Implementation of these recommendations is not the sole responsibility of any one entity. We must continue to work together, across government agencies and in coordination with the private sector to drive towards our goal of building up agriculture within the State of Hawaii. During this past legislative session, we were able to find traction for some of our recommendations and they have been passed by the legislature and are pending final approval from the Governor. We look to build on these small successes and other positive additions provided by the Legislature; those interested in knowing more details should contact me. I encourage you all to continue being passionate advocates for agriculture and become active participants in the civic process to move us towards a New Day in Hawaii.

Mahalo,

A handwritten signature in black ink that reads "Russell S. Kokubun" followed by a long horizontal flourish.

Russell S. Kokubun  
Chairperson



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# Table of Contents

<b>3</b>	Letter to the Governor
<b>4</b>	Department of Agriculture Letter to Stakeholders
<b>6</b>	Executive Summary
<b>7</b>	The Workforce Development Council
<b>8</b>	What are Industry Skill Panels?
<b>10</b>	Broader Issues Affecting Workforce Development
<b>12</b>	Common Themes and Recommendations
<b>14</b>	Local Area Meetings:
<b>15</b>	<b>OAHU</b>
<b>16</b>	Oahu Recommendations
<b>18</b>	Breakout Group Discussions
<b>23</b>	<b>HILO</b>
<b>24</b>	Hilo Recommendations
<b>26</b>	Breakout Group Discussions
<b>30</b>	<b>KONA</b>
<b>31</b>	Kona Recommendations
<b>33</b>	Breakout Group Discussions
<b>38</b>	<b>KAUAI</b>
<b>39</b>	Kauai Recommendations
<b>41</b>	Breakout Group Discussions
<b>45</b>	<b>MAUI</b>
<b>46</b>	Maui Recommendations
<b>48</b>	Breakout Group Discussions
<b>52</b>	“Quick Wins” and After-Meeting Actions
<b>55</b>	<b>APPENDIX A</b> Agricultural training and education programs in Hawaii
<b>70</b>	<b>APPENDIX B</b> Agricultural resources flyer
<b>71</b>	<b>APPENDIX C</b> Agriculture, food, and natural resources occupations in Hawaii
<b>100</b>	<b>APPENDIX D</b> HB No. 749 HD1 – Relating to workforce development
<b>102</b>	<b>APPENDIX E</b> Skill Panel Participants by Area and Breakout Group

# Executive Summary

The Agriculture industry in Hawaii is at a crossroads. The old days of plantation farming are gone. New sectors of agriculture like biotechnology and biomass have emerged. While traditional farms still exist, local farmers are aging. According to the 2007 Census of Agriculture for Hawaii, the average age of a farmer is 58.6 years old.<sup>1</sup>

While agriculture has historically been a multi-generational industry, it is becoming less so in the modern era. Fewer young people are choosing agriculture as a profession. The perception of low wages, poor benefits, long working hours, undesirable working conditions, and the stigma of agriculture work are all factors contributing to the next generation's hesitancy toward agricultural work.

However, with an increasing interest in "sustainability" by government agencies, private industry, and the general public, the idea of creating a more sustainable agriculture industry in Hawaii has been gaining interest and support. Farmers' markets and school garden programs are increasing statewide. Restaurants and hotels are utilizing more locally-sourced foods. In addition, recent movements have called for Hawaii to be a leader in food and fuel security to set an example for the rest of the nation. These efforts have added to the growing momentum for the industry and to an improved public perception overall.

To support and further these initiatives, the Department of Labor and Industrial Relations' Workforce Development Council (DLIR-WDC), in partnership with the Department of Agriculture (DOA), sponsored statewide Sustainable Agriculture Skill Panel meetings to address industry needs and identify barriers that are impeding the agricultural workforce. Beginning in December 2011, the WDC coordinated meetings on Oahu, Kauai, Maui and Hawaii Island (with meetings held in both Hilo and Kona). Over 600 stakeholders attended the meetings, including participants from the private, non-profit, and government sectors.

The Agriculture Skill Panel's objective was:

*In order to re-establish agriculture as an essential component for the well-being of our island community, a capable and competent workforce with the ability to fulfill the unique needs of a progressive agricultural industry will be required.*

To accomplish this objective, these skill panels were held to develop statewide strategic action plans that accomplish the following:

- Educate government and community leaders about the importance of the agriculture industry;
- Develop an action plan to meet the current and future workforce needs of the local agriculture industry; and
- Offer solutions and assist with implementation of initiatives that support and grow Hawaii's agriculture industry.

This report highlights discussion points and outcomes of the Skill Panel meetings and provides recommendations for future action by the state government. The report also describes some "quick wins" that occurred as a result of the meetings and action items that are already moving forward.

<sup>1</sup> United States Department of Agriculture National Agriculture Statistics Service. 2007 Census of Agriculture State Profile: Hawaii. [http://www.agcensus.usda.gov/Publications/2007/Online\\_Highlights/County\\_Profiles/Hawaii/cp99015.pdf](http://www.agcensus.usda.gov/Publications/2007/Online_Highlights/County_Profiles/Hawaii/cp99015.pdf). Accessed December 14, 2012.

# Workforce Development Council

The Hawaii Workforce Development Council (WDC) is comprised of private and public-sector members appointed by the Governor. The 31 members are committed to providing direction to the State's workforce development efforts, and supporting and encouraging the best use of resources for those purposes.

The WDC is mandated by State law to develop and annually update information on workforce development for the Governor and the Legislature. Each year, the WDC presents workforce issues and recommendations in its *Comprehensive State Plan for Workforce Development*.

During 2008-2009, WDC members and other stakeholders revisited the role, mission, and vision of the WDC, outlined the state's planning context using previous reports and studies, assessed how the state compares with the rest of the nation, and established goals and priorities for 2009-2014. Based on an evaluation of current state programs and resource requirements, the group identified the following four major priority areas:

1. Improve the delivery of timely education and training to prepare current and future workers for projected high-demand occupations;
2. Focus more attention on upgrading the skills of incumbent workers;
3. Expand the labor pool in the face of anticipated long-term shortages; and
4. Address workforce housing.

Starting in 2009, following best practices in other states, the WDC began implementing a "sector strategies" approach to workforce development planning known as Industry Skill Panels. Since its implementation, the WDC has held Skill Panels for three key industries in the State of Hawaii: healthcare, software development, and agriculture.



## What are Industry Skill Panels?

Industry Skill Panels are private/public partnerships working to ensure that employees in key industries have the skills needed to quickly and competently meet the changing needs of businesses. Harnessing the expertise of leaders in business, labor, education, economic development, and other sectors, Skill Panels bring competitors within a specific industry together to collaboratively address critical issues, skill gaps, training needs, and performance outcomes that affect the industry as a whole.

Skill Panel leaders build consensus, prioritize their local and regional industry workforce needs, and become better able to mobilize partners and leverage resources to make the greatest economic impact. Additionally, their mutual efforts are more influential with government, businesses, associations, and educational institutions than they would be if trying to fill workforce needs individually within silos.

## What's expected of each Skill Panel constituency group?

### Employers and Labor:

- Identify skill sets needed
- Identify skill needs required

### Economic Development Agencies:

- Identify employers that should be on panel
- Identify economic development programs that may be leveraged
- Assist in understanding the labor market when attracting outside companies to come to Hawaii and establish a business

### Department of Education (K-12):

- Provide a resource to parents and students showing where jobs and training opportunities are located

### University of Hawaii System (Higher Education):

- Identify training programs that would be affected
- Include private educational institutions

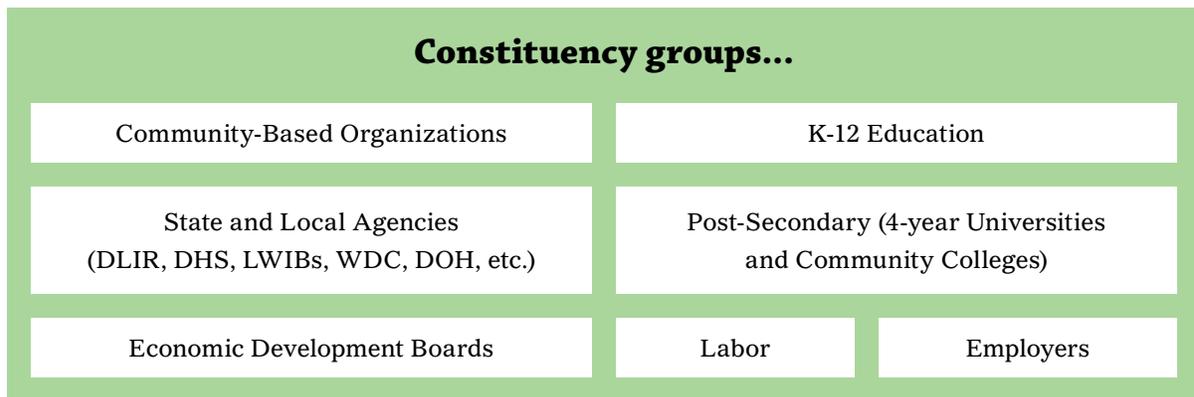
### Local Workforce Investment Boards and Councils:

- Identify job-training dollars
- Identify training programs

### Community-Based Organizations:

- Identify training funds and programs
- Provide case-management for clients
- Understand the needs of the client
- Identify job-training programs and opportunities

## How do Industry Skill Panels work?

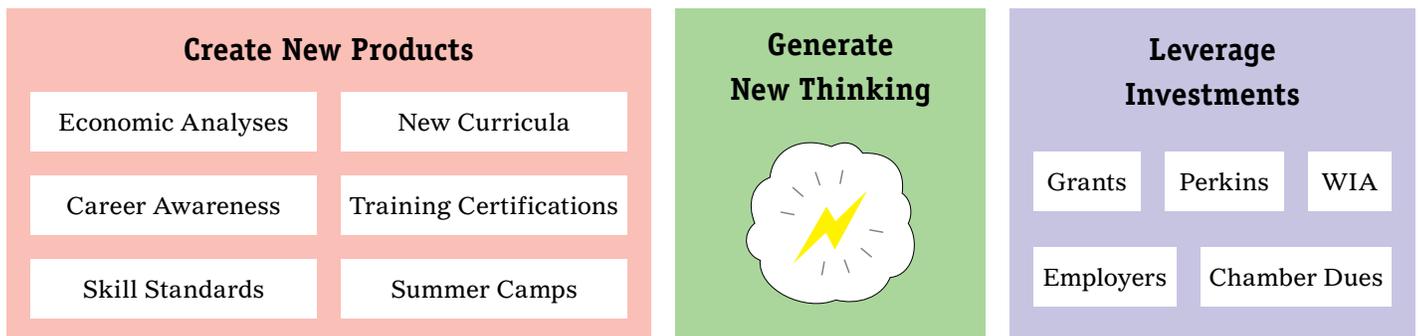


### form Industry Skill Panels...

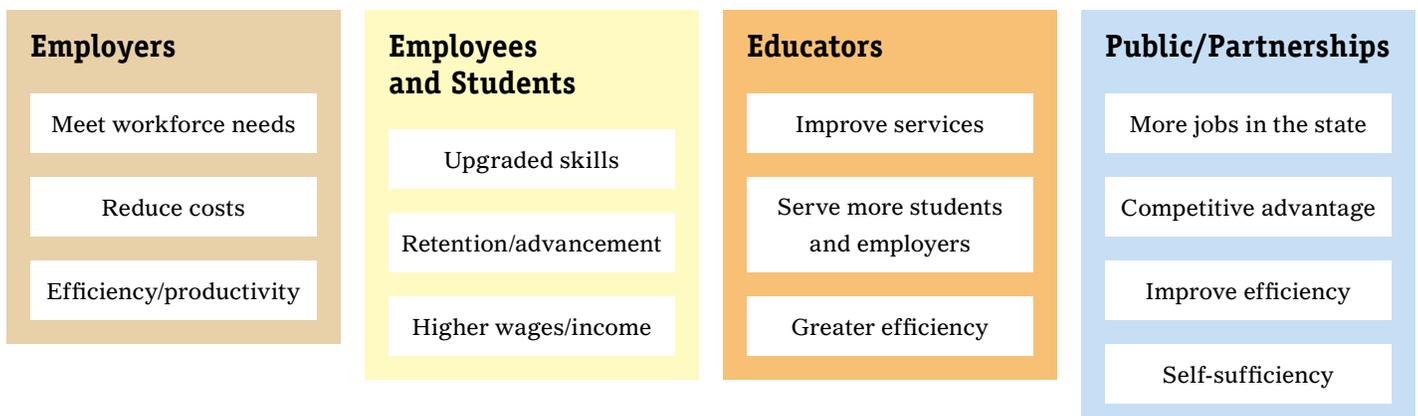
Skill Panels are regionally-based, industry-driven partnerships of employers, public systems, and other stakeholders. They act as a focal point for critical industry workforce needs. They:

- Identify key skill gaps and skill standards for targeted occupations
- Address system inefficiencies and market failures
- Customize training programs for new workers
- Solve incumbent worker training needs
- Identify promising new approaches to meet critical needs
- Share promising practices for adoption and replication

### in order to...



### which provides value to...



## Broader Issues Affecting Workforce Development

Many of the discussions by attendees included broader issues in agriculture that were outside of the purview of workforce development. Issues such as fuel costs, water scarcity, land availability, poor infrastructure, and government bureaucracy were mentioned time and time again. The underlying theme was that the broader issues would ultimately affect workforce development, because these issues were hurting the bottom line for both individual farmers and the industry as a whole.

If a farmer cannot make a livable wage for him or herself due to the high costs of farming and doing business in Hawaii, then how could that farmer afford to pay a livable wage to an employee? If agriculture does not provide a livable wage for workers, then what is the incentive for workers to obtain higher education or go into the field at all? Questions like these were raised to illustrate the connection between the larger issues (high costs of fuel, land and water rights, third-party auditing, certification, and government imposed fees and taxes) and the effects they have on workforce development.

Further, the definition of “sustainable agriculture” in and of itself seems to be a barrier to achieving state and industry

goals. Many of the discussions in the skill panel meetings surrounded topics of sustainability; however, with respect to agriculture, sustainability was described in vast and sometimes differing viewpoints by meeting attendees.

Fortunately, the involvement of the DOA in these meetings was extremely beneficial for participants to have their voices heard on the issues that went beyond workforce development. The DOA has taken the opportunity provided by the skill panels to move forward on some of the recommendations gleaned from the meeting discussions. In addition, the DOA recently submitted a legislative package comprised of legislative changes that are a direct result of the recommendations provided in the Skill Panel meetings. Through continued conversation and legislative and administrative changes, the overall vision for the State is to create an “agricultural renaissance” fueled by collaborative initiatives, involving multiple state agencies and industry partners, to fulfill the priorities under the Governor’s *New Day Plan*.

The following bills were submitted as part of DOA’s 2013 legislative package. Six of the seven proposed bills directly correlate to recommendations by Skill Panel attendees:

### 1. INCREASE BARREL TAX ALLOCATION

#### HB857/SB1088

Revenues generated by the barrel tax are a valuable resource to develop agricultural programs and provide vital positions within HDOA. Currently, the HDOA receives 15 cents of the barrel tax. The desire is to increase that amount to 42.5 cents for HDOA, 42.5 cents for DBEDT, and 10 cents for DOH. UH would continue to receive 10 cents as well. HDOA is in need of strong sustained support for this measure to ensure that vital agricultural programs and positions are funded.

**STATUS UPDATE:** Did not pass 2013 legislative session;\* however, a few positions and programmatic initiatives proposed for funding with the passage of HB857/SB1088 were instead funded through general funds.

### 2. INCREASE AVAILABILITY OF CAPITAL FOR AGRICULTURAL INFRASTRUCTURE

#### HB770/SB992

Access to affordable capital is one of the many challenges that farmers and ranchers face. Expansion of the HDOA loan program will increase the availability of capital for the agricultural community. HDOA wishes to expand the agricul-

tural loan program by allowing for loans for infrastructure and infrastructure improvements.

**STATUS UPDATE:** Did not pass 2013 legislative session.\*

### **3. PROVIDE SUPPORT FOR NEW FARMERS AND NEW FARM INNOVATION**

#### **HB771/SB993**

New farmers are often discouraged from entering into the business due to the difficulty of finding start-up capital. HDOA wishes to help finance new farmers by expanding the definition of those who would qualify for new farmer loans. Furthermore, HDOA wishes to encourage farm practices that can help increase yields and improve the efficiency of farmers and ranchers in Hawaii. As a result, HDOA wants to make capital available for new and innovative farm practices.

**STATUS UPDATE:** Passed 2013 legislative session.

### **4. PROMOTE PURCHASES OF LOCALLY GROWN AGRICULTURAL COMMODITIES**

#### **HB769/SB991**

Purchase of fresh meat and produce by governmental agencies has been problematic with agencies having to issue solicitations for these commodities that tend to be volatile in pricing and availability. In working with the Governor's Office and State Procurement Officer, language was crafted to amend the procurement code to exempt purchases of fresh meat and produce, which will allow agencies to more efficiently purchase these items that are highly perishable, and vary in availability, quality, and quantity.

**STATUS UPDATE:** Did not pass 2013 legislative session.\*

### **5. CLARIFY PERMISSIBLE USES ON IAL**

#### **HB774/SB996**

The important agricultural lands law (Part III, Chapter 205) established methodologies, standards, and criteria to identify, designate, and reclassify important agricultural lands. To date, the land use commis-

sion has designated 89,859 acres of agricultural lands as IAL. However, there is no guidance as to whether IAL is subject to all of the permissible uses and activities allowed on non-IAL agricultural land. HDOA plans to identify permissible and accessory uses and activities on IAL that are in consonance with the definitions, objectives, and policies governing IAL.

**STATUS UPDATE:** Did not pass 2013 legislative session.\*

### **6. AMEND PROVISION ALLOWING OVERNIGHT ACCOMMODATIONS ON AGRICULTURAL LAND**

#### **HB772/SB994**

Act 329 of the 2012 Legislative Session allowed for overnight accommodations on agricultural land as part of an agricultural tourism activity. In order to prevent the potential for abuse of overnight stays, HDOA is clarifying the definition of bona fide agricultural operations to ensure agricultural tourism activity is occurring in the presence of an agricultural operation.

**STATUS UPDATE:** Did not pass 2013 legislative session.\*

\* Hawaii is on a 2-year biennium legislative session. Therefore, all 2013 bills stay alive for the 2014 legislative session, where they can be further discussed.

# Common Themes and Recommendations

As a state made up of islands with four distinct counties, experience has shown that local area needs are often unique to each island. Agriculture is no exception. This was the basis for holding local area meetings rather than one large statewide meeting, so that each local area could provide input on its unique circumstance and perspective. While there were expected differences, the discussions also revealed a number of common statewide themes related both to workforce development and to agriculture issues in general.

## COMMON THEMES:

1. **INCREASING YOUTH EDUCATION AND TRAINING** — Engage young people in agriculture early. To develop their interest in future careers in the field, increase agriculture programs in public schools (including internships and mentorships) and develop clear pathways from secondary to post-secondary education in agriculture.
2. **GARNERING GOVERNMENT SUPPORT** — Educate lawmakers on the importance of agriculture to our economy and the future of sustainability in Hawaii.
3. **STREAMLINING REGULATIONS AND POLICIES** — Educate government agencies on the regulations and policies that are hindering the industry from achieving self-sufficiency goals, then enact new legislation or adopt new processes to overcome barriers.
4. **FOSTERING PARTNERSHIPS AND COLLABORATION** — Work together. With budget deficits and decreased federal funding, more will need to be done with less.
5. **CREATING INCENTIVES FOR INDUSTRY AND EMPLOYEES** — Increase tax incentives for farmers and businesses. Provide more employee incentives,

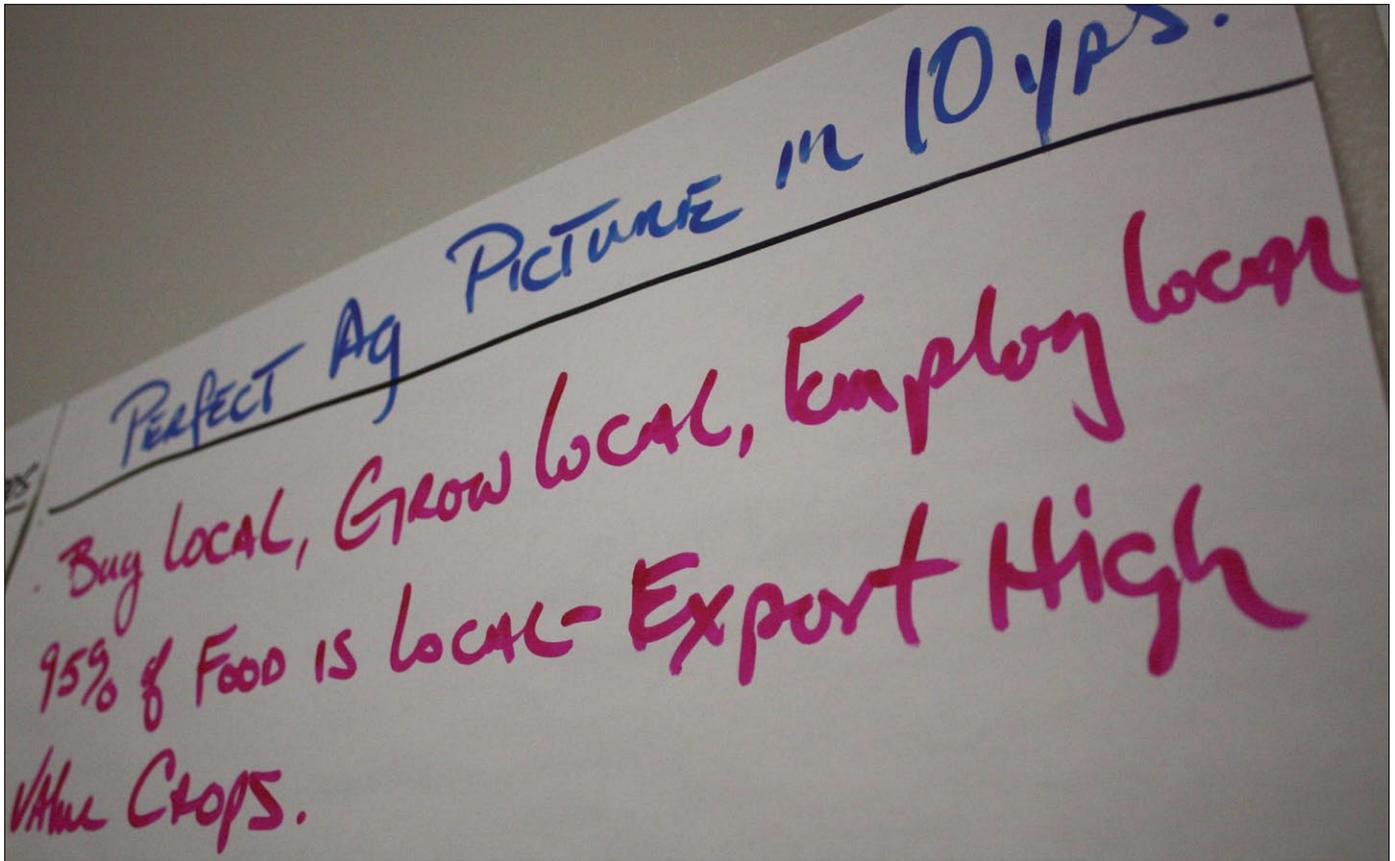
such as housing and loan forgiveness programs, to support the growth of the industry.

6. **IMPROVING THE INDUSTRY'S IMAGE** — To attract a younger generation of workers, the old perception of agriculture as a low-skilled, low wage job will need to be overturned.
7. **MARKETING, DIVERSIFICATION, AND ACCESS TO MARKETS** — Develop Hawaii-specific agriculture marketing plans. Support opportunities to diversify with value-added products. Explore new markets or streamline government regulations so that farmers have access to new markets such as the military.
8. **DISSEMINATING AND SHARING RESOURCES** — Create a mechanism to share existing resources like scholarships, grant funding, and other government programs that can help support the industry.

## COMMON RECOMMENDATIONS:

Developed out of those common themes, the following Workforce Development Recommendations were established:

1. **Develop an “Agriculture workforce training and funding resource list” (a database) through a state-funded initiative.** An asset map would provide the following:
  - A. a catalog of available agriculture-related training programs offered statewide; and
  - B. a catalog of available funding for training at community-based organizations, the community colleges, and Master Gardener programs.



2. **Support and promote agricultural education pathway programs and vocational training through mentorships, internships, On-the-Job Training (OJT), and apprenticeship programs.**

A. The DLIR and Local Workforce Investment Boards (WIBs) can identify how WIA formula funds and discretionary grants for training can be utilized (through their Adult Worker and Dislocated Worker programs, National Emergency Grants (NEGs), the State Energy Sector Partnership (SESP) and Job Training Program, etc.).

B. The Veteran-to-Farmer program can serve as a model.

3. **Identify training needs for new and existing farmers in skill areas like business management, record-keeping, agriculture economics, etc.** This could be done by:

A. Developing curricula in collaboration with the community colleges and other stakeholders.

B. Using the Employment and Training Fund (ETF) to meet those needs.

C. The Veteran-to-Farmer program can serve as a model.

It should be noted that the general consensus among attendees was that the state's government, industry, and educational institutions are misaligned and disconnected. Another big concern was that the State claims to have goals and priorities on paper that are incongruous with its own actions. Several examples were given, such as the inability for government agencies and public educational entities to purchase more locally-sourced goods due to state procurement requirements; the fragmented career path for agriculture within the DOE's Natural Resource pathway; and the focus by the University of Hawaii on agriculture **research** rather than agriculture **production**.

# **Local Area Meetings**



## MEETING INFORMATION

# Oahu Ag Skill Panel

Hilton Hawaiian Village  
 Mid-Pacific Conference Center  
 South Pacific Ballrooms  
 December 14, 2011  
 8:30 am to 4:00 pm

## LOCAL AREA CHALLENGES – OAHU

Attendees identified one major workforce challenge for agriculture on Oahu as the lack of communication and collaboration between DOE, UH, and the agriculture industry, including the lack of an established agriculture pathway program. Other, less pressing challenges identified by Oahu panelists are:

1. Lack of extension agents,
2. the aging farmer population and disconnect between older farmers and youth to share knowledge and mentor, and
3. language barriers within the existing pool of agriculture laborers, which can hinder productivity and safety.

## RECOMMENDATIONS – OAHU

Issues:							
Roundtable discussions to remove contradictory policies	Show me the money	Tax Incentives	Education	Support and Involve Youth in Agriculture	Economic Constraints	Resources for Farming Support	Tax credits to increase capacity for farmers or private investors to invest
Recommendations:							
» Create a one-stop clearinghouse	» Provide funded education program for skilled, educated and regulatory-knowledgeable workforce, including materials in various foreign languages	» Reduce PUC rates » Reprioritize ag industry	» Roundtable dialogue between entities » Internships	» Leverage their involvement/attitude » Increase involvement and education » Involve in solutions for the sector	» Fuel, labor, feed, land, transportation » Capital	» UH Extension, HARC, Education programs » Rotating labor pool/labor » Federal/state funding—connecting to producers » Collaboration » Facilities	

Issues:					
Certified/licensed people to run water & energy systems, including a public/private partnership to provide hands on experience in the field.	Partner with two existing models to develop workers: Pacific Gateway Center – immigrant model and Richard Ha’s community model.	Entrepreneurial Leadership/Thinking/ Education/Youth	Support for Research & Development	Collaboration with nonprofits and private sector	Job Readiness
Recommendations:					
		<ul style="list-style-type: none"> <li>» Entrepreneurial leadership/thinking</li> <li>» Young people breaking the barriers and being involved in farmers market – actually selling products grown (Malama Learning Center)</li> <li>» Make use of aging workforce – helping to navigate/skills &amp; expertise/mentoring</li> <li>» Sustained relationships between industry and education – create alignment</li> <li>» Engaging youth in the workforce</li> <li>» Supporting associations in secondary and post-secondary – “Future Farmers of Hawaii”; pathways for students into agriculture careers (like HRSA)</li> <li>» Future Farmers of America</li> <li>» Internships – bringing in interns from CTAHR</li> </ul>	<ul style="list-style-type: none"> <li>» A lot of innovations locally</li> <li>» Teach people how to use small by-products – innovation – to pilot scale up to yes/no answers</li> <li>» Greater support of research and development</li> <li>» Moving R&amp;D out into community use (CTAHR) – restructuring system</li> </ul>	<ul style="list-style-type: none"> <li>» Private industry working with education</li> <li>» Opportunity to collaborate with nonprofits focused on sustainability (ex. interest in energy and agriculture); vs. total dependence on government</li> <li>» Partnering with private sector (ex. Ulupono, Monsanto, Kuhio) – meeting landowner’s needs</li> <li>» Sustained relationships between industry and education – create alignment</li> </ul>	<ul style="list-style-type: none"> <li>» Provide Training:</li> <li>» At worksites for current and potential workers.</li> <li>» Create and fund Job-ready Specialist positions around sites where there are potential workers (e.g., homeless shelters, prisons).</li> <li>» Strengthen CTE Natural Resources pathway to lead to career readiness.</li> <li>» Support young farmer training programs.</li> <li>» Partnerships and Collaboration:</li> <li>» Link with one-stop centers.</li> <li>» Improve interface with PSD.</li> <li>» Initiate discussions with DOE.</li> <li>» Improve Data Collection:</li> <li>» Establish reliable, accurate data collection and reporting system.</li> <li>» Have more communication between producers, the public workforce system, and potential workers.</li> </ul>

**BREAKOUT GROUP #1:****Expanding Regulatory Capacity**

Description: Expanding regulatory capacity to ensure the safety and quality of food production and processing as well as protect Hawaii's agricultural industry and unique natural resources and ecosystems from invasive species.

**Challenges Affecting Expanding Regulatory Capacity**

**LANGUAGE BARRIERS:** Panelists identified that most farmers on Oahu are not native English speakers. Most are immigrants from out of the United States, where their first language could be as diverse as Laotian, Chinese or Filipino. As a related matter, cultural differences were identified as a barrier and challenge for farmers. Cultural barriers, in which farmers from other countries are not accustomed to the rule of law when it comes to Ag production, tend to exacerbate language barriers already present.

**GOVERNMENT CUTBACKS AND THEIR EFFECT:** Panelists noted that the lack of extension agents for farmers was a challenge affecting the extension of agriculture on Oahu. Support from the government, which included outreach, effective communication between producers and buyers, and overall management of regulations relating to agriculture was a growing challenge, especially for new farmers. Some suggested the solution to this challenge as simple as putting back staffing that was cut over the past couple of years, along with possibly making the job more attractive by adjusting pay scale and salary for those positions.

**Desired Outcomes for Expanding Regulatory Capacity**

In 10-20 years the committee envisioned a one-stop shop to streamline the regulatory process. The state of Hawaii will have prioritized agriculture for support and funding. The state's educational entities will be educating farmers and regulators to encourage import replacement. Further, the state and its farmers will be adaptable to technology innovation.

**Priorities to Support Expanding Regulatory Capacity**

- » **PRIORITY 1:** Roundtable discussions to remove contradictory policies (streamline)
- » **PRIORITY 2:** Show me the money
- » **PRIORITY 3:** Tax Incentives
- » **PRIORITY 4:** Education

**BREAKOUT GROUP #2:****Enhancing and Increasing Opportunities for Farmers and Farm Workers**

Description: Enhancing and increasing opportunities for farmers and farm workers to provide the human capital necessary to position agriculture as an entrepreneurial enterprise and an economic driver for Hawaii.

**Challenges Affecting Enhancing and Increasing Opportunities for Farmers and Farm Workers**

At the elementary and secondary level, there is a lack of connection by the DOE to start the education and knowledge base for agriculture early. Currently, students are not associating education with agriculture and do not have a positive association with agriculture. Also, several participants mentioned the need to increase mentorship and internships, because farmers with expertise are not connecting with future farmers. About 80% of the time on a ranch or farm is labor and students need to experience that. If possible, farmers should receive funding for hosting an intern or conducting a mentorship, because students are inexperienced and need a lot of supervision. This will also promote more local workers because there is an economic incentive to train them.

In higher education, participants felt that there needed to be a more formal avenue for communication between agriculture and education. Currently, the network is largely informal. Also, the objective for higher education should be connecting training needs with workforce needs (such as preparing management and marketing staff) and expanding opportunities for those educated in the community colleges and universities. It was agreed that workers need a range of skills. Other skill needs addressed included: critical thinking skills (motivating and supervising others); project management with best practice analysis; general business and research skills; and language skills for farm staff that don't speak English.

Major challenges plague agriculture labor including poor public perception of working in the Ag industry, seasonal and unpredictable nature of the work, and poor wages and benefits packages. One participant pointed out that it takes \$54,000 to support a family of four for a year on the Big Island. Farmworkers are making \$40,000, maximum. Farming does not provide a livable wage. One

suggestion to overcome this is a social service package that is helping to pay for housing, transportation, health, childcare, and other costs. To increase pay to a livable wages, it would take consumers willing to pay for product at a level to support farmers' decisions to pay workers a sustainable wage.

**Desired Outcomes for Enhancing and Increasing Opportunities for Farmers and Farm Workers**

The theme for the groups' vision of agriculture in 10-20 years is "Change." Perceptions will change about agriculture work, consumers will change their buying habits to locally-grown, the business and regulatory environments will change to become more supportive of agriculture and less hindering, and education will change to include the values, culture, and curriculum necessary to grow the next generation of farmers.

There will also be a shift in focus to diversified agriculture and niche crops and more locally grown crops will be established to displace imports. In addition, future farmers will have more opportunities to enter the industry through government loans and programs, like incubator and veterans' programs, and farm workers will have incentives to stay working in agriculture, especially in shortage areas.

**Priorities to Support Enhancing and Increasing Opportunities for Farmers and Farm Workers**

- » **PRIORITY 1:** Support and Involve Youth in Agriculture
- » **PRIORITY 2:** Economic Constraints
- » **PRIORITY 3:** Resources for Farming Support

**BREAKOUT GROUP #3:****Full Build Out of Agriculture Infrastructure**

Description: Developing essential agricultural infrastructure to support the build out of the industry and expansion of market opportunities.

**Challenges Affecting Full Build Out of Agriculture Infrastructure**

There seems to be outright hostility and lack of understanding on the part of Department of Education schools for allowing the certification of nurseries in schools. Instead, some noted that the worst students were the ones directed to Ag programs en masse, instead of those interested and encouraged to attend. There are significant challenges at the high school level, with resources for Ag programs cut or reduced.

Farmers have challenges in dealing with the government. This included mistrust between farmers and the government, with heavy handed policies and miscommunication between entities due to language issues. Some mentioned that government seemed to be playing a game of “Gotcha” with farmers instead of helping, especially in the areas of safety and employment compliance. Farmers attending felt that there needed to be better communication between farmers and government.

A third concern had to do with the overall age of farmers, being that most are in their 60’s and will retire in the next couple of years. These retirements may have the effect of shutting down farms or selling them off to developers, thus losing the ability to grow crops and manage the land as farmland into the future.

Generally, members of the committee mentioned again and again the need for more extension agents to support the farming community. Development of farmer-to-farmer mentoring, targeting students already in Ag programs with incentives such as tuition payment, language assistance for non-English speaking farmers, and creating farming incubators for new farmers were identified as needs.

**Desired Outcomes for Full Build Out of Agriculture Infrastructure**

In general, participants were hoping to see the Ag industry in 10 to 20 years more organized than it is now. From having specified engineers to oversee water and energy issues to scientists looking at new technologies, participants are hoping to see a more focused direction in the way Ag is developed on Oahu. With the goal to “feed ourselves better”, participants would like to see everything from students being more enthusiastic about getting into Ag because of its vital role on Oahu to training farmers to be entrepreneurs as well as planters to provide them the business acumen for success. Other participants wanted to see farm communities developed, in which self-sufficient agricultural clusters with multiple farms are combined with energy sources and production facilities all in one area.

**Priorities to Support Full Build Out of Agriculture Infrastructure**

- » **PRIORITY 1:** Tax credits to increase capacity for farmers or private investors to invest.
- » **PRIORITY 2:** Certified/licensed people to run water & energy systems, including a public/private partnership to provide hands on experience in the field.
- » **PRIORITY 3:** Partner with two existing models to develop workers: Pacific Gateway Center – immigrant model and Richard Ha’s community model.

**BREAKOUT GROUP #4:****Growing Diversified Agriculture**

Description: Growing diversified agriculture to coincide with new developments in technology and growing practices and reduce the reliance on imports to ensure food sustainability and security.

**Challenges Affecting Growing Diversified Agriculture**

There was a general feeling that more needed to be done with the DOE's pathways programs. Education needs to align curriculum with industry needs, raise standards on STEM, and start students in college credit courses in high school. Also, it was noted that there is better communication between secondary schools and the community colleges, but that communication with UH-CTAHR needed improvement.

Budget cuts in higher education and the Department of Agriculture have greatly affected communication between industry, extension, and research, which is hurting intellectual capacity and expansion of agriculture. We must propose legislation to increase extension agents so that communication can be re-established or increased.

There was a consensus that jobs in the agriculture industry are perceived as low-skill and low-wage. It is difficult to get labor because people join as laborers in the agriculture industry as a last resort. Participants felt that careers in agriculture are not attractive to younger generations. The key to attracting them is that employers need to provide desirable work conditions, spend time training, and provide benefits.

Some noted that there is a benefit for agriculture with the new Green economy and focus on sustainability, which could create a "cultural shift" and help to change people's perceptions that Agriculture is "sexy."

It was identified that both labor and the development of specialty science occupations is needed in order for diversified agriculture to grow. Another key issue is the lack of business skills in agriculture, including writing (business plans, etc.), marketing, economics, and financing. The Ulupono Initiative, projected job growth in several Ag sectors estimated at 1,200 – 2,000 jobs in the next 2 years. This includes jobs that descriptions don't exist for

yet (ex. algae, ethanol) and skills sets that don't exist yet in Hawaii, which include expertise in bio crops, mass production, food products, and a combination of food and energy.

**Desired Outcomes for Growing Diversified Agriculture**

The key message from this section was a call for more integration. Attendees expressed that the best-case scenario, in 10-20 years, would be an integrated system including food, fuel, and feed as well as more integrated farming methods (integrated crop production, fish ponds, and terrestrial animals, etc.). The hope is that more integration will increase food production locally, creating a more sustainable environment for local farmers. The groups overarching goal was determined: To increase food production locally to 20% by 2020.

**Priorities to Support Growing Diversified Agriculture**

- » **PRIORITY 1:** Entrepreneurial Leadership/Thinking/ Education/Youth
- » **PRIORITY 2:** Support for Research & Development
- » **PRIORITY 3:** Collaboration with nonprofits and private sector

**BREAKOUT GROUP #5:****Practical Application of Agriculture Skills**

Description: Develop special projects at a site like He'eia, as proposed by HCDA, to utilize synergies between departments to fully illustrate the possibilities inherent in an expanded agricultural industry and the interconnectedness between agriculture and the community. Provide similar opportunities in an urban setting.

**Challenges Affecting Practical Application of Agriculture Skills**

Participants noted several areas that were lacking between education and industry.

**LACK OF COLLABORATION:** Six pathways developed by CTE Advisory Councils do not have a lot of participation from the Ag Industry and are under-developed; No specific interface between Ag industry and schools; Very little research is being done to move forward in Ag practices, such as more efficient taro production; There is a lack of blended Ag and Healthcare curriculum for producing foods that improve health; No clear link or collaboration with the business community; and UH does not refer students for internships.

**LACK OF A UNIFIED VISION:** Education in Hawaii is more western driven with little focus on Hawaiian culture; The Education system does not view Ag as an employment source; Farming is looked at as an activity, not a business; Education views the Ag industry as one entity but it is created by many diversified small businesses; A negative stereotype of Ag not being “academic enough” with many perceiving Ag as “dirty plantation work” instead of a business; and Politicians do not understand the industry.

**INSTITUTIONAL/GOVERNMENT BARRIERS EXIST:** Loss of skilled Ag teachers (from retirement) and are replaced only by part-time Ag teachers who are full time for other subjects like Science; Government places restrictions on food safety so that children cannot eat the food at school they have grown in school farms; and Institutions not encouraging Ag, even as a Minor degree, to accompany applicable Majors like Business, Law, and Nursing.

Currently, each island is importing seasonal Ag labor while we could be using the untapped workforce in our state. Untapped labor sources could include prisoners,

parolees, people with special needs, and youth. Many in the current Ag labor force are lacking adequate skills and workers are not prepared when they show up for work. There are also many supports needed for Ag laborers, such as transportation and housing, because wages are generally low.

In addition, a lack of accurate Labor Market Information and job listings is further hindering the industry. It is difficult to know how many Ag jobs really exist, as one farmer noted, as he had more job openings last year than the DLIR report said existed for his whole county last year. Department of Labor tries to get job postings out via HireNet Hawaii, but the challenge is to get more current information from more employers.

**Desired Outcomes for Practical Application of Agriculture Skills**

Practical Applications of Agriculture are a priority in the state with models in every community for sustainable, affordable initiatives. Initiatives should include: buying local, selling nationally, local food production meeting the needs of the state, educating consumers, a positive collective image of farmers, involving youth from an early age, an organic farm training center, a fully articulated Ag curriculum taught in schools with skilled full time Ag teachers, integration of all State Ag plans, recruitment and retention programs for youth, preserved Ag land, education waivers for Ag students, every school cafeteria serving food from school farms, FFA in every high school, affordable workforce housing near farms, gardens at every household, every new development allocates an amount of land to growing food, clean water with water rebates, long term Ag leases for farmers to live on and farm, culturally relevant farming, Nursing working with Ag from birth to death, health insurance rebates for home farming, marketing Ag as much as other industries (like tourism), encouraging or requiring markets to buy directly from local producers, Department of Ag focuses more on being a resource than on compliance, legislation makes it feasible to make and buy local, farmers are educated about standards and business management, and collaboration between Ag and multiple agencies.

**Priorities to Support Practical Application of Agriculture Skills**

» **PRIORITY 1:** Job Readiness



## MEETING INFORMATION

# East Hawaii (Hilo) Ag Skill Panel

Nani Mau Gardens  
421 Makalika St. Hilo, Hawaii  
January 24, 2012  
8:30 am to 4:00 pm

## LOCAL AREA CHALLENGES – HILO

The two main challenges identified by the Hilo meeting attendees are:

1. a lack of communication and
2. an unclear educational pathway for agriculture.

Participants felt that both the Department of Education and the University of Hawaii have inadequate communication with the agriculture industry. In addition, they felt that the pathway for agriculture from the secondary (high school) level to the post-secondary (college) level is not clearly defined, and that there is no “agriculture academy” that exists in Hawaii’s public school system like the existing “academy” for the construction industry.

## RECOMMENDATIONS – HILO

Issues:			
Networking, Education, & Partnerships	Economic Incentives	Accessing Markets	Land & Water
<b>Recommendations:</b>			
<ul style="list-style-type: none"> <li>» Roster of attendees here today distributed</li> <li>» Resource person to coordinate</li> <li>» Establish local natural farming facilities</li> <li>» More technical training in new innovations in farming and alternative energy</li> <li>» Island-wide broadband for everyone</li> <li>» Partnering with military to change their buying habits</li> <li>» Resource location for meetings to access information</li> <li>» Ag curriculum in K-12 schools</li> <li>» Address regulations for food safety in schools, etc.</li> <li>» CTAHR needs to increase the number of Extension Agents</li> <li>» Ensure SWCD relationships in perpetuity</li> <li>» Increase outreach</li> <li>» Create partnerships between research and sustainable farmers</li> <li>» Get ranchers and farmers on the Water Board</li> <li>» Create a method to have 2 joint associations meeting (quarterly) to discuss workforce issues. (There are more than 2 dozen Ag-related associations; many farmers belong to 2 or more, but the associations don't meet jointly like a joint chamber meeting with the education sub-committee)</li> <li>» CTAHR/UH develop informational and/or teaching videos to show on public T.V.</li> <li>» Videos may show new technology in agriculture; Best practices in agricultural production; and Natural Farming techniques.</li> </ul>	<ul style="list-style-type: none"> <li>» Rebates for essential Ag operation needs</li> <li>» Tuition waiver programs for technical trainings</li> <li>» Decrease shipping costs</li> <li>» Eliminate barriers to organic/green farming tax incentives</li> <li>» Incentivize alternative energy; provide funds to get started</li> <li>» Increase cost sharing by government to start up and incentivize producers</li> <li>» Self-help programs and barter</li> <li>» Identify local substitutes for imported value-added products</li> <li>» Incentivize hiring of local graduates</li> <li>» Teach farmers economics</li> <li>» Positive reinforcement for producers who are following the rules</li> <li>» Provide internships for students</li> <li>» "County Share" for equipment</li> <li>» Increase the number of Ag parks on state lands</li> <li>» Incentives for those increasing the fertility of the land</li> <li>» Free and affordable training</li> <li>» Address bee/apiary problems and the need to restore our local bees</li> </ul>	<ul style="list-style-type: none"> <li>» Farm to School Program and other state institutions</li> <li>» Reform procurement laws (in process)</li> <li>» Education of producers on what laws/regulations are</li> <li>» Expand "Buy Local" program</li> <li>» Country of Origin labeling – laws need to be looked into and enforced</li> <li>» Increase enforcement</li> <li>» Expand commodities</li> </ul>	<ul style="list-style-type: none"> <li>» State leases (DOA, DLNR) – coming up with a system that gets qualified people onto lease lands without excluding others</li> <li>» Reform Ch. 343 (EA's, EIS's, Conservation District Use Application) – triggers for this could be softened</li> <li>» Create more Ag parks to increase infrastructure</li> <li>» Move all DLNR leases over to DOA (still working on), highest and best use, in a timely manner</li> </ul>

<b>Issues:</b>				
<b>Streamlining Regulatory Framework</b>	<b>Building on What's Working</b>	<b>Institutional/Org Resources &amp; Partnerships</b>	<b>Value-Added Distribution &amp; Marketing</b>	<b>Quality Education</b>
<b>Recommendations:</b>				
<ul style="list-style-type: none"> <li>» Create the one-stop shop – who to go to and technical assistance</li> <li>» Discussion at county and state levels – influence/interface with strategic planning happening at ADC (agricultural practices)</li> <li>» Farm Safety Certification – will help open up some markets</li> <li>» Create college-level courses on navigating and streamlining the regulatory framework</li> <li>» Level the playing field (different standards for foreign imports and trade agreements – lower than ours; wages; use of pesticides; working conditions; domestic produces, local)</li> </ul>	<ul style="list-style-type: none"> <li>» Farm to School Program – funding it and working with DOE and other state institutions to establish true agricultural education programs</li> <li>» Expand education of lawmakers, etc. – strengthen through increasing farmer involvement in advocacy efforts</li> </ul>	<ul style="list-style-type: none"> <li>» Specific leader of effort, point person who is empowered to connect resources, coordinate partnerships</li> <li>» Hold more and smaller skill panel meetings to focus on specifics like “Developing Partnerships”</li> <li>» Form steering committee to bring pieces of partnership together, convene regularly</li> <li>» Increase efficiency of partnerships to avoid duplication, drive ideas forward efficiently</li> <li>» Find resources to bring people together to build collaborations and partnerships, to make things happen</li> <li>» Need a Community Sponsored Ag (CSA) in each community</li> <li>» Reinvest in Ag education across the system, increase positions like teachers, specialists in Ag K-16 champions</li> <li>» Integrate other three priorities into the process of partnerships; don't lose sight of other three priorities</li> </ul>	<ul style="list-style-type: none"> <li>» Look at model in Taos, NM: Food center with certified kitchen, incubator, mobile slaughter house, etc.</li> <li>» Connecting could be done with an interactive website – an “Ag Dating Service”; for example, connecting farmers with graphic designers.</li> <li>» Develop collaborations between farmer, food science professionals, marketing professionals, and distributors.</li> <li>» Share options on how to add value to product.</li> <li>» Develop business connections with other countries to create export opportunities.</li> <li>» Publish a “Hawaii Guide to Value-Added Products” for farmers -- how-to, what are regulations and requirements, etc.</li> </ul>	<ul style="list-style-type: none"> <li>» Make sure Ag is one of the DOE career tracks. Ag is not just farming.</li> <li>» More focus on Ag specific courses – not lumped in with general natural resources. Need targeted funding.</li> <li>» Include more hands-on, student service learning</li> <li>» Develop a cluster around Ag education: national labs, research universities, and applied professionals should collaborate to determine the educational process and type of worker needed. What are you educating them for?</li> <li>» Increase the conversation – create a “critical mass” of information around Ag education for public and government. “Glamorize” it, give it “sex appeal.”</li> <li>» Bring together different extension classes in one place for farmers (CAS model).</li> <li>» Publish a farm manual that compiles information from buyers on what they want.</li> <li>» Use new technology tools to educate youth.</li> <li>» Develop a traveling exhibit to go around to schools: each exhibit with a different component of Ag – “Wide, Wide World of Hawaii Ag.”</li> </ul>

**BREAKOUT GROUP #1:****Innovation and Sustainability**

Description: New technologies, ideas and innovation are critical components to the growth and expansion of the agriculture industry. Ecologically-friendly and economically-viable sustainability planning, as well as innovative support for traditional farming, are also critical to agriculture in Hawaii.

**Challenges Affecting Innovation and Sustainability**

There is a great need for more Cooperative Extension Agents in order to increase and sustain interaction between educators and farmers. Currently the extension agents working through CTAHR are bogged down with paperwork and heavy workloads.

The pathway to a career in agriculture is unclear: students aren't sure what classes to take in order to enter an agricultural position upon graduation. Certificate programs need to be developed for each agricultural sector to tie into available jobs.

There is a strong need to engage youth through hands-on apprenticeship and work experience programs, but many barriers exist, including the mentioned lack of agricultural career tracks in education and access to land.

Many prospective workers in the agriculture industry lack supplemental skills like business, marketing, management, and even soft skills like a steady work ethic.

The capacity to employ is low. Most small farmers are self-employed and cannot afford to pay healthcare costs and other benefits, taxes, and a minimum wage for new workers. The cyclical and seasonal nature of agricultural work also limits hiring—some small farmers resort to using a barter or trade system to acquire employees.

**Desired Outcomes for Innovation and Sustainability**

Participants shared a vision of agriculture's future that was centered on a better and broader agricultural education system throughout the state. This would include an integrated K-20 educational program; continuing education for farmers; higher demand for and availability of resources for agricultural scholarships; farm internships; and a registry of qualified agriculture instructors avail-

able to teach. The group's best case scenario would be a holistic approach to agriculture where Ag education would be incorporated into students' everyday learning, with a farm on every school campus. The University of Hawaii Community Colleges would have integrated programs and departments, with Natural Farming courses available. Extension agents would be accessible.

The preferred vision would also include alternative training programs such as ex-offenders' programs using agriculture as a path to reintegration, with similar programs for the homeless and other disadvantaged groups, like kids with ADHD. The vision would also include ten 10-acre teaching farms that are closely integrated with education, where students could learn a wide array of agricultural skills. These training programs would continuously improve and adapt to the changing needs of the industry.

**Priorities to Support Innovation and Sustainability**

- » **PRIORITY 1:** Networking, Education, and Partnerships
- » **PRIORITY 2:** Economic Incentives

**BREAKOUT GROUP #2:****Regulatory Issues**

Description: There is a critical need to strike a balance between setting regulations for safety and consistency and being unduly restrictive on individual farmers. Strategic action steps (i.e., legislation, laws, ordinances, public awareness, etc.) should be taken to target and identify the regulatory issues that are deemed unnecessary.

**Challenges Affecting Regulatory Issues**

Agricultural rules and regulations come from many different places, and the complexities of those rules have the effect of unintentionally setting up some farmers to fail. One suggestion to improve this complexity would be to bring the county, state, and federal regulations together in one place so that farmers don't have to fulfill piecemeal and duplicative regulations. Communication is not enough.

Farmers are not realizing what's involved at the front end when they start a new business. It was suggested that maybe some sort of primer or checklist be formed to lessen the disconnect. Otherwise, further training may need to be offered.

Right now, near-term relief is needed more than long-term relief. Permitting is seen as a daunting task; addressing it now could help the industry develop.

Regulatory issues are affecting labor and labor shortages. With the downturn in the economy, the state government had to cut positions focused on agricultural development in the state. Less staff meant that more had to carry a larger workload, which is unsustainable in keeping the status quo.

There is not an abundance of functioning farms, so there is no incentive to create a labor force to work those farms. As a result, there are a shrinking number of agriculture experts to help develop the industry. Many who were farmers at one time have since left to pursue other growing industries.

**Desired Outcomes for Regulatory Issues**

The outcomes that participants wanted to see in 10-20 years were diverse. Most agreed upon these items:

- Create a One-stop office to call for regulations and how to do it;
- Join together individual farmers to fill more and bigger markets;
- Streamline regulations (this was a constant theme);
- Address the lack of health insurance affordability for farmers (either through a tax credit or some other fiscal vehicle);
- Instill in Hawaii's youth a sense of creativity, flexibility, trying new ideas, and experimentation, to foster technical skills or just the ability to think openly; and
- Increase the number of county extension agents with a full spectrum of education to provide technical assistance

**Priorities to Support Regulatory Issues**

- » **PRIORITY 1:** Accessing Markets
- » **PRIORITY 2:** Land & Water
- » **PRIORITY 3:** Navigating and Streamlining the Regulatory Framework
- » **PRIORITY 4:** Building on What's Working

**BREAKOUT GROUP #3:****Education and Training**

Description: Education and training are vital components in the development and expansion of our future and existing workforce. Having a responsive workforce system that can readily address the needs of farmers and aspiring agricultural entrepreneurs is absolutely essential to sustain and grow this industry. Incumbent worker training, coordinated work-based modules, career exploration and development strategies are all key activities here.

**Challenges Affecting Education and Training**

Communication between education and agriculture is misaligned and disconnected. The Department of Education and the agricultural industry have not effectively communicated what is needed in post-secondary school. The community colleges are not aligned with the leading economic sectors in which higher education should be investing. There is a need for short-term training in various skill sets (such as equipment, welding, etc.) that are not currently provided by the educational entities.

Also, education needs to think broader and include programs that address technology, research, and innovation and also provide students with non-traditional learning through hands-on experiences. Programs are needed to mentor students and link them to land and other resources like scholarships, so that there is a pipeline not only to continuing education but also directly into farming if the student wants to pursue that path.

One suggestion to ease labor shortages on the Big Island was to create a registry of employment opportunities for farmers, similar to a “nurses” registry, so that farmers can find work.

Participants felt that there is no incentive for agriculture workers to obtain education, because a college degree doesn’t necessarily lead to higher wages. Also, since a clearly defined pathway of secondary and post-secondary agriculture education doesn’t exist, students are not making the connection from higher education to the industry.

Some of the discussion focused on the difference between small farming and large corporate agriculture. While some members felt that “large Ag” is not sustainable, others felt we need to support all agriculture efforts, large and small.

**Desired Outcomes for Education and Training**

Participants hoped that in 10-20 years, the state will reinvest in agriculture through increased education in every school from K-16 as well as in FFA programs and mentorship opportunities. They wanted youth to become engaged in agriculture and get encouragement from their parents to pursue agriculture as a career. They envisioned educators becoming invested by including agricultural education into lesson plans and pursuing continuing education or professional development in agriculture. Overall, they hoped that farming would be elevated as an economically viable career option for youth.

In addition, participants wanted to see more coordination and supportive partnerships between the University of Hawaii System, the Department of Education, and the agriculture industry. They hoped young adults who are out of high school would become engaged in agriculture through the community colleges or through experiences like “A Living Farm,” a well-rounded 2-year agriculture program for people interested in living and working on-site to test-drive agriculture as a career.

**Priorities to Support Education and Training**

- » **PRIORITY 1:** Institutional/Organizational Resources and Partnerships

**BREAKOUT GROUP #4:****Infrastructure and Marketing**

Description: Building and strengthening a comprehensive, responsive support system is fundamental to the vitality of the agriculture industry. A highly integrated communication network must effectively reach all farmers, policy-makers, buyers, distributors, and consumers. Marketing, as a key component to connect products to consumers, must be well coordinated and supported throughout our island community.

***Challenges Affecting Infrastructure and Marketing***

The issues brought up by participants spanned from how the current generation of farmers promotes farming to the next generation to specifically pointing out gaps between the College of Tropical Agriculture and Human Resources and the real-life training needs students have after graduating and going to work on a farm. Other issues focused on current laws and regulations for farmers, how they receive that information from places such as the Food and Drug Administration's HAACP regulations, and how to communicate with non-English speaking farmers.

In addition, participants noted that there are labor shortages in the areas of farm mechanics, food inspectors, overall farm laborers and a lack of technically trained folks with knowledge of the specific agriculture issues in Hawaii. Participants also mentioned that land leases and regulations don't currently allow farmers to live on leased land, which has been a long simmering issue due to agriculture theft and vandalism on farm lands.

***Desired Outcomes for Infrastructure and Marketing***

Participants wanted to see all vested interests team up to ensure that laborers' health is well protected through better insurance coverage. They also hoped that farmers would have the chance to recruit workers from a wide variety of areas (including an H1 visa program for farmers), and that the educational system would promote farming. There were other focused points brought up by the group, such as:

- CTAHR would become more proactive in farming outreach;
- Business-minded mentorship programs would be created to provide input to help farmers grow their businesses;
- The Workforce Development office would partner with business groups on an internship program; and
- A healthy exports/import business, good flow of currency, and a solid Chamber of Commerce would take shape.

***Priorities to Support Infrastructure and Marketing***

- » **PRIORITY 1:** Collaborative Opportunities for Value-Added Products, Distribution and Marketing
- » **PRIORITY 2:** Quality of Education: Producing Skilled Workers & the Next Generation



## MEETING INFORMATION

# West Hawaii (Kona) Ag Skill Panel

King Kamehameha Kona Beach Hotel  
75-5660 Palani Road, Kailua-Kona  
March 6, 2012  
8:30 am to 4:30 pm

## LOCAL AREA CHALLENGES – KONA

The three major challenges identified by Kona attendees are:

1. lack of communication between agriculture and education,
2. low wages for agriculture workers and high costs of farming in Hawaii, and
3. lack of extension agents and services.

A lack of communication has resulted in the Community Colleges not offering courses on specific and important agriculture needs, such as food safety and the University focusing on research rather than production. Poor agriculture wages and the high cost of living and doing business in Hawaii are resulting in workers leaving the industry for better paying jobs or not entering the agriculture field at all. Furthermore, the lack of extension agents is contributing to the poor communication between the industry and education.

## RECOMMENDATIONS – KONA

Issues:						
Bureaucracy/ Legislation	Education	Non-GMOs and Other Sustainable Agriculture Practices	Future Farmers	Community Collaboration	Funding and Finance	Government
Recommendations:						
<ul style="list-style-type: none"> <li>» Change State procurement code under the justification and current priorities of the State’s initiatives of food security and sustainability</li> <li>» Allow farmers and farm workers to live on ag lease land and Kamehameha School/ Bishop Estates lands</li> <li>» Stop invasive species from coming on island through increased manpower (more ag inspectors)</li> <li>» Create and impose an inspection fee on imported produce and products</li> <li>» Eliminate GET on all locally grown produce</li> <li>» Change building code to allow ag workers affordable housing</li> <li>» Better enforcement (mandatory labeling) by Department of Agriculture</li> <li>» Expand Department of Agriculture loan program</li> <li>» Enhance Department of Business, Economic Development &amp; Tourism’s marketing of local products worldwide</li> <li>» Increase outer islands’ citizens access to participate in legislative testimony</li> </ul>	<ul style="list-style-type: none"> <li>» Repay ag students college loans when graduated</li> <li>» Train farmers on business development skills</li> <li>» Outreach training for marketing, branding, and value-added product development</li> <li>» K-12 organic gardening</li> <li>» Training for teachers to teach ag (ag-specific professional development)</li> <li>» Culinary arts and lunch from the garden</li> <li>» Pool scholarship funds</li> </ul>	<ul style="list-style-type: none"> <li>» Enforce pesticide “drift” laws</li> <li>» Eliminate use of pesticides/herbicides on all public places, especially schools and parks</li> <li>» No GMO food crops grown on island</li> <li>» No GMO tests on island</li> <li>» Educate community on effects of GMO through marketing campaign</li> <li>» Make Hawaii Island (or the State) a “GMO Free Zone”</li> <li>» Create legislation to ensure that sustainable practices are given substantial priority and funding to meet the State’s food security and sustainability initiatives</li> <li>» Create a non-GMO seed bank on Hawaii Island</li> <li>» Require GMO labeling for all imported products</li> </ul>	<ul style="list-style-type: none"> <li>» Integrate and support school gardens and encourage sustainability in school curriculum from Early Childhood/K-12 education</li> <li>» Tie in daily DOE curriculum to include agriculture, aquaculture and ranching</li> <li>» Fund a 6-month cycle internship for local future farmers</li> <li>» Promote mentoring and young farmer training programs</li> <li>» Shift change in attitude to “You CAN make a living as a farmer in Hawaii” and “Making a Difference” and “It’s a lifestyle”</li> <li>» Have workshops for mature farmers like “Master Gardener to Farmer” or “Managing a Profitable Farm”</li> <li>» Replicate creative ideas like at Hana High School where interns get \$7/hr pay and \$4/hr worth of produce for interning</li> </ul>	<ul style="list-style-type: none"> <li>» Identify existing leaders in farming cultural groups and encourage them to be a gateway for community collaboration</li> <li>» Find funding for certified kitchens to launch/re-launch to expand value-added product lines of local farmers</li> <li>» Create and maintain web-portal for farmers, laborers, consumers, restaurants and retail, etc., to connect</li> <li>» Encourage collaboration between local farmers and restaurants/chefs (i.e., producers and buyers)</li> <li>» Increase small farmer co-ops where farmers collaborate to meet the needs of local businesses</li> <li>» Create local Hawaii branding and/or local farm branding (i.e., insignias on doors of restaurants that buy that farm’s produce such as “We Support the Following Local Farms”</li> <li>» Collaborate to create an annual Farm Aid Hawaii concert with a website to promote small farming and educate the public about sustainability, etc, as well as to raise money for ag issues (invite Willie Nelson, Santana, Jack Johnson, etc.) and market this as a concert festival with music, booths, hands-on educational activities, media, etc.</li> <li>» Hold regular County Ag Forums (monthly or quarterly) to keep conversation going</li> <li>» Have a directory of local produce buying businesses and have volunteers with signs identifying businesses</li> <li>» Collaborate to get more local people buying local food instead of mainly tourists. (i.e., ensure food stamps are accepted at farmer’s markets)</li> <li>» Encourage consumer awareness</li> </ul>	<ul style="list-style-type: none"> <li>» Connect the government’s vision with state funding for Ag programs</li> <li>» Develop a local brand program</li> <li>» Fund effective public transportation</li> <li>» Properly staff government ag-related agencies</li> <li>» Fund and re-vamp commercial kitchens</li> <li>» Ease access to capital for farmers</li> <li>» Fund field trips and hands-on resources in DOE</li> <li>» Department of Agriculture should develop a staff position for writing grants for ag industry and farmers to increase federal funds flowing into the state for ag development</li> <li>» Hire state government staff to assist with the “Fresh Fruit and Vegetables” USDA grant money implementation to avoid wasting these available funds</li> </ul>	<ul style="list-style-type: none"> <li>» Increase number of import and export inspectors</li> <li>» Assist in policy that will decrease imports</li> <li>» Legislation that recognizes the differences between small farms and large scale agriculture</li> <li>» Increase availability of transportation options to various markets</li> <li>» Study feasibility of using volunteer Ag inspectors</li> <li>» Adapt existing models used elsewhere to Hawaii needs</li> <li>» Support legislation that will increase the amount of farm worker housing</li> </ul>

Issues:							
Production	Education	Transportation	Government Policies	Land Availability	Improve Image: Make Agriculture a Desirable Profession	Take Advantage of Best Practices, Training and Education	Foster Political Interest and Cooperation
Recommendations:							
<ul style="list-style-type: none"> <li>» Create small neighborhood co-ops to share hiring, machinery &amp; equipment, and other resources</li> <li>» Promote “Buy Hawaii, Buy Local”</li> <li>» Create FarmWatch programs (similar to Neighborhood Watch) to deter theft and vandalism</li> <li>» Create and issue Market Report (to match market needs with farmer production and vice versa)</li> <li>» Build more commercial kitchens</li> <li>» Create website and other information sources that provide farmers with needed information in easily accessible, understandable, user-friendly format</li> </ul>	<ul style="list-style-type: none"> <li>» Have all high school students learn how to grow their own food.</li> <li>» Have continuing education for adults teach how to grow your own food.</li> <li>» Have adults and youth participate in community gardens.</li> <li>» Educate and publicize to consumers to “buy local, eat local”.</li> <li>» Provide vocational education/ courses on how to run your own business, cost study and farm education</li> <li>» Offer courses in how to grow various crops and produce.</li> <li>» Provide degree in cattle farming.</li> <li>» Have available internship in agriculture at Hilo College.</li> </ul>	<ul style="list-style-type: none"> <li>» Adjust inter-island ocean freight schedule to meet the consumer market needs. (Shoppers purchase most on weekends.)</li> <li>» Need to introduce another competition for inter-island freight.</li> <li>» Establish perishable crop handling facilities at ports.</li> <li>» Create distribution networks to pick up fruits, vegetables through Hui’s.</li> <li>» Product cost would decrease if better public transportation was provided for the workforce that is more convenient for workers to get to work. Currently employers are providing transportation to farm labor workers.</li> </ul>	<ul style="list-style-type: none"> <li>» Deregulate some government policies.</li> <li>» Educate public to vote for pro-agriculture legislators.</li> <li>» Reorganize our power structure in government.</li> <li>» Have government policies that would promote “grow local, buy local and eat local.”</li> </ul>	<ul style="list-style-type: none"> <li>» Work with County of Hawaii to make agriculture land available to local farmers.</li> <li>» Provide those who newly graduated with Agriculture degree agricultural land, either by lease or conditions to purchase.</li> <li>» State of Hawaii to make land available to grow food.</li> <li>» Provide farm lands infrastructure, roads, water, etc.</li> <li>» Government should encourage large land owners to provide to farmers land for long term agriculture use.</li> </ul>	<ul style="list-style-type: none"> <li>» Make use of “Farm to Table” being a hot topic</li> <li>» Utilize the local food movement to help develop a brand which will get the public to understand and value locally grown products</li> <li>» State and county focus on “buying local” and cooking make Ag a more acceptable occupation</li> <li>» Make it possible and known that there is a future in agriculture.</li> <li>» Improve pay and benefits for farm workers while still making it possible for farmers to make an acceptable profit margin.</li> </ul>	<ul style="list-style-type: none"> <li>» Integrate agriculture education and training throughout K-12, as well as colleges and universities.</li> <li>» Develop internship programs where high school and college students can earn credit by participating in internships on farms</li> <li>» Create more opportunities for management training for farmers for a better understanding of administering and complying with labor laws and for establishing programs and practices to help retain a quality workforce</li> <li>» Establish or utilize an existing organization, such as the Farm Bureau, to have a pool of trained agricultural workers and coordinate seasonal employment. The agency can provide all the same services like a staffing agency.</li> <li>» Utilize existing incumbent worker programs like ETF</li> <li>» Build curriculum for a certified training program for trained coffee workers</li> </ul>	<ul style="list-style-type: none"> <li>» Implement a minimum wage that is livable for farm workers</li> <li>» Level the regulatory playing field by having scalable regulation such as with workers compensation and health insurance</li> <li>» Provide incentives for farmers who are in compliance</li> <li>» Increase funding for school-related programs focused on agriculture, such as FFA</li> <li>» Create outreach programs from the government agencies, both for the benefit of the farmers and the agencies so that the agencies will have a better understanding of the changing farming and ranching environment. Educate state and county workers about what farms are doing.</li> <li>» Produce data on what is grown locally and what is needed locally so farmers will know what to grow, eliminating over production and zero production</li> <li>» Develop regulations that will help Ag be a “good job” for both the farmer and the farm worker</li> <li>» Provide funding for an Ag program similar to Construction Academy program which allows high school students to earn college credit while taking Ag classes</li> </ul>

**BREAKOUT GROUP #1:****Innovation and Sustainability**

Description: This topic area will include discussion of innovative training strategies with a focus on sustainable practices in agriculture. The need for teaching more sustainable practices is great as our state is faced with high oil prices and a system that is currently importing 80-90% of its food. Additional areas of discussion include: Organic Farming, Soil Building, and Natural farming.

**Challenges Affecting Innovation and Sustainability**

There is a need for more extension agents and better communication between the industry and UH and the Community Colleges as well as between the different Ag associations on the island. The introduction of Natural farming courses at Hawaii CC was a good sign, but much more must be done to enhance education in sustainable agriculture. There was some concern that the Community Colleges were not teaching the right courses such as agriculture economics and business management and participants felt that teachers were being lost to retirement and not getting replaced. Participants felt that UH was more focused on research and not focused on agriculture production.

To attract the younger generation, participants highlighted that scholarships are available and need to be better promoted, because they are currently underutilized. Also, dwindling Future Farmers of America (FFA) programs on the island was further affecting outreach to youth.

The need for certified kitchens was also a hot topic; however, participants felt that Department of Health regulations currently hindered the development of new kitchens and incubators. Certified kitchens were noted as a great teaching tool to develop skills in creating and marketing value-added products for farmers.

Currently, two factors that are affecting the growth of the agricultural workforce are legal and illegal immigrant farmworkers and the difficulty some students have in finding high-wage jobs upon graduation. Some participants felt that the University and Community Colleges are training students to work for seed companies, because those companies typically pay higher wages.

There is a lack of middle-management and farm managers because those workers are going off-island to find better paying jobs. There are also shortages in related industries that directly affect local agriculture, such as chefs and line cooks and some local chefs' groups are trying to raise money to increase culinary arts. Furthermore, participants felt that there are so many unemployed people, but something is preventing unemployed/underemployed from working in farming.

**Desired Outcomes for Innovation and Sustainability**

Participant's preferred vision encompassed a sustainable agriculture industry with increased public awareness of locally-sourced food, a stronger market for locally-sourced food, availability of new markets for farmers, like the DOE, resulting in increased revenues for local farmers, and increased organizations and government agencies to support the industry.

In addition, there will be more food awareness by the public (i.e. effects of GMOs) and the public will move towards the old ways of life, including traditional farming, living simply and within ones means, with more focus on personal responsibility. The government will support this new way of life by practicing what they preach (i.e. "Buy Local") and by decreasing subsidies for "bad food" or increasing subsidies for "good food."

**Priorities to Support Innovation and Sustainability**

- » **PRIORITY 1:** Reduced Bureaucracy/Legislation
- » **PRIORITY 2:** Education
- » **PRIORITY 3:** Non-GMOs and Other Sustainable Agriculture Practices

**BREAKOUT GROUP #2:****Education and Training**

Description: This topic area will focus discussion around K-12 and Adult education for agriculture. It may also include continuing education for farmers and farm workers to keep up with new and innovative practices. Additional areas of discussion may include: Education and training needs that are lacking in the state as well as best practices of programs in West Hawaii that are currently available.

**Challenges Affecting Education and Training**

Currently, communication between education and the Ag industry is minimal and several factors, such as limited funding for extension services, No Child Left Behind limiting Ag education in the DOE schools, and decreasing number of teachers in the Natural Resources pathway, are hindering communication even further. Also, educators are not assisting in changing the negative images of farming and agriculture and in some cases, may even perpetuate it.

Also, many participants brought up the lack of a unified vision for agriculture. Our government has a new vision (i.e. Governor Abercrombie's "New Day Plan"); however, there is limited communication with the industry regarding this vision. A focused, parallel vision is needed by all in order to successfully move forward.

Many participants pointed out that there is a lack of markets (local stores, restaurants, military, etc.) for farmers to sell local produce and value-added products. How this is affecting education and labor is unknown. However, it is resulting in labor shortages, because farmers do not have enough income to hire local labor. Farmers can barely live on wages due to the high cost of living in Hawaii. Also, there is a lack of training funds for local farmers and disconnect between farmers, training, and available resources.

Another interesting shortage is that there are few local "Willing Workers on Organic Farms" (WWOOFers) and many WWOOFers come in from the mainland and foreign countries to work for trade. Although, this may not be a labor shortage in the traditional sense because WWOOFers do not usually receive regular pay and benefits, Kona participants found value in WWOOFers and think we need more of them.

**Desired Outcomes for Education and Training**

The Kona participants' vision for ensuring a vibrant education and training for the agricultural workforce included a variety of strategies to support it. There will be Farm to school programs in the State, more small-scale "Farm Schools" teaching one-year programs, online classrooms teach agriculture-related topics, a coordinated Ag Pathway from K-16, a refined Ag curriculum that introduces STEM, and young farmer training programs will be developed to train the next generation of farmers.

In addition, the Community colleges and NELHA will work together to become a world leader in aquaculture, there will be coordinated teacher training in agriculture throughout the island, and there will be community support and volunteers to help with Natural Resource pathways teachers. Overall, there will be a more established vision for youth that shows the bigger picture of agriculture to support its growth.

There will also be more business training (i.e. taxes, Ag economics, etc.) available to farmers and people in the Ag industry and there will be more education targeted at government agencies and the community to increase general knowledge of the Ag industry and the benefits of a thriving Ag industry in Hawaii.

The broader vision included large-scale changes at the government and community level. Big picture visions include resources and land that are accessible to farms and farmers, Institutional buy-in with streamlined bureaucracy, more designated Ag land, effective public transportation, the Big Island marketed for sustainability (world-wide model), more people eating locally, and community connected with Community Supported Agriculture (CSAs)

**Priorities to Support Education and Training**

- » **PRIORITY 1:** Future Farmers
- » **PRIORITY 2:** Community Collaboration
- » **PRIORITY 3:** Funding and Finance

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### **BREAKOUT GROUP #3: Infrastructure**

Description: It is hard to discuss supporting and growing agriculture without highlighting the needs in this topic area. Fostering growth in the next generation of farmers as well as existing farmers must include a strong and supportive infrastructure. In addition, what types of labor needs does this topic area encompass and do we have the ability to grow local labor to fill those labor needs? Additional areas of discussion include: Government services, Farmers Organizations (including Farm Co-operatives and Farmers Union), and Farm worker housing.

#### ***Challenges Affecting Infrastructure***

The challenges broke down into specific subsections:

**LEGISLATION**—There were issues of inconsistent legislation from the government regarding materials used in agriculture. For example, participants noted that government does not allow the use of certain chemicals on Hawaii farms. However, produce imported from the continent/internationally are not restricted if those same chemicals are used. Another set of participants wanted to know why the West Hawaii Extension Agent at the Department of Agriculture position was vacant.

**EDUCATION**—Participants noted that farmers’ access to education was key for their development. Certified training for farmers needed to continue, with a desire that it be expanded. This expansion included access to learning materials (books) as well as the ability to hear from experienced farmers who had knowledge on “how it’s done.”

Others, discussing education, wanted to know why the University of Hawaii is now more focused on research farming, rather than in extensions.

#### ***Desired Outcomes for Infrastructure***

Participants were looking at expanding farming beyond just the field and into residential areas. “Victory garden”-type systems were envisioned with people growing crops at home. Resources such as alternative energy, and an integrated distribution system would be in place with a best case scenario for farmers.

Other items that were envisioned include:

- Composting all organic waste,
- Average age of farmers will be 40 years old, not 60 as is currently the case,
- Creation of legal residential camps, and
- Significantly increase imports and significantly increase use of local products

#### ***Priorities to Support Infrastructure***

- » **PRIORITY 1:** Government
- » **PRIORITY 2:** Production

**BREAKOUT GROUP #4:****Food Distribution**

Description: To help the industry thrive and remain economically viable, this topic area is increasingly important in order for farmers to run sustainable and smart businesses. In doing so, how do farmers identify new markets and what are the barriers for farmers to enter those untapped and existing markets? Additional areas of discussion include: Transportation and Marketing.

**Challenges Affecting Food Distribution**

One participant pointed out that there is zero communication in education on food distribution. No one is training that there is a need to use a trucker, have a wholesaler, or a retailer to sell the product or how to get product to the chefs. University of Hawaii researchers educate farmers in new plants but not how to sell it or market products. Education at the University should include the whole distribution system, so that food safety requirements are met and local produce can be sold in Hawaii safely.

At the secondary and post-secondary level, all schools from K-12 need to educate young consumers by providing a school garden curriculum so that they are their own food producers. Also, need to provide students the value of good work ethic “planting + work + healthy job = profit.” This would encourage motivation and pride in agriculture by having students work in their own school gardens.

There was some discussion on the need to educate the consumer about the pricing of local produce and about the lower quality product that consumers are buying from foreign markets just because it is cheaper.

The high cost of labor directly affects food distribution, because a farmer has to hire laborers to harvest crops, etc., which cause the price of products to go up. Farmers often cannot afford to hire the labor needed, so farmers do the job themselves. A better distribution system would lend itself to lower cost allowing farmers to hire more labor.

**Desired Outcomes for Food Distribution**

In 10-20 years, food distribution will be improved through a stronger local market. A stronger local market will be achieved through more support of small farms, more promotion of sustainable, organic and locally grown products, and an increase in farmers markets (both in number and frequency) to provide more opportunities for local products to be sold. Also, better marketing and advertising on a global scale is needed. Also, schools with school gardens or Ag programs will sell more products to local consumers.

In addition, there will be more efficient food distribution vendors, like FedEx, and more opportunities to distribute to the mainland and globally. Shipping containers will be going out daily in order to reach the market on demand days. Lastly, Hawaii will be less dependent on fuel and have alternative energy sources to cut costs.

**Priorities to Support Food Distribution**

- » **PRIORITY 1:** Education
- » **PRIORITY 2:** Transportation
- » **PRIORITY 3:** Government Policies
- » **PRIORITY 4:** Land Availability

**BREAKOUT GROUP #5:****Recruitment and Retention of Workers**

Description: Although plantation farming is now a thing of the past, the perception of farming to be a low-skilled, low-paying job still remains in today's society. How does the industry change this perception and what is needed in order to provide stable, high-paying jobs to the agriculture labor force? Additional areas of discussion include: Immigrant and seasonal workers, Outreach programs and campaigns, Future Farmers of America and 4-H Clubs.

***Challenges Affecting Recruitment and Retention of Workers***

The current state of communication between education and the Ag industry is that it is severely lacking and dwindling. Department of Education (DOE) is straying away from the technical aspects relating to membership in Future Farmers of America (FFA) and memberships have decreased. FFA program ends at 12th grade level and there is no continuity. There is a communication breakdown between DOE and industry.

As a result of this disconnect, students are not choosing agriculture as a career and Ag laborers are brought in from the outside (seasonal, migrant workers), which are not stable and often not a good fit.

Participants described the current state of labor as dismal. There is a lack of both unskilled and skilled labor; pay in the Ag industry is not attractive; labor laws are confusing; seasonal workers are not retainable; and often there are language barriers with migrant workers. In addition, the type of work in agriculture is usually hard and monotonous labor, so workers get tired of the hard work and get bored.

In order to overcome some of these issues, participants suggested incentivizing work. By engaging workers in the whole process and not just one aspect, it may make the job more meaningful. Also, incentives such as profit-sharing and free housing can create appeal for agriculture workers. Regulatory incentives should also be rewarded to farmers who are compliant to level the playing field and encourage farms to stay in business. In addition, employers, farmers and workers all need to be educated and in compliance with labor laws and state laws.

***Desired Outcomes for Recruitment and Retention of Workers***

In 10-20 years, there will be a focus in the Ag industry to find local workers first. There will be more organizations facilitating learning to grow local labor (i.e., Ma'ō Farms), which will create a pool of workers who learn on the farm. Growing local labor for Ag will also be facilitated through schools. School curriculum will focus on Ag from K-16 and also teach entrepreneurial and business skills. High schools will address the need for Ag workers by putting an Ag academy in every school, similar to Construction Academy program funded by the legislature, and the FFA will be brought back as a resource.

In addition, there will be more support for the Ag industry by the community and organizations, like the Chamber of Commerce, and there will be more understating of the value of a strong local agriculture industry. Local agriculture will feed the local community, resulting in increased profit for local farmers so that they can pay workers a livable wage.

Furthermore, farmers will have multiple skills; project management will be used for crop development and diversification; horticultural skills will be integrated with other skills, i.e., project management, business, marketing, management. Project management will have a strategy that fills gaps between seasons, making farm workers employed year-round.

***Priorities to Support Recruitment and Retention of Workers***

- » **PRIORITY 1:** Improve Image: Make Agriculture a Desirable Profession
- » **PRIORITY 2:** Take Advantage of Best Practices, Training and Education
- » **PRIORITY 3:** Foster Political Interest and Cooperation



## MEETING INFORMATION

# Kauai Ag Skill Panel

Kauai Beach Resort  
4331 Kauai Beach Drive  
May 11, 2012  
8:00 am to 3:30 pm

## LOCAL AREA CHALLENGES – KAUAI

The two main workforce challenges identified on Kauai are:

1. The disconnect between educational institutions and the agriculture industry. This is made worse by a lack of outreach by educators, resulting in their not understanding what skills and methods to teach and how to effectively teach agriculture at all levels of education.
2. The poor perception of being an agricultural worker in Hawaii. Agriculture's reputation as a low-skilled, low-wage job and a lack of agricultural role models hinder the growth of the industry.

## RECOMMENDATIONS – KAUAI

Issues:				
Sustainability, Profitability, and Import Replacement	Timely Training	Strong Export Market	Skill Development / Education	Information
Recommendations:				
<p>» (SPIR) as a top priority for success in business development – i.e., people need to be trained in these areas for successful business development in Ag. Although SPIR was the top rated of all the priorities, the group tabled it because it was way too broad of a topic to cover in the hour or so that we had to develop doable actions.</p>	<p>» Create a task force to develop continuous dialogue between education and industry</p> <p>» Create wiki page of frequently asked questions and best practices</p> <p>» Work with large land owners or incubation training and provide more support to programs</p> <p>» Create certificate programs based out of KCC, WDC, DLIR, DOA, DOE, Farm Bureau, Employers, Commodity groups, SBDC, Trade associations, County, KEDB, Kauai Products Council</p> <p>» Bring training to the farmer</p> <p>» This will allow the evaluation of needs</p> <p>» And match needs with effective training</p> <p>» Small grant monies for practicum training (software/marketing)</p> <p>» Create advisory group – direct KCC to initiate an ag career certificate program</p> <p>» Continue an agricultural business plan competition</p> <p>» Hui different ag processors to fund training opportunities</p> <p>» Have a business development group identify ag initiatives and opportunities and anticipate what is happening in the industry</p> <p>» Have an ag “evangelist” to high schools to talk about how awesome ag is and to point the kids in the right direction.</p> <p>» Create awareness for central info and referral service (CTAHR)</p> <p>» Make training available in shorter formats to fit farmers’ time.</p> <p>» Survey farmers for training needs</p> <p>» Apprenticeship, internship and mentorship programs (incl. technical and marketing)</p>	<p>» Study on what export market to get into, and skills needed, and tying all together.</p> <p>» Develop expertise in processing technologies</p> <p>» Commercial kitchen technologies</p> <p>» Encourage farmers to become part of commodity groups</p> <p>» Create list and encourage membership</p> <p>» Internet and polycomm and online training for e-commerce</p> <p>» Hire a third party marketing firm to create buzz about Kauai Ag</p> <p>» Create a value added product for export, like rainbow papaya</p> <p>» Request the Hawaii Export Council to provide training on Kauai</p> <p>» Develop legal resources for farmers</p> <p>» Develop ag marketing training and expertise &amp; professional sales skills (Including cultural considerations)</p> <p>» Create for farmers</p> <p>» Apprenticeship program</p> <p>» Internship program</p> <p>» Mentorship program</p> <p>» Have an annual workforce development conference on Kauai to help address farming and their needs.</p> <p>» Develop treatment facilities to market and export crops.</p>	<p>» Increase farmer computer literacy</p> <p>» Complete the CTE ag pathway standards and separate ag and science as a career pathway with the DOE (don’t make it a general “Natural Resources” pathway)</p> <p>» Return science credit to ag</p> <p>» Recognize expertise in ag field and offer high school or college credit for it</p> <p>» Give internships</p> <p>» Collaboration of active mentors for alternative education</p> <p>» Support a strong, vibrant FFA program in high school to develop leadership and work readiness skills</p> <p>» Develop alternatives to Formal Ag education (like coops/ internships/mentorships)</p> <p>» Interview skills- use industry reps to do mock interviews and teach resume/application skills</p> <p>» KCC continue to develop and offer Ag programs</p> <p>» Create a system of ag programs K-12 to Post secondary and alternative skill development programs</p>	<p>» Develop and establish an ag database with information like:</p> <p>» list of producers</p> <p>» list of consumer wants</p> <p>» list of potential mentors/ Internships</p> <p>» educational opportunities</p> <p>» ag links and websites</p> <p>» ag organizations</p> <p>» list of scholarships</p>

<b>Issues:</b>					
<b>Community</b>	<b>Education &amp; Training</b>	<b>Resources: Infrastructure, Human, Financial, Natural</b>	<b>Partnerships</b>	<b>No food safety standard or regulations for the State of Hawaii (DOA, DOH)</b>	<b>Align and retrain educational institutions, state agencies, legislators and local authorities.</b>
<b>Recommendations:</b>					
<ul style="list-style-type: none"> <li>» Create co-ops to partner and share information, experience and education, financial, leverage skills and resources</li> <li>» Promote and enlarge community ag groups like 4-H and FFA</li> <li>» Commodity groups become more involved in community to promote Ag awareness</li> </ul>	<ul style="list-style-type: none"> <li>» Increase awareness of existing education programs (Kauai CC programs).</li> <li>» Identify who will take leadership in program awareness (Ex: Mayor's Advisory Groups).</li> <li>» Make an asset map.</li> <li>» Umbrella group with expertise to work with DOE to integrate Ag programs in K-12.</li> <li>» Expo – Where technology can be demonstrated and tested.</li> <li>» Create and strengthen high school internship and college mentorship programs.</li> <li>» Ask to have Natural Resources Pathway to be available in Kauai schools.</li> <li>» Develop Train-the-Trainer program for K-12 teachers.</li> <li>» Lobby to have Ag prioritized in DOE.</li> <li>» Push more of an Ed marketing element at Farm Fair and integrate cross-sector participation with emphasis on Ag and relationships to it.</li> <li>» Garden Fair or another event with local taste test.</li> <li>» Incorporate school gardens in Farm Fair with competition and incentives for kids (ride tickets, food bank).</li> <li>» Workshops for business training, financial record keeping for existing producers.</li> <li>» Incorporate social media networking to increase awareness about Kauai Ag.</li> <li>» Expand Kauai CC to 4-year College and participate in university research.</li> <li>» Get DOE to the table during Ag discussions.</li> </ul>	<ul style="list-style-type: none"> <li>» Ag educators and Ag education programs in high schools.</li> <li>» Provide incentives (non-financial) to supplement pay.</li> <li>» Training – On-the-Job training incentive.</li> <li>» Training by CTAHR extension.</li> <li>» Develop training network that can work with Kauai CC for credits.</li> <li>» Umbrella/leadership clearinghouse needs to be developed to hold all program information and link to partnership along with follow up.</li> <li>» Seek legislative support for on-the-ground Ag training programs (CTAHR).</li> <li>» Water infrastructure; legislation for improvements; how to address the dam/res. decomish issues.</li> <li>» Co-ops (KAA, EKWUC) to generate revenue by selling hydro-power.</li> <li>» Foster creation or operation of community kitchen, slaughterhouse, TFDF.</li> <li>» Ag co-op development to bring costs down to replace function of old plantations.</li> </ul>	<ul style="list-style-type: none"> <li>» Mentoring students; people with experience with new farmers.</li> <li>» Encourage high school media programs to focus on Ag.</li> <li>» Commodity groups should form an association or Co-op type formation.</li> <li>» Marketing as a commodity group.</li> <li>» Establish direct activities with Tourism industry; Agrotourism.</li> <li>» K-12 and University increase communication to develop partnerships.</li> <li>» Need overarching direction to develop partnerships.</li> <li>» Increase marketing by state agencies to public.</li> <li>» Inmate job training/ placement program development (and resources).</li> <li>» Partner cross-commodity groups to address resource problem.</li> </ul>	<ul style="list-style-type: none"> <li>» For workforce development priorities and resources to be focused, there needs to be one set of food safety standards and regulations for the State of Hawaii; Those standards need to be crop specific; location specific and science and technology based.</li> </ul>	<ul style="list-style-type: none"> <li>» Need input from the farmers, agricultural producers, food manufacturers and retailers; educate legislators;</li> <li>» Make food service compliance clear, user-friendly and affordable.</li> </ul>

**BREAKOUT GROUP #1:****Business Development**

Description: Whether large, medium or small, agriculture is a business and it must make a profit. Do agricultural operations have adequate business skills? Do they have the appropriate human resources skills to get maximum productivity out of workers? Do they have marketing skills? Do they have the skills to develop new markets for their products?

**Challenges Affecting Business Development**

Educational entities are not providing real outreach to the farming community for teaching and learning opportunities, and there is very little communication overall. Although there are new sources of information, including the Internet, that farmers and the agriculture community can use, the fact that no one in the community really knows how to harness these information sources is a hindrance in getting information into the hands of farmers.

Also, marketing efforts aimed at those seeking a career are not very effective. The community at large needs to change their perception on what Ag looks like and how one can make a living at it. Currently, career-seekers are not given any encouragement or incentive to pursue agriculture.

A constant theme discussed by the group was that there was a dire need for laborers in the agriculture industry at this point in time. Many employers want to work “under the radar” so that they will not have to deal with worker’s compensation and insurance issues that typically create employment burdens for legit farmers.

The industry feels unsupported in general. Farmers are not seen as role models, which makes the next generation reluctant to get into farming. There is currently no vision of agriculture in the community, making it harder to come up with a solid list of goals that the community can focus on to develop the industry.

**Desired Outcomes for Business Development**

An overarching theme was there will need to be a paradigm shift in both the industry and what the industry produces. Currently, consumers are buying overseas or continent-produced groceries. A shift to “buying local”

would need to happen in order to create a demand, and therefore a viable market, for local agricultural products.

With that paradigm shift, a well-integrated system of teaching and fulfilling the needs of small and large producers was envisioned in which farmers, the government and the educational institutions would work in cooperation with each other.

**Priorities to Support Business Development**

» **PRIORITY 1:** Sustainability, Profitability, and Import Replacement (SPIR)

*\* Note: Although SPIR was the top rated of all the priorities, the group tabled it because it was way too broad of a topic to cover in the hour or so that we had to develop doable actions.*

» **PRIORITY 2:** Timely Training

» **PRIORITY 3:** Strong Export Market

**BREAKOUT GROUP #2:****Application of Automation/Technology**

Description: Can farmers use automation to reduce labor or eliminate menial tasks, and by doing so, attract a higher skilled and higher paid workforce? Can they use automation to improve processing efficiency or maintain product quality? How do farmers use automation to provide product traceability and maintain the Kauai brand?

**Challenges Affecting Application of Automation/Technology**

Participants noted that many of the agriculture tutorials and lessons that are given are more book-focused rather than hands-on, which some noted lends students to focus more on being hired by larger farms than smaller ones. Others felt that Ag education is missing the boat, noting that in previous generations, the lessons would be done in the fields using on-the-job training and apprenticeships.

Because automation and technology are more in the younger generation's purview, labor shortages are not as acute in this area as they are in other areas of the agriculture industry. However, the "soft skills" of these young employees are lacking. Critical skills like coming to work on time, staying motivated, and being willing to get one's hands dirty are in short supply.

Also commonly lacking in younger farmers is a technical knowledge of farming at the level of plant type and planting techniques. The educational institutions are partly responsible for this: when students are not taught the necessary foundations, their minds at a new job are not able to absorb "incompatible" ideas that are different from what they were specifically taught. On the other hand, some new workers coming into agricultural work fresh from a university are very astute on the technology of accounting or management, but not very good in areas such as business plan writing or grant writing.

**Desired Outcomes for Application of Automation/Technology**

Many mentioned that a closer relationship between agriculture and the educational institutions was what they preferred to see over the next 10-20 years. Also

brought forward as part of this vision were ideas like creating clear pathways into jobs at big and small farms as well as seed farms, and allowing companies to train local employees instead of importing in outside talent for specialized work.

Another idea that was brought up involved creating cooperative farms where experience could be gained and degrees earned. This co-op idea included a profit-sharing component, as well as an idea that it could be a self-sustaining unit for food production.

**Priorities to Support Application of Automation/Technology**

- » **PRIORITY 1:** Skill Development / Education
- » **PRIORITY 2:** Information
- » **PRIORITY 3:** Community

**BREAKOUT GROUP #3:****Increasing Productivity**

Description: Agriculture has always been about developing sustainable systems that maximize output per acre. Do farmers have the agronomic skills to do that?

**Challenges Affecting Increasing Productivity**

There is an overall disconnect between educational entities and the agriculture industry. This includes a lack of communication about what available educational opportunities exist; a lack of knowledge about what occupations are in agriculture and a lack of connection by the elementary and secondary schools to those occupations; a lack of commitment and interest in agriculture by the Department of Education; and a lack of support and dwindling Future Farmers of America (FFA) programs to attract people to the industry while they're in high school.

Participants felt that educational entities could support and create interest in agriculture by introducing it to students at a young age; teaching traditional agriculture as well as the high-tech side of agriculture; making DOE's Natural Resource Pathway (which includes agriculture) available in all the state's high schools; offering online education through CTAHR; and by teaching K-12 and the general public about the benefits of agriculture and encouraging parents that agriculture is a viable career option for their children.

Overall, there is a need for good entry-level workers (laborers) and mid-level workers (between harvester and management) on all islands. To overcome this need for low and mid-level workers, agriculture has turned to groups of willing and available laborers including Marshallese citizens in the U.S. on COFA, ex-offenders, and immigrants.

Entry- and mid-level workers need basic work readiness skills, including attendance, motivation, health and sobriety, and flexibility with time and abilities. For farmers who want to work for themselves, there is also a huge need for basic business management skills.

Agriculture students are starting to work before completing their degrees, so the graduation rate is low. Also, new grads have very high income expectations. Like many industries, workers must gain some experience before moving up and increasing their wages.

**Desired Outcomes for Increasing Productivity**

In 10-20 years, participants envisioned a robust agriculture industry with the entire workforce coming from a local pool of educated laborers and receiving a better, more competitive pay scale and benefits package. They envisioned more collaboration between the agriculture industry and other industries, and that the agritourism industry will be thriving on Kauai, thanks to an agritourism ordinance.

They hoped that agricultural education would expand to be included in all K-12 schools and that more distance learning would become available through the University of Hawaii, so that existing farmers and workers could increase their knowledge while still working. Also, they hoped there would be a clear pathway for a local person to reach their career goals in agriculture, and that there would be more trust among the agriculture community to integrate ex-offenders.

**Priorities to Support Increasing Productivity**

- » **PRIORITY 1:** Education & Training
- » **PRIORITY 2:** Resources: Infrastructure, Human, Financial, Natural
- » **PRIORITY 3:** Partnerships

**BREAKOUT GROUP #4:****Food Safety**

Description: Food safety regulations are increasing. How can farmers turn this into an opportunity to differentiate their products? Do farmers have the skills to be innovators in the food processing and packaging process? Can they create a farmer-consumer relationship via product tractability?

**Challenges Affecting Food Safety**

Overall, participants noted that communication did exist—and was even robust—but that communication isn't focused on any one issue to resolve. One challenge that was proposed had to do with liability and certification issues for farmers. Participants were also looking for more research from educational entities to keep farmers ahead of the “game” of innovation. In addition, they felt that better communication between agriculture inspectors and farmers is needed, since costs associated with inspections done without communication tend to force a rise in production costs for producers.

The group had many keynote items, including making sure that classes at the education level for farmers are “titled” correctly and coming up with ways to change the reputation of farming. They said that most students who are interested in “food” as a career don't look at farming and agriculture, and instead choose the culinary route. Additionally, participants said that the current inability for researchers and farmers to communicate and collaborate represents a type of cultural clash, and is a “Plantation” style of doing things. A final challenge brought up was that there needed to be more entry-level certification in related agricultural fields.

**Desired Outcomes for Food Safety**

Educating the next generation and providing opportunities for young people to get into agriculture was a common theme for the group. Ideas included expanding educational opportunities, including an expansion of the STEM curriculum in agriculture, as well as having kids at the K-12 level become involved in agriculture programs.

**Priorities to Support Food Safety**

- » **PRIORITY 1:** No food safety standard or regulations for the State of Hawaii (Department of Agriculture, Department of Health)
- » **PRIORITY 2:** Align and retrain educational institutions, state agencies, legislators and local authorities



## MEETING INFORMATION

# Maui Ag Skill Panel

Maui Beach Hotel  
170 West Kaahumanu Ave, Kahului  
June 7, 2012  
8:30 am to 4:30 pm

## LOCAL AREA CHALLENGES – MAUI

The two main workforce challenges identified on Maui are:

1. the lack of communication, and
2. the lack of funding for agriculture education.

With no formal conduit for communication, the agriculture industry's needs are unclear, and information and available resources are not effectively disseminated to farmers and those in the agriculture community who need it. In addition, lack of funding for agriculture in secondary schools is hindering opportunities for students to explore career options in Ag.

## RECOMMENDATIONS – MAUI

Issues:			
K-12 College Integrated Agriculture Curriculum (Public, Private, Home)	Increased Government Support (Inspectors, Advertising, Funding, Permitting, Regulations, Statistics)	Land Repurpose Partnerships to Open New Agriculture Parcels as New Training Spaces (Incubators)	Youth Education
Recommendations:			
<ul style="list-style-type: none"> <li>» Develop a farm reality show to solicit interest</li> <li>» Determine speaker/expert pool as a resource (list of educators, etc.)</li> <li>» Align curriculum to standards – look for flexibility with integration</li> <li>» Create a Junior Plant Scientist Project</li> <li>» Put together a curriculum team of experts (involve teachers)</li> <li>» Look for external grants</li> <li>» Look for partners to work together for grant opportunities</li> <li>» Get buy in for DOE, DOA and DOH</li> <li>» Look for models from other states – could also be models outside of agriculture</li> <li>» Future Farmers of America – incorporate at all schools</li> <li>» Survey and find local talent – create list</li> <li>» Outline a plan of action</li> <li>» Identify the needs of the farmer</li> <li>» Identify courses students need for a career in Agriculture.</li> <li>» Educate counselors on the career of agriculture (they can assist with the link to industry)</li> <li>» Always involve parents in engaging students with agriculture</li> <li>» Create more competitive opportunities for students, i.e., get corporate sponsors to donate money for competitive research projects for students</li> <li>» A “School Garden Coordinator” at every school</li> <li>» Make sure there is true integration from K-12 and secondary education; determine the incentives</li> <li>» Create opportunities to talk story with all levels of educators</li> <li>» The pilot plan needs to be evaluated each year</li> <li>» Identify the integration examples that already exist and share with all – work on creating a mindset for people to have</li> <li>» True networking</li> <li>» Identify Subject Matter Experts and develop a survey</li> <li>» Look for external support – funds, resources, in-kind and time</li> <li>» Develop a plan to engage the DOE, CTAHR, etc.</li> <li>» Develop a team of stakeholders</li> </ul>	<ul style="list-style-type: none"> <li>» Educate the public on what government resources are out there</li> <li>» Talk story sessions on each island community and with community associations</li> <li>» Introduce needs assessment survey on-line for 2 weeks</li> <li>» Report back out on needs assessment survey</li> <li>» DOA Inspector on every Island</li> <li>» Needs assessment baseline self-sufficiency study for Maui</li> <li>» Reinstate transparent data on agriculture production statewide</li> <li>» Government should “Buy Local” for DOE lunches and meals</li> <li>» Revised procurement laws to favor local producers by island</li> <li>» Define grant opportunities on each island</li> </ul>	<ul style="list-style-type: none"> <li>» Hilt-Like farm trust</li> <li>» Allow cluster housing for the farmers on agriculture properties</li> </ul>	<ul style="list-style-type: none"> <li>» Develop curriculum to integrate agriculture into existing curriculum</li> <li>» “No Child Left Inside”</li> <li>» Infuse agriculture into K-12</li> <li>» Market agriculture as a viable career choice</li> <li>» Active Future Farmers of America programs in every school</li> <li>» Teach child about agriculture by age 7</li> <li>» Fix regulations so kids can eat what they grow</li> <li>» Create a curriculum of indigenous agriculture at the University level and fund an indigenous agricultural specialist</li> <li>» Expose children to commercial agriculture through more field trips, farmers in the classroom (and other agriculture occupations), and beyond food agriculture (such as urban landscaping)</li> <li>» Develop more on-the-job training opportunities with private farmers and apprenticeships</li> <li>» Work ethic/value-based education curriculum</li> <li>» Agriculture competition for students</li> </ul>

<b>Issues:</b>			
<b>Entrepreneurship/Research &amp; Development</b>	<b>The “Image”:</b> Recapture past values while moving forward from the romanticized past.	<b>Create a Shared Vision:</b> Put aside individual differences for the sake of the “Big Picture.”	<b>Politics/Politicians:</b> Show support of agriculture through policy decisions.
<b>Recommendations:</b>			
<ul style="list-style-type: none"> <li>» Develop farmer mentors to support UHMC’s new farmer network/sustainable tropical crop program</li> <li>» More public/private partnerships</li> <li>» Start identifying vacant lands to farms</li> <li>» Connect hotels with landscaping</li> <li>» More value-added agriculture competitions</li> <li>» Connecting agriculture training with other trades/industries; interdisciplinary</li> <li>» Develop problem-based learning following site/farm visits</li> <li>» Commercializing indigenous crops (breadfruit) and value-added</li> <li>» Networking and seeking solutions outside of education institutes (on the farm)</li> <li>» Work on developing cooperative Co-ops</li> <li>» Change the way farmers see the market and expand the market (taxing imports)</li> <li>» Look at new crops and learn how to market those crops</li> <li>» Identify locally-grown to be product replacement (e.g., Eucalyptus for florists)</li> <li>» Create the demand for new products by including in the local culinary and Nurserymen training</li> <li>» Create permanent farmers markets (7 days a week) throughout the county</li> <li>» Create farmer/community program to teach how to grow in the sand</li> <li>» Highlight/publicize agricultural successes through the media; create an agriculture page in the newspaper</li> <li>» Maui County Master Plan must include community gardens in subdivisions</li> <li>» Support development of locally-sourced, sustainable farm inputs (e.g., bio-char, composting, soil amendments)</li> <li>» Turning waste into value-added products</li> <li>» Replicate the Rivertop Vet-to-Farmer pilot on Maui</li> <li>» Create mechanisms for farmers to experience international farms; Ag tours for farmers</li> <li>» Bring back the Body &amp; Soil Conference and tours and fund it properly</li> <li>» Speed up the permitting process; train farmers about new processes and regulations for permitting when the Governor signs the Bill.</li> </ul>	<ul style="list-style-type: none"> <li>» Use media to sell agriculture; create a local brand (ex.g., No Ka’oi)</li> <li>» Create an agricultural business incubator with UH for agriculture-related business and marketing skills</li> <li>» Recapture old values by encouraging mentorships/internships, and provide more support for mentors and guidance and resources, and match mentors with interns</li> <li>» Encourage and share resources about the Small Business Administration’s program SCORE to help experienced, retired agriculture workers to mentor beginning farmers</li> <li>» Participate in the small business development network</li> <li>» Actively support and help develop meaningful K-12 agriculture programs</li> <li>» Support agriculture images of future leaders in Hawaii</li> <li>» Make agriculture in Hawaii a priority</li> </ul>	<ul style="list-style-type: none"> <li>» Identify agriculture champions to push agriculture and a shared vision forward</li> <li>» Teach 21st century agriculture soft skills in schools including: communication, collaboration, critical thinking, and creativity</li> <li>» Put aside individual differences</li> <li>» Partner to identify, create, and support win-win scenarios</li> <li>» Encourage accountability</li> <li>» Overcome barriers of distance to come together as a state instead of by county</li> <li>» Share best agriculture practices</li> </ul>	<ul style="list-style-type: none"> <li>» Identify legislative agriculture advocates/champions</li> <li>» Clarify legislative process</li> <li>» Share grassroots success stories with legislators and others</li> </ul>

**BREAKOUT GROUP #1:****Strengthening Diversified Agriculture**

Description: Building and strengthening a diversified agricultural industry may be fundamental to the vitality of Maui County's agriculture industry. Is diversification a key component in sustainability?

**Challenges Affecting Strengthening Diversified Agriculture**

The challenges identified by the panel were as follows:

- Lack of opportunities for students on Maui to get into an agriculture-focused curriculum in high schools. This related to a lack of passion by youth to be a part of agriculture in their community.
- Smaller farms are being left off the side by government in areas of procurement as government tends to seek supply from larger agriculture companies.
- No central point of resource information for those working in agriculture.

This focus was shared by farmers on Molokai, with these specific differences:

- Large farms pay more in wages and therefore are able to attract and retain farm workers, leaving smaller farms to struggle in obtaining quality recruits and workers.
- With the economy on Molokai very focused on subsistence and non-monetary transactions, agriculture trade is much more challenging, especially dealing with those entities/buyers that are focused on monetary reimbursement.

**Desired Outcomes for Strengthening Diversified Agriculture**

As the group was large, a number of diverse visions emerged from the participants. There were many participants who focused on sustainability and growing the industry. This was based on a goal of creating a viable industry that would produce enough food for both the

local area as well as for the state, and reduce dependence on food imports from the Continent and internationally. This goal focused on a number of areas that would make sustainability worthwhile, including the development of dairies, the addressing of lowering the cost of produce grown on Maui, creating an educated workforce that would be interested in becoming farmers, and various forms of co-operative Ag operations in the County.

Molokai residents focused their goals on having fisherman fish, the ability to drink valley water, every home having gardens and having those gardens grow sustainable crops like sweet potatoes.

**Priorities to Support Strengthening Diversified Agriculture**

- » **PRIORITY 1:** K-12 College Integrated Agriculture Curriculum (Public, Private, Home)
- » **PRIORITY 2A:** Increased Government Support (Inspectors, Advertising, Funding, Permitting, Regulations, Statistics)
- » **PRIORITY 2B:** Land Repurpose Partnerships to Open New Agriculture Parcels as New Training Spaces (Incubators)

**BREAKOUT GROUP #2:****Best Management Practices**

Description: Best management practices are critical to the success and growth of the industry. There appears to be a need to strike a balance between profitability/productivity versus regulations for food and worker safety. What practices/programs are currently in place to address this and other issues?

**Challenges Affecting Best Management Practices**

Currently, there is no formal line or conduit for communication between education and agriculture. Previously, agriculture was seen as a “dumping ground” where troubled students were encouraged to enter. This perspective needs to change and it should start with the DOE to make agriculture an important industry. Participants felt the DOE could support agriculture by increasing Ag programs in schools, like the School Garden Network and “Ag in the Classroom,” so that young people can relate to food better and to see how it can be a profitable industry.

In addition to increased support by the DOE, there needs to be more positive role models in agriculture (including other jobs; not just farmers). Panelists further noted that education about our food needs to start at home with the family. Information like this should include cultural aspects of food so that the youth can see that a career in agriculture is more than just a paycheck. Educating the youth from a cultural perspective would also include Western vs. Hawaiian methods of agriculture, emphasizing Ahupua’a and Ahamoku systems.

Participants discussed two main points that were affecting labor and best management practices: Technology and food safety. Currently, our technology is behind the times of other countries. Mechanization will grow agriculture and make the industry more attractive and less back-breaking. While technology and mechanization is important, it is usually equated with large-scale farming and profitability; however, there are many profitable small-scale farms. The big gap is related to how we farm.

With regards to food safety, less farmers in Maui County (compared to other islands) has resulted in more expensive audit costs for food safety. Therefore, not as many farmers are getting food safety certified. A tracking program for food safety must be established and the

program must be recognized by food purchasers. In addition, we need to train laborers the correct way to farm for food safety standards, taking into account the language issues for immigrant laborers (e.g., Samoan has many dialects).

**Desired Outcomes for Best Management Practices**

In 10-20 years, participants envision a broad based shift in agriculture which includes changes in government, education, and the agriculture industry itself. Government will develop subsidy-based models for farmers that contribute to the local economy, including:

- subsidies based on best practices; provide tax credits for farmers who farm locally and other incentives for farmers to assist with water and other resources;
- developing a Resource Center for farmers as a “One-stop Shop,” including land and product financing.

Education will support and promote agriculture as a viable industry through increased agriculture curriculum in K-12 schools and in-school FFA programs. By providing hands-on farm experiences to students, it is envisioned that students will truly see a farm-to-table example through the use of agricultural product in the schools food program.

The agriculture industry will support its own thriving industry by diversifying food crops and models. By developing a labor force that earns enough money to provide, it is envisioned a better lifestyle will be created for farmers.

**Priorities to Support Best Management Practices**

- » **PRIORITY 1:** Youth Education
- » **PRIORITY 2:** Entrepreneurship/Research & Development

**BREAKOUT GROUP #3:****Labor Issues**

Description: Labor issues will always be a challenge for the agriculture industry. Generating interest and/or losing skilled employees to other industries have always been a constant. How do we address and overcome these and other labor issues that affect the agriculture labor force?

**Challenges Affecting Labor Issues**

Participants noted a lack of specific items:

- Unified direction, lack of centralized information and poor logistics in communicating that information,
- Lack of personal communication,
- An overall lack and difficulty in communicating agriculture as a “lifestyle” and the rewards and appeal of the industry, and
- Communication and partnerships between education and human resource departments, professional associations (like SHRM), and large communication entities are lost or non-existent.

There are certain resources that are lacking as well, such as Agriculture Job Fairs or funding for agriculture education programs, which could be utilized to better communicate agriculture opportunities if they were more available or prevalent. There are certain programs that are working and need to be enhanced, such as Future Farmers of America and CTE’s Natural Resources pathway. However, the agriculture industry is transitioning and there is no surety in what the industry will look like in the future.

Due to the lack of investment in education and youth to support agriculture, we are in a situation where 2% of an aging workforce is feeding 98% of the population. Aging farmers and Ag employees are not taking ownership by sharing the attractive aspects of agriculture as a career to youth. One participant noted that Agriculture is the least funded department in the college.

The negative perception of agriculture by the general

public and lack of parental support for students interested in agriculture is creating an overall labor shortage and forcing the Ag industry to bring in migrant workers. In addition, issues within the current Ag workforce, such as work ethic, substance abuse problems, and Hawaii’s high cost of living, is further exacerbating these labor shortages. Also, a lack of commitment by the community to buy local and to eat locally sourced foods is contributing to these shortages and increasing the price of food.

**Desired Outcomes for Labor Issues**

The group’s vision of Maui agriculture in 10-20 years is a robust industry supported by a community that buys local, employs local, where 95% of food is grown locally, and where there is exporting of high value crops. This vision includes a government that supports agriculture through incentive programs. Also, government procurement will allow education and corrections facilities to require only Hawaii grown food and land zoning practices will keep agriculture land as agriculture land.

In addition, community values and connections to agriculture will be cultivated; there will be a significant effort by all to lower the age demographic of farmers; Hawaii will grow its own animal feed for local livestock; land will be affordable and accessible through private land owners and there will be an honest analysis of land use and water.

Lastly, expanded agriculture education will support this vision through the following:

- Agricultural enrichment day or week in every school with a fun “mascot”
- Agriculture industry-specific education programs
- Interdisciplinary agriculture curriculum for K-College
- Students understand the multi-facets of agriculture
- 3-year demonstration farms encourage programs that are simultaneously self-sustaining and educational
- Resources and support available to create integrated, self-sustaining agriculture programs

- Agriculture takes a focus in education like Science, Technology, Engineering, and Math (STEM). STEM becomes “STEAM”.
- Students consider agriculture as a career

### ***Priorities to Support Labor Issues***

- » **PRIORITY 1:** The “Image”: Recapture past values while moving forward from the romanticized past.
- » **PRIORITY 2:** Create a Shared Vision: Put aside individual differences for the sake of the “Big Picture.”
- » **PRIORITY 3:** Politics/Politicians: Show support of agriculture through policy decisions.

# Quick “Wins” and After-Meeting Actions

In addition to the success of bringing agencies, organizations, farmers, and employers together, the Sustainable Agriculture Skill Panels have developed some “Quick Wins” in a relatively short period of time. These initiatives were, in many cases, derived from conversations that were held in the various committee sessions, in which interested participants would initially show interest in collaboration. Details would be worked out either at a break during the session or soon after the session ended.

## ***Maui and Molokai Water Conservation Workshops***

Developed out of the Maui Agriculture Skill Panel meeting as a specific need, Maui County has developed Water Conservation workshops for Molokai and Maui farmers. Both conventional and organic farmers on Maui and Molokai are in need of re-evaluating their water usage and ideas and methods to help them conserve while increasing the efficiency and profits of their farm business. The workforce development component for this priority is addressed by conducting sessions focusing on the Molokai Irrigation System, water conservation and management practices, and “water wise” techniques.

## ***Bio-Energy Agriculture Pilot Program***

As a presenter at both the Hilo and Kona meetings, Rivertop Energy Solutions conducted community outreach to inform farmers and employers of its proposed pilot program currently in development in Waimea. Rivertop has designed a community scale project to meet the agriculture industry’s needs, with the hope that the project will serve as a replicable model for Agriculture throughout the state.

According to Rivertop’s CEO, David Ruf, “The conferences have allowed us to meet a broader range of people in the industry than any other forum we have attended

to date. We have been able to listen to the communities issues, discuss ideas, develop a network of interested people, and most of all have been able to vet our concepts and projects with the community. The feedback and exposure we have received had been irreplaceable, and enabled us to improve our concepts and maintain the strong momentum we have in moving to implementation.”

In addition, Rivertop Solutions created a Hawaii Island Roadmap highlighting goals and objectives to support a thriving agriculture industry for the island.

## ***University of Hawaii Community Colleges (UHCC) C3T Grant***

Utilizing the skill panels as a forum to generate qualitative data on skill needs directly from the industry and employers, the UHCC system office participated and presented at the skill panel meetings in preparation for the University to implement its C3T grant, a \$24 million grant awarded through the U.S. Department of Labor. One component of the grant is to build capacity for courses offered at the community colleges statewide, which align with employer needs in the Agriculture, Energy, and Healthcare industries. While the skill panels are creating instant buzz in the community about UHCC’s industry focuses and course offerings, UHCC remains a long-term partner of WDC and the C3T grant will provide a way for the skill needs addressed at the skill panel meetings to be implemented at the local Community Colleges.

## ***Breakout Groups Moving to Action***

An overwhelming concern of skill panel attendees has been on the past work conducted and the inability for the industry to move forward with proposed plans and innovative ideas due to divisions within the industry and other hindrances. In spite of this, the general tone of the meetings has been one of collaboration, partnerships, and making more out of less. This coordinated effort has re-

sulted in the development of several working groups to carry on the priorities and actions determined in each breakout session.

In addition, DLIR Director, Dwight Takamine, and DOA Chairperson, Russell Kokubun, have held a series of follow-up meetings with agriculture skill panel leaders. The neighbor island groups reconvened on November 28, 2012 and plan to meet every six months at the very least or as needed. The Oahu leadership group is coordinating its meeting to occur by May 2013 (estimated date) and will continue meeting on the same schedule as the neighbor islands.

The purpose of these follow-up meetings was to update the agriculture skill panel leaders about actions taken in response to the skill panels' recommendations. Director Takamine noted that a total of 418 recommendations were made by the 600+ attendees. DLIR and DOA prioritized those recommendations and selected the top priorities for actions by each Department.

DLIR did the following:

1. In response to the recommendations for training programs, DLIR's Research and Statistics (R&S) Office compiled a list of agriculture-related courses at the UHCCs with input from the CC's. The list was posted on the SESP website for public access (see Appendix A).
2. In response to recommendations for financial assistance for training, DLIR's Workforce Development Division (WDD) produced a flyer listing resources. The flyer was posted on the SESP website for public access (see Appendix B).
3. In response to recommendations that the agriculture industry needs to become more appealing to more jobseekers, DLIR-R&S compiled a list of occupations in the agriculture industry. The list was posted on the SESP website for public access (see Appendix C).
4. In response to recommendations for increased communication between educational entities and the agriculture community, DLIR submitted HB No. 749 HD1, relating to workforce development. If passed, the Bill establishes Hawaii's Agriculture Workforce Advisory Board which will include representation from DLIR, DOA, Hawaii Farm Bureau Federation, Hawaii Department of Education, University of Hawaii's College of Tropical Agriculture and Human Resources, and agriculture producers and stakeholders (see Appendix D). **STATUS UPDATE:** Passed 2013 legislative session.

# Appendices

## APPENDIX A:

# Agricultural Training and Education Programs in Hawaii

Published October 2012

Program Name and Description	Agricultural Category	School	Location	Island	Notes About the Program
<b>AGRICULTURAL PROGRAMS ON THE BIG ISLAND:</b>					
"AGRICULTURE": 1-year certificate of achievement and 2-year associate in applied science degree programs. Intend to prepare students for employment in government service, agribusiness, horticulture, livestock, sugar, flowers and foliage, macadamia nuts, papaya, and coffee industries.	Agribusiness/ Agricultural Business Operations	Hawaii Community College	Hilo	Big Island	
"FOOD SERVICE": 42-credit certificate of achievement and 63-credit associate in applied science degree programs. Intend to prepare students for entry-level positions in the food service industry. Degrees are also offered at West Hawaii.	Food Services/ Culinary Arts	Hawaii Community College	Hilo	Big Island	
"TROPICAL FOREST ECOSYSTEM AND AGROFORESTRY MANAGEMENT": Certificate of achievement and associate in applied science degree programs. Prepares students to actively manage threatened native forests and manage the regeneration of Hawaii's native ecosystems. Students will learn how to grow native plants and establish agroforestry operations. Students will also be trained in the use of electronic data-loggers, Geographic Positioning Systems (GPS), and Geographic Information Systems (GIS). Classes and internships will involve rigorous fieldwork in forests and lava flows. Entry requirements include placement tests, completion of English 21 or placement in English 102, completion of Math 25x or 26 or placement in Math 100 and completion of English 22 or placement in English 100. Call 808-974-7537/974-7510 or go to <a href="http://www.hawcc.hawaii.edu/hawcc/forestteam">http://www.hawcc.hawaii.edu/hawcc/forestteam</a> for more information.	Forest Technology	Hawaii Community College	Hilo	Big Island	
"AGRIBUSINESS SPECIALTY": Bachelor of science degree program. Intends to prepare students for a variety of areas such as marketing of agricultural products, agricultural sales of equipment and supplies, employment in management, financial institutions, brokerage firms, and farm appraising. Program is flexible to meet student's individual interest. Students may gain experience through an internship program.	Agribusiness/ Agricultural Business Operations	University of Hawaii at Hilo	Hilo	Big Island	
"AQUACULTURE SPECIALTY": Bachelor of science degree program. Intends to prepare persons as aquaculturists who are qualified for technician and biologist positions, as owners/operators of aquaculture farms, or for graduate school.	Agriculture Production Operations, General	University of Hawaii at Hilo	Hilo	Big Island	
"AGRICULTURE": Bachelor of science degree program. Curriculum consists of general agriculture courses and an agriculture specialty. Students may pursue specialties in agribusiness, agroecology and environmental quality, animal science/pre-vet, aquaculture, crop protection, general agriculture, and tropical horticulture.	Agriculture, General	University of Hawaii at Hilo	Hilo	Big Island	
"GENERAL AGRICULTURE SPECIALTY": Bachelor of science degree program. Intends to prepare students with a general background in agriculture. Upon completing the various agriculture courses, students may transfer to another program within the College of Agriculture such as animal science, agribusiness, crop protection, and tropical horticulture. Students may also be prepared for graduate programs in agriculture at other institutions.	Agriculture, General	University of Hawaii at Hilo	Hilo	Big Island	
"ANIMAL SCIENCE SPECIALTY": Bachelor of science degree program. Designed for persons interested in livestock production, animal-related industries, preveterinary medicine and pregraduate studies. Provides classroom education and "hands-on" laboratories at the university farm and privately owned ranches. Curriculum includes core courses such as introduction to animal science, livestock management techniques, animal nutrition, reproduction in farm animals, feeds and feeding, anatomy and physiology, and animal breeding and genetics. Animal science electives include range management, bovine reproductive techniques, livestock and meat evaluation, animal diseases and parasites, and production courses for most livestock species.	Animal Sciences	University of Hawaii at Hilo	Hilo	Big Island	

Program Name and Description	Agricultural Category	School	Location	Island	Notes About the Program
"TROPICAL HORTICULTURE SPECIALTY": Bachelor of science degree program. Intends to prepare students for employment in government service; nurseries; landscaping; tissue culture laboratories; flower, fruit, nut, and vegetable farms; or related industries. Also intends to prepare students for graduate school. Students are instructed with state-of-the-art equipment, new teaching classroom/ laboratory facilities, and a fully-operational university farm laboratory.	Applied Horticulture / Horticultural Operations, General	University of Hawaii at Hilo	Hilo	Big Island	
"BIOLOGY": 4-year bachelor of arts degree program. Areas of emphasis include microbiology, molecular biology, marine biology, cell biology, botany, and zoology. Biomedical studies are offered in premedicine, pre-dental, preveterinary, and pre-physical therapy areas. See UH-Hilo catalog for details. See PROGRAM 521 Physical Science, General for more information on programs in natural science.	Biological Sciences	University of Hawaii at Hilo	Hilo	Big Island	
"TROPICAL CONSERVATION BIOLOGY AND ENVIRONMENTAL SCIENCES": Master of science degree program. Intends to provide graduate training in conservation biology and environmental science and prepare students for technical positions and for entry into Ph.D programs in related fields. Students must have a bachelor's degree and be currently working in the field.	Biological Sciences	University of Hawaii at Hilo	Hilo	Big Island	
"CHEMISTRY": 4-year bachelor of arts degree program. Emphasizes either the physical or biological aspects of chemistry. A health sciences concentration is an option for students who complete 16 hours of biology courses. See UH-Hilo catalog for details.	Chemistry	University of Hawaii at Hilo	Hilo	Big Island	
"GEOGRAPHY": 4-year bachelor of arts degree program. Intends to provide a broad background in contemporary geography. Required courses represent a survey of physical geography, human geography, and geographic techniques. See UH-Hilo catalog for details.	Geography	University of Hawaii at Hilo	Hilo	Big Island	
"PLANNING": 12-credit undergraduate certificate program. Requires completion of an individually tailored program which includes Geography 340, two approved upper-division electives and a 1-semester planning internship with a local private or government agency. Contact Geography faculty for details.	Geography	University of Hawaii at Hilo	Hilo	Big Island	
"GEOLOGY": Bachelor of science degree program. Instructs students in the evolution of the earth and its materials, structure, and life. Includes courses in physical and historical geology, environmental geology, stratigraphy, geochemistry, mineralogy, volcanology, oceanography, petrology, and paleontology.	Geological and Earth Sciences	University of Hawaii at Hilo	Hilo	Big Island	
"AGROECOLOGY AND ENVIRONMENTAL QUALITY SPECIALTY": Bachelor of science degree program. Curriculum is designed for students interested in sustaining agrarian and surrounding ecosystems through more efficient management of wind, biota, and water. Intends to prepare students for career opportunities in environmental regulatory agencies, conservation, farm service agencies, and consulting. Also intends to prepare students for graduate studies.	Natural Resources and Conservation	University of Hawaii at Hilo	Hilo	Big Island	
"MARINE SCIENCE": 4-year bachelor of arts degree program. A multi-disciplinary degree program designed to take full advantage of the unique variety of marine environments available for study on and around the island of Hawaii. New students begin with introductory courses in general oceanography and marine biology. See UH-Hilo catalog for details.	Oceanography	University of Hawaii at Hilo	Hilo	Big Island	
"CROP PROTECTION SPECIALTY": Bachelor of science degree program. Intends to prepare students for employment as agricultural inspectors, research technicians, teachers, and supervisors of agricultural enterprises. Also intends to prepare students for graduate school. Provides comprehensive training through organized lectures and practical laboratories. Offers a broad range of plant protection courses such as plant pathology, weed science and entomology. Additional courses in horticulture, soil science, animal science, and agricultural engineering round out the agricultural requirements.	Plant and Soil Sciences	University of Hawaii at Hilo	Hilo	Big Island	
<b>AGRICULTURAL PROGRAMS ON KAUAI:</b>					
"MARINE OPTION": 12-credit certificate of completion program. This program offers students the opportunity to learn about marine and freshwater environments. Students work with marine scientists applying their academic knowledge to the real world while learning practical marine lab skills. This certificate can be used when applying for marine related jobs or for further study at a four-year institution.	Oceanography	Kauai Community College		Kauai	

Program Name and Description	Agricultural Category	School	Location	Island	Notes About the Program
"PLANT BIOSCIENCE TECHNOLOGY": 23-credit advanced academic subject certificate program. This program is designed to provide students with education and training in horticulture, propagation/micropropagation, agriculture, pest management, and crop improvement.	Applied Horticulture / Horticultural Operations, General	Kauai Community College	Puhi	Kauai	
"CULINARY ARTS": The culinary arts program is designed to meet the needs of persons who are already employed in the culinary arts area and to prepare persons for entry in that field: 9-credit certificate of competence in food service; 16-credit certificate of completion in food service; 30-credit certificate of achievement in culinary arts; 62-credit associate in applied science degree program in culinary arts.	Food Services/ Culinary Arts	Kauai Community College	Puhi	Kauai	
<b>AGRICULTURAL PROGRAMS ON MAUI:</b>					
"BAKING": 2-year (65-credit) associate in applied science degree program.	Food Services/ Culinary Arts	University of Hawaii Maui College	Kahului	Maui	
"SANITATION": 2-credit certificate of competence program.	Food Services/ Culinary Arts	University of Hawaii Maui College	Kahului	Maui	
"PANTRY COOK": 2-credit certificate of competence program.	Food Services/ Culinary Arts	University of Hawaii Maui College	Kahului	Maui	
"WAITER/WAITRESS": 3-credit certificate of competence program.	Food Services/ Culinary Arts	University of Hawaii Maui College	Kahului	Maui	
"PREPARATION COOK": 4-credit certificate of competence program.	Food Services/ Culinary Arts	University of Hawaii Maui College	Kahului	Maui	
"SHORT ORDER COOK": 2-credit certificate of competence program.	Food Services/ Culinary Arts	University of Hawaii Maui College	Kahului	Maui	
"STOREROOM CLERK": 4-credit certificate of competence program.	Food Services/ Culinary Arts	University of Hawaii Maui College	Kahului	Maui	
"BAKER'S HELPER": 4-credit certificate of competence program.	Food Services/ Culinary Arts	University of Hawaii Maui College	Kahului	Maui	
"PASTRY COOK": 12-credit certificate of competence program.	Food Services/ Culinary Arts	University of Hawaii Maui College	Kahului	Maui	
"CULINARY ARTS": 31-credit certificate of achievement and 64-credit associate in applied science degree programs.	Food Services/ Culinary Arts	University of Hawaii Maui College	Kahului	Maui	
"RESTAURANT SUPERVISION": 2-year (73-credit) associate in applied science degree program.	Food Services/ Culinary Arts	University of Hawaii Maui College	Kahului	Maui	
"CULTURAL & NATURAL RESOURCE MANAGEMENT-MALAMA AHUPUAA": 64-66 credit associate in technical studies program. Students in this program take core requirements and choose from two areas of concentration: Kiaa or Malama Aina.	Natural Resources and Conservation	University of Hawaii Maui College	Kahului	Maui	
"SUSTAINABLE TROPICAL CROP PRODUCTION": 15-credit certificate of completion program. Includes instruction in vegetable crop production, farm tractor and equipment operation, agricultural enterprise, soils technology, and irrigation principles and design.	Agriculture Production Operations, General	University of Hawaii Maui College	Kahului, Kaunakakai, and Lanai City	Maui	

Program Name and Description	Agricultural Category	School	Location	Island	Notes About the Program
"SUSTAINABLE TROPICAL CROP MANAGEMENT": 1-year (39-credit) certificate of achievement and 2-year (60-credit) associate in applied science degree programs which are part of the Agricultural Careers program. Include instruction in all certificate of completion courses plus weed science, horticulture, small engine repair, and other areas.	Agriculture Production Operations, General	University of Hawaii Maui College	Kahului, Kaunakakai, and Lanai City	Maui	
AGRICULTURE SCIENCE: 7-credit certificate of competence program.	Applied Horticulture / Horticultural Operations, General	University of Hawaii Maui College	Kahului, Kaunakakai, and Lanai City	Maui	
"GIS IN ECOSYSTEM MANAGEMENT": 8-credit certificate of competence program. Geographic Information Systems (GIS) and Global Positioning Systems (GPS) are used to improve agricultural practices to make it more efficient. Decisions about watering, planting, and pesticide use are made from data gathered by GIS and GPS.	Applied Horticulture / Horticultural Operations, General	University of Hawaii Maui College	Kahului, Kaunakakai, and Lanai City	Maui	
NURSERY PRODUCTION: 9-credit certificate of competence program.	Applied Horticulture / Horticultural Operations, General	University of Hawaii Maui College	Kahului, Kaunakakai, and Lanai City	Maui	
PEST MANAGEMENT: 9-credit certificate of competence program.	Applied Horticulture / Horticultural Operations, General	University of Hawaii Maui College	Kahului, Kaunakakai, and Lanai City	Maui	
"LANDSCAPE MAINTENANCE": 13-credit certificate of completion program.	Applied Horticulture / Horticultural Operations, General	University of Hawaii Maui College	Kahului, Kaunakakai, and Lanai City	Maui	
FLORICULTURE MANAGEMENT: 34-credit certificate of achievement program.	Applied Horticulture / Horticultural Operations, General	University of Hawaii Maui College	Kahului, Kaunakakai, and Lanai City	Maui	
"NURSERY MANAGEMENT": 34-credit certificate of achievement program.	Applied Horticulture / Horticultural Operations, General	University of Hawaii Maui College	Kahului, Kaunakakai, and Lanai City	Maui	
"HORTICULTURE AND LANDSCAPE MAINTENANCE": 1-year (40-credit) certificate of achievement and 2-year (60-credit) associate in applied science degree programs which are part of the Agricultural Careers program. Include instruction in soils technology, plant disease and pest control, irrigation principles and design, ornamental plant materials, and other areas.	Applied Horticulture / Horticultural Operations, General	University of Hawaii Maui College	Kahului, Kaunakakai, and Lanai City	Maui	
"TURFGRASS SPECIALIST": 3-semester (23-credit) certificate of completion program designed to train persons to work in the specialized turfgrass industry, including golf courses, hotels, condominiums, parks, and sod farms.	Applied Horticulture / Horticultural Operations, General	University of Hawaii Maui College	Kahului, Kaunakakai, and Lanai City	Maui	
"CULINARY ARTS": Estimated 10-month to 24-month certificate program. Provides on-center training in a variety of skills to include, but not limited to: counter and customer service skills, food safety, ServSafe certification, cleaning and sanitization, nutrition, knife skills, culinary fundamentals, preparing and cooking meat, poultry, and fish/shellfish, preparation of stocks, soups, and sauces, and introduction to pantry, station saute and panfry cooking and baking. Program includes 12 weeks of work-based learning off-center.	Food Services/ Culinary Arts	Hawaii Job Corps Center	Makawao	Maui	

Program Name and Description	Agricultural Category	School	Location	Island	Notes About the Program
<b>AGRICULTURAL PROGRAMS ON OAHU:</b>					
"BIOCHEMISTRY": 4-year bachelor of science degree program. This program prepares students to be innovative, rigorous, and well-trained scientists, educators, and health practitioners.	Chemistry	Chaminade University of Honolulu	Honolulu	Oahu	
"MARINE BIOLOGY": 124-credit bachelor of science degree program. This is a rigorous program that includes a sequence of courses and laboratory and fieldwork. This program prepares students to enter the private or public sector and domestic or international careers in fields such as living marine resource management, marine environmental analysis and protection, and interpretation or teaching biology and marine science. Students also achieve the academic preparation to pursue a master's or doctoral degree in their field.	Marine Biology	Hawaii Pacific University	Honolulu	Oahu	
"CULINARY (PATISSERIE)": 19-credit certificate of completion program. Intends to prepare students for employment as pastry cooks, baker's helpers and other skilled entry-level positions in bakeries, hotels, and patisseries.	Food Services/ Culinary Arts	Kapiolani Community College	Honolulu	Oahu	NOTE: Please contact the Department at 734-9466 or culinary@hawaii.edu for more information.
"CULINARY (PATISSERIE)": 65-credit associate in science degree program. Intends to prepare students for entry into the patisserie industry and for advancement to such positions as professional bakers, pastry cooks, and assistant pastry chefs.	Food Services/ Culinary Arts	Kapiolani Community College	Honolulu	Oahu	NOTE: Please contact the Department at 734-9466 or culinary@hawaii.edu for more information.
"CULINARY(DINING ROOM)": 16-credit certificate of completion program. Intends to prepare students for employment as waiters/waitresses, hosts/hostesses, or captains.	Food Services/ Culinary Arts	Kapiolani Community College	Honolulu	Oahu	NOTE: Please contact the Department at 734-9466 or culinary@hawaii.edu for more information.
"CULINARY(CULINARY ARTS)": 14-credit certificate of completion program. Intends to prepare students for employment as prep cooks, cooks helpers, and pantry helpers in restaurants, hotels, and institutions.	Food Services/ Culinary Arts	Kapiolani Community College	Honolulu	Oahu	NOTE: Please contact the Department at 734-9466 or culinary@hawaii.edu for more information.
"CULINARY(CULINARY ARTS)": 45-credit certificate of achievement program. Intends to prepare students for employment as garde manager helpers, short-order cooks, and assistant sous chefs in restaurants, hotels, clubs and institutions.	Food Services/ Culinary Arts	Kapiolani Community College	Honolulu	Oahu	NOTE: Please contact the Department at 734-9466 or culinary@hawaii.edu for more information.
"CULINARY (CULINARY ARTS)": 70- to 72-credit associate in science degree program. Intends to prepare students for entry into the food service industry and for advancement to such positions as line cooks, sous chefs, food service supervisors, assistant managers, and managers.	Food Services/ Culinary Arts	Kapiolani Community College	Honolulu	Oahu	NOTE: Please contact the Department at 734-9466 or culinary@hawaii.edu for more information.
"CULINARY (INSTITUTIONAL FOOD SERVICE MANAGEMENT)": 63-credit associate in science degree program. This program intends to prepare students for entry into culinary arts field in institutional organizations such as hospitals and schools.	Food Services/ Culinary Arts	Kapiolani Community College	Honolulu	Oahu	NOTE: Please contact the Department at 734-9466 or culinary@hawaii.edu for more information.
"CULINARY COMPETITION": 10-credit (1-year) certificate of completion program. This program is offered to students who participate in sanctioned culinary competitions and salons, commis opportunities in competition, and staging positions in culinary establishments.	Food Services/ Culinary Arts	Kapiolani Community College	Honolulu	Oahu	NOTE: Please contact the Department at 734-9466 or culinary@hawaii.edu for more information.
"CULINARY(CULINARY ARTS)": 18-credit (1-year) certificate of completion, advanced program. This program prepares graduates of the associate in science culinary arts with a concentration in culinary arts to continue to the BAS in culinary management at UH West Oahu. Candidates are challenged to apply basic knowledge and skills learned in the prerequisite AS degree program to advanced level culinary management courses.	Food Services/ Culinary Arts	Kapiolani Community College	Honolulu	Oahu	NOTE: Please contact the Department at 734-9466 or culinary@hawaii.edu for more information.
"CULINARY ARTS": 11-month diploma program. Program is an in-depth course for the understanding, preparation, and production of worldwide cuisines. From history of foods to present day theories, terminology, systems, and trends, the program is designed to provide training for persons interested in becoming food service industry professionals. Program combines classroom lecture and hands-on kitchen preparation and production skills. Students will master the commercial kitchen while learning basic through advanced cooking techniques. Preparation of recipes, portioning, styling, and presentation with an emphasis on classic French cooking will equip students with a foundation for a career as a culinary professional.	Food Services/ Culinary Arts	Travel Institute of the Pacific	Honolulu	Oahu	

Program Name and Description	Agricultural Category	School	Location	Island	Notes About the Program
<p>"BIOENGINEERING": 4-year bachelor of science (BS) degree program. Application of biological sciences and engineering principles for the design and operation of systems for biological processing of chemicals, environment protection, and food processing and production. Contact the Department of Molecular Biosciences and Bioengineering for details.</p>	Agribusiness/ Agricultural Business Operations	University of Hawaii - Manoa Campus	Honolulu	Oahu	<p>Programs offered by the College of Tropical Agriculture and Human Resources (CTAHR) intend to prepare students for effective service in business, industry, research, government, the community, and teaching. Contact the CTAHR Office of Academic and Student Affairs or individual department offices for more information. * Changes may be made during each academic year. For more current information, please call the department chair of each unit.</p>
<p>"BIOENGINEERING": Master of science (MS) degree program. Advanced training in the application of biological sciences and engineering principles for design and operation of systems for biological processing of chemicals, environment protection, and food processing and production. A bachelor's degree in an accredited engineering program or equivalent is required for admission. Contact the Department of Molecular Biosciences and Bioengineering for details.</p>	Agribusiness/ Agricultural Business Operations	University of Hawaii - Manoa Campus	Honolulu	Oahu	<p>Programs offered by the College of Tropical Agriculture and Human Resources (CTAHR) intend to prepare students for effective service in business, industry, research, government, the community, and teaching. Contact the CTAHR Office of Academic and Student Affairs or individual department offices for more information. * Changes may be made during each academic year. For more current information, please call the department chair of each unit.</p>
<p>"MOLECULAR BIOSCIENCES AND BIOENGINEERING": Graduate degree program. An amalgamation of biochemical, nutritional, molecular biological, and bioengineering tools to study tropical agriculture, aquaculture, and plant and environmental biotechnology. Contact the Department of Molecular Biosciences and Bioengineering for details.</p>	Agribusiness/ Agricultural Business Operations	University of Hawaii - Manoa Campus	Honolulu	Oahu	<p>Programs offered by the College of Tropical Agriculture and Human Resources (CTAHR) intend to prepare students for effective service in business, industry, research, government, the community, and teaching. Contact the CTAHR Office of Academic and Student Affairs or individual department offices for more information. * Changes may be made during each academic year. For more current information, please call the department chair of each unit.</p>
<p>"ANIMAL SCIENCE": 4-year bachelor of science (BS) degree program. This program is for individuals who are interested in working in agriculture as a researcher, extension personnel, a producer, a teacher, or in any of the many career options in agribusiness. This program, with advising, may also prepare students for entrance into veterinary medicine. See program 378 Veterinary Medicine for pre-veterinary program information.</p>	Animal Sciences	University of Hawaii - Manoa Campus	Honolulu	Oahu	<p>Programs offered by the College of Tropical Agriculture and Human Resources (CTAHR) intend to prepare students for effective service in business, industry, research, government, the community, and teaching. Contact the CTAHR Office of Academic Affairs or individual department offices for more information. *Changes may be made during each academic year. For more current information, please call the department chair of each unit.</p>

Program Name and Description	Agricultural Category	School	Location	Island	Notes About the Program
<p><b>"ANIMAL SCIENCES"</b>: 30-credit master of science (MS) degree program. Students may elect to pursue either a thesis (Plan A) or a non-thesis (Plan B) program. Students who want to specialize in nutrition, muscle biology, physiology, animal genetics and biotechnology, or livestock diseases should have a strong background in biology and chemistry.</p>	Animal Sciences	University of Hawaii - Manoa Campus	Honolulu	Oahu	Programs offered by the College of Tropical Agriculture and Human Resources (CTAHR) intend to prepare students for effective service in business, industry, research, government, the community, and teaching. Contact the CTAHR Office of Academic Affairs or individual department offices for more information. *Changes may be made during each academic year. For more current information, please call the department chair of each unit.
<p><b>"MATHEMATICAL BIOLOGY"</b>: Certificate in mathematical biology program. The purpose of this certificate program is to induce students to pursue the interdisciplinary study of biology and mathematics together with research. Students must complete 15 credits of approved coursework with a "C" grade or higher and attain a GPA of 2.5 in the collection of courses used to satisfy the certificate requirements. Acceptance into this program requires completion of either Math 304 or 305 with a grade of "C" or better.</p>	Biological Sciences	University of Hawaii - Manoa Campus	Honolulu	Oahu	* Changes may be made during each academic year. For more current information, please call the department chair of each unit.
<p><b>"BIOLOGY"</b>: 4-year bachelor of arts (BA) and bachelor of science (BS) degree programs. A minor is also offered. The BA degree program is specifically designed for premedical and other preprofessional students. The BS degree is designed to prepare students for graduate study in biotechnology, ecology/evolution, cell/molecular, organismic, or marine/aquatic biology as well as for secondary science education. Prospective majors should consult the Department of Biology early in their studies to design a curriculum that satisfies program requirements.</p>	Biological Sciences	University of Hawaii - Manoa Campus	Honolulu	Oahu	* Changes may be made during each academic year. For more current information, please call the department chair of each unit.
<p><b>"MOLECULAR CELL BIOLOGY"</b>: 4-year bachelor of science (BS) degree program. The objective of the BS program is to prepare students for careers in fields that require advanced knowledge of molecular biology, in particular those that relate to human health and welfare. Examples of such fields include, but are not limited to medicine, pharmacology, pathology, genetic testing and counseling, biotechnology, nanotechnology, teaching, and basic research in the life sciences. This program focuses on the molecular biology of eukaryotic cells and organisms with emphasis on understanding of the molecular biology of human health, disease, and treatment. Contact an advisor in the Department of Microbiology for details.</p>	Biological Sciences	University of Hawaii - Manoa Campus	Honolulu	Oahu	* Changes may be made during each academic year. For more current information, please call the department chair of each unit.
<p><b>"BOTANY"</b>: 4-year bachelor of arts (BA) and bachelor of science (BS) degree programs. The BA degree is a liberal arts degree with an emphasis on understanding modern concepts in plant sciences. The BS degree is a pre-professional degree intended for students who plan advanced study in botany, a career in secondary science education, or for positions requiring detailed knowledge of plants. Students should consult the Department of Botany early in their studies to design a curriculum which satisfies program requirements.</p>	Biological Sciences	University of Hawaii - Manoa Campus	Honolulu	Oahu	* Changes may be made during each academic year. For more current information, please call the department chair of each unit.
<p><b>"BOTANY"</b>: Master of science (MS) and doctor of philosophy (PhD) degree programs. Six tracks are available: conservation, ecology, ethnobotany, general botany, systematics and evolution, and structure/function. An inter-departmental graduate program is available through Ecology, Evolution, and Conservation Biology (EECB)-Botany. Contact: Graduate Chair, Department of Botany for details.</p>	Biological Sciences	University of Hawaii - Manoa Campus	Honolulu	Oahu	* Changes may be made during each academic year. For more current information, please call the department chair of each unit.
<p><b>"BIOMEDICAL SCIENCES"</b>: Master of science (MS) and doctor of philosophy (PhD) degree programs offered in the following areas of concentration: anatomy and reproductive biology, biochemistry, biophysics, genetics and molecular biology, pharmacology, physiology, and tropical medicine. A PhD degree program is offered in biostatistics-epidemiology. A Ph.D in biomedical sciences non-disciplinary program is also offered. Contact the College of Natural Sciences for details.</p>	Biological Sciences	University of Hawaii - Manoa Campus	Honolulu	Oahu	* Changes may be made during each academic year. For more current information, please call the department chair of each unit.

Program Name and Description	Agricultural Category	School	Location	Island	Notes About the Program
"ETHNOBOTANY": 4-year bachelor of science degree program. This program integrates biological and social science theories. Graduates of this program will be prepared to work in areas related to the conservation of biological and cultural diversity and in natural health care businesses and practices. Students will also be prepared to enter graduate school programs in ethnobotany, botany, anthropology, and related fields or enter advance medical training programs. For more information, contact Ethnobotany Advisor, Department of Botany.	Biological Sciences	University of Hawaii - Manoa Campus	Honolulu	Oahu	* Changes may be made during each academic year. For more current information, please call the department chair of each unit.
"NATURAL RESOURCES AND ENVIRONMENTAL MANAGEMENT": 4-year bachelor of science (BS) degree program. Interdisciplinary study in the management of natural and environmental resources. General core in the natural and social sciences, environmental issues and policy, quantitative and analytical methods, applied management techniques, and an internship. Students select between two upper-division tracks that emphasize either the biological/physical sciences or social science. The tracks provide greater depth in the respective area plus individual student specialization in a specific subfield. Contact the Department of Natural Resources and Environmental Management for details.	Biological Sciences	University of Hawaii - Manoa Campus	Honolulu	Oahu	* Changes may be made during each academic year. For more current information, please call the department chair of each unit.
"MICROBIOLOGY": 4-year bachelor of arts (BA) and bachelor of science (BS) degree programs. The BA degree is a liberal arts degree designed for pre-health professionals, educators, and those with a wide-range of interests. Students may focus on areas such as infectious disease, immunology, environmental microbiology, molecular biology, virology and cell biology of microorganisms. The BS degree is designed for those seeking a career in microbiology, molecular biology, immunology, virology or infectious diseases. This degree intends to prepare students to enter the work force as professional microbiologists or to enter graduate programs in microbiology or other biological disciplines. Contact an advisor in Department of Microbiology for details.	Biological Sciences	University of Hawaii - Manoa Campus	Honolulu	Oahu	* Changes may be made during each academic year. For more current information, please call the department chair of each unit.
"MICROBIOLOGY": Master of science (MS) and doctor of philosophy (PhD) degree programs offer advanced training with specialization in microbial ecology, biochemistry, physiology, molecular genetics; metabolic regulation, regulation of gene expression; immunology, immunogenetics, immunochemistry; medical microbiology; animal and environmental virology, viral pathobiology; and cell biology. Undergraduate preparation in biological and physical sciences is desirable. Contact the Chairperson, Department of Microbiology for details.	Biological Sciences	University of Hawaii - Manoa Campus	Honolulu	Oahu	* Changes may be made during each academic year. For more current information, please call the department chair of each unit.
"ZOOLOGY": 4-year bachelor of arts (BA) and bachelor of science (BS) degree programs. The BA degree is a liberal arts degree allowing specialization in broad areas of zoology such as marine biology, cell and molecular biology, ecology, evolution and conservation biology, and aquaculture. This degree is particularly suited for preprofessional careers in the health sciences (e.g., premedical and physician assistant, pre dental, preveterinary medical, preoptometry) and allied fields (e.g., cytotechnology, biotechnology, animal technicians) and as a basis for prelaw (e.g., environmental law). The BS degree provides good preparation for graduate study in zoology, for technical training in zoology (e.g., aquatic technicians, animal caretakers) and as preparation for secondary school teachers of zoology and biological science. Prospective majors should consult a departmental advisor as early as possible.	Biological Sciences	University of Hawaii - Manoa Campus	Honolulu	Oahu	* Changes may be made during each academic year. For more current information, please call the department chair of each unit.
"ZOOLOGY": Master of science (MS) and doctor of philosophy (PhD) degree programs. Areas of strength include marine biology, ecology, evolution, and conservation biology, comparative physiology, ichthyology, avian biology, and developmental biology. Contact Graduate Chair, Department of Zoology for details.	Biological Sciences	University of Hawaii - Manoa Campus	Honolulu	Oahu	* Changes may be made during each academic year. For more current information, please call the department chair of each unit.
"ENTOMOLOGY": Master of science (MS) and doctor of philosophy (PhD) degree programs offer instruction in insect biology, ecology, pest management, biological control, and a variety of other topics related to agricultural and environmental protection and the study of insects in natural, agricultural and urban situations. Contact the Department of Plant and Environmental Protection Sciences College of Tropical Agriculture and Human Resources for program details.	Biological Sciences	University of Hawaii - Manoa Campus	Honolulu	Oahu	* Changes may be made during each academic year. For more current information, please call the department chair of each unit.

Program Name and Description	Agricultural Category	School	Location	Island	Notes About the Program
"PLANT AND ENVIRONMENTAL PROTECTION SCIENCES": The bachelor of science (BS) degree program offers the opportunity to take courses in environmental issues, pest management, plant protection, entomology, plant pathology and application of biotechnology to applied biological issues. Graduates are prepared for careers in state and federal agricultural and environmental agencies, pest management in the private sector, field and laboratory research, or further graduate study in the biological, agricultural, and environmental sciences. Contact the Department of Plant and Environmental Protection Sciences, College of Tropical Agriculture and Human Resources for program details.	Biological Sciences	University of Hawaii - Manoa Campus	Honolulu	Oahu	* Changes may be made during each academic year. For more current information, please call the department chair of each unit.
"TROPICAL PLANT PATHOLOGY": Master of science (MS) and doctor of philosophy (PhD) degree programs. Contact the Department of Plant and Environmental Protection Sciences for details.	Biological Sciences	University of Hawaii - Manoa Campus	Honolulu	Oahu	* Changes may be made during each academic year. For more current information, please call the department chair of each unit.
"CHEMISTRY": 4-year bachelor of arts (BA) and bachelor of science (BS) degree programs. The BA program requires 27 semester hours of chemistry beyond the introductory level. The BS program, requires additional, in-depth coursework, including at least one additional laboratory course and at least one elective. Opportunities for undergraduate research are available. There are also BA and BS degrees in biochemistry that are currently pending approval. All degrees require related work in math and physics, which should be completed within the first two years. Contact the Chemistry Department for details.	Chemistry	University of Hawaii - Manoa Campus	Honolulu	Oahu	* Changes may be made during each academic year. For more current information, please call the department chair of each unit.
"CHEMISTRY": Master of science (MS) and doctor of philosophy (PhD) degree programs in chemistry. Graduate research opportunities in the subdisciplines of organic, inorganic, physical, and biological chemistry are available. Contact the Chemistry Department or visit the website at <a href="http://www.manoa.hawaii.edu/chem/">www.manoa.hawaii.edu/chem/</a> for detailed information.	Chemistry	University of Hawaii - Manoa Campus	Honolulu	Oahu	* Changes may be made during each academic year. For more current information, please call the department chair of each unit.
"FAMILY RESOURCES": 4-year bachelor of science (BS) degree program. Emphasizes human and family development and family resource management. Prepares students to work with families to make informed decisions that enhance the quality of their lives. Includes study of human development, family development, marriage, parenting, family economics and resource management, consumer economics, group dynamics and leadership, and community development. Contact: Advisor, Family Resources, Department of Family and Consumer Sciences, College of Tropical Agriculture and Human Resources for details.	Family and Consumer Economics	University of Hawaii - Manoa Campus	Honolulu	Oahu	*Changes may be made during each academic year. For more current information, please call the department chair of each unit.
"FOOD SCIENCE": 30-credit master of science (MS) degree program. This program is for students who desire to work in food processing, regulation, and in the private and public sector of the food business arena. It also prepares students for managerial positions. Students will learn about food chemistry, microbiology, structure, food processing, food engineering, safety, regulation, sanitation, and quality control. Areas available for research include food safety and quality, food processing and engineering, food chemistry and biochemistry, food microbiology, food science education, and special area. Graduates of this program are prepared for diverse careers in the food industry, health-care and fitness facilities, hospitals, nutrition education and communication enterprises, government or private-sector food and nutrition agencies, and scientific research laboratories.	Food Sciences and Technology	University of Hawaii - Manoa Campus	Honolulu	Oahu	
"GEOGRAPHY": 4-year bachelor of arts (BA) degree program. Topics of study include physical geography; human geography; cartography and remote sensing; and Pacific and Asian regional problems. Contact the Geography Department at (808)956-8465 for details.	Geography	University of Hawaii - Manoa Campus	Honolulu	Oahu	
"GEOGRAPHY": Master of arts (MA) and doctor of philosophy (PhD) degree programs. Topics of study are the same as the bachelor of arts degree program (except for additional computer applications under cartography and remote sensing). Contact the Department of Geography for details.	Geography	University of Hawaii - Manoa Campus	Honolulu	Oahu	

Program Name and Description	Agricultural Category	School	Location	Island	Notes About the Program
<p>"GRADUATE OCEAN POLICY": 16-credit certificate program. Classified UHM graduate students and law students in good standing are eligible for this program. Community professionals who hold bachelor's degrees and who meet minimum UHM admission requirements are admitted as special, non-degree students on approval from the Graduate Division. Students must complete 16 credits in coursework drawn from an approval list (includes courses in law, geography, urban and regional planning, economics in the policy track and from oceanography, botany, zoology, geology and geophysics, meteorology, and engineering in the science track). Students must also:</p> <ul style="list-style-type: none"> <li>• Participate in one interdisciplinary, integrative seminar in ocean policy each semester. The seminar will be team-taught with content focused on a new topic each term, 2 credits per semester.</li> <li>• Prepare and present a research paper.</li> <li>• Complete two one-credit practica such as: one week of oceanographic research at sea and observation of legislative regulatory development concerning ocean policy over the course of a semester. (Can be waived on the basis of past experience.)</li> </ul> <p>Contact Professor Alison Rieser, Department of Geography, at (808) 956-8467 for details.</p>	Geography	University of Hawaii - Manoa Campus	Honolulu	Oahu	
<p>"GEOLOGY": 4-year bachelor of arts (BA) degree program. Offers instruction in geological sciences within a broad liberal arts content. Contact the Department of Geology and Geophysics at <a href="http://www.soest.hawaii.edu/gg">http://www.soest.hawaii.edu/gg</a> for details.</p>	Geological and Earth Sciences	University of Hawaii - Manoa Campus	Honolulu	Oahu	*Changes may be made during each academic year. For more current information, please call the department chair of each unit.
<p>"GEOLOGY AND GEOPHYSICS": 4-year bachelor of science (BS) degree program. Intends to prepare students for entry-level positions in industry or graduate work in geochemistry, hydrology, geology, geophysics, oceanography, and volcanology Contact the Department of Geology and Geophysics at <a href="http://www.soest.hawaii.edu/gg">http://www.soest.hawaii.edu/gg</a> for details.</p>	Geological and Earth Sciences	University of Hawaii - Manoa Campus	Honolulu	Oahu	*Changes may be made during each academic year. For more current information, please call the department chair of each unit.
<p>"GEOLOGY AND GEOPHYSICS": Master of science (MS) and doctor of philosophy (PhD) degree programs. Fields of research include marine geology and geophysics; seismology; solid earth geophysics; volcanology, petrology, and geochemistry; planetology and remote sensing; hydrology and engineering geology; and high pressure geophysics. Contact the Department of Geology and Geophysics at <a href="http://www.soest.hawaii.edu/gg">http://www.soest.hawaii.edu/gg</a> for details.</p>	Geological and Earth Sciences	University of Hawaii - Manoa Campus	Honolulu	Oahu	*Changes may be made during each academic year. For more current information, please call the department chair of each unit.
<p>"HORTICULTURE/TROPICAL HORTICULTURE": The program offers a BS degree in Tropical Plant and Soil Sciences with specializations in (1) Plant Sciences and Genetics, (2) Plant Production and Management, and (3) Environmental Soil Science. Students have an opportunity to take courses in tropical flower, fruit, vegetable and crop production, turf and landscape management, plant physiology, breeding and genetics, and soil science. They learn about the full spectrum of subjects and activities required to understand and responsibly manage land, water, crops, and their environments for the benefit of humankind. In addition, they learn about the adaptation and application of new technologies, such as molecular biotechnology, computer-based systems, and the Internet, to enhance plant production systems, assure a safe food supply, and protect the environment. For more information, call 956-8909 or 956-5900.</p>	Horticulture Science	University of Hawaii - Manoa Campus	Honolulu	Oahu	<p>Programs offered by the College of Tropical Agriculture and Human Resources (CTAHR) intend to prepare students for effective service in business, industry, research, government, and the community, and teaching. Contact the CTAHR Office of Academic and Student Affairs or individual department offices for more information.</p> <p>*Changes may be made during each academic year. For more current information, please call the graduate chair of the unit.</p>

Program Name and Description	Agricultural Category	School	Location	Island	Notes About the Program
<p><b>HORTICULTURE/TROPICAL HORTICULTURE:</b> The department offers graduate study leading to the MS (Plan A, Plan B and Plan C) and PhD degrees. The TPSS graduate program has three options: Plant Science, Horticulture, and Soil Science. All three options emphasize the development of problem-solving skills that integrate molecular, biochemical, physiological, chemical, genetic and ecological approaches to collaborative research in plant and soil sciences. The Plant Science option develops the adaptation and application of biotechnology to tropical crop plant production and requires understanding of fundamental biological processes, molecular and organism biology, genetics, plant physiology, and crop production systems. The Horticulture option explores the many facets of tropical food and ornamental crop production and requires the understanding of agricultural systems, plant production, soil fertility, and protection of the environment, as well as supporting disciplines such as crop ecology, plant physiology, and molecular biology. For more information, call 956-5698 or 956-5900.</p>	Horticulture Science	University of Hawaii - Manoa Campus	Honolulu	Oahu	<p>Programs offered by the College of Tropical Agriculture and Human Resources (CTAHR) intend to prepare students for effective service in business, industry, research, government, and the community, and teaching. Contact the CTAHR Office of Academic and Student Affairs or individual department offices for more information.</p> <p>*Changes may be made during each academic year. For more current information, please call the graduate chair of the unit.</p>
<p><b>"MARINE BIOLOGY":</b> 4-year bachelor of science (BS) degree program. The BS degree program has a very rigorous curriculum that will provide students with an excellent foundation in marine biology and related disciplines. It is built on a balanced understanding of the biology of the marine organisms, the marine environments, the organization of organisms into communities, and the relationship between these organisms and their environments. Students will be able to study a wide range of pelagic fishes, as well as sharks, marine mammals, seabirds, reef species, plants and micro-organisms. Extensive field experiences are integrated with traditional classroom and laboratory courses. It will prepare some students for employment in marine biology and others for admission to graduate schools. Prospective students should consult the Department of Biology early in their studies.</p>	Marine Biology	University of Hawaii - Manoa Campus	Honolulu	Oahu	
<p><b>"MARINE BIOLOGY":</b> Master of science (MS) and doctor of philosophy (Ph.D) degree programs. The goal of both programs is to produce scientists who are experts in their research areas with a broad understanding of the biology, ecology, evolution, and life processes of marine organisms. Students should have a B.S., B.A., or M.S. degree in the biological sciences including zoology, biology, microbiology, botany, biological oceanography, and marine biology. However, highly motivated students with other degrees may be considered if they have strong academic backgrounds and demonstrated experience in the biological sciences. Students without evidence of adequate preparation in mathematics, physics, and biochemistry will be required to make up these prerequisites prior to or after admission. Applicants may apply directly to the M.S. or Ph.D degree programs and the admissions committee will determine the student's readiness for their chosen program. Newly enrolled students who select the Ph.D track will be required to demonstrate doctoral-level proficiency in the two core courses: marine biology-environments and organisms marine biology-processes and impacts for advancement. Contact mbiograd@hawaii.edu for details.</p>	Marine Biology	University of Hawaii - Manoa Campus	Honolulu	Oahu	
<p><b>"GLOBAL ENVIRONMENTAL SCIENCE":</b> 4-year degree program. Refer to program 528 Oceanography for details.</p>	Natural Resources and Conservation	University of Hawaii - Manoa Campus	Honolulu	Oahu	<p>*Changes may be made during each academic year. For more current information, please call the department chair of each unit.</p>
<p><b>"MARINE OPTION PROGRAM":</b> 12-credit certificate program. Designed for undergraduates in any field with an interest in the ocean. Program sponsors a wide variety of marine activities, including field trips, workshops, symposia, and noncredit courses. Students must complete a hands-on project to earn the certificate. In addition to oceanography courses, students take courses in marine biology. Contact the Marine Option Program for details or go to <a href="http://www.hawaii.edu/mop">www.hawaii.edu/mop</a>.</p>	Oceanography	University of Hawaii - Manoa Campus	Honolulu	Oahu	<p>*Changes may be made during each academic year. For more current information, please call the department chair of each unit.</p>

Program Name and Description	Agricultural Category	School	Location	Island	Notes About the Program
<p>"GLOBAL ENVIRONMENTAL SCIENCE": 4-year degree program. This program combines a solid and rigorous background in basic science with a flexible and interdisciplinary course of environmental study. The program is a holistic, scientific approach to the study of earth and earth's physical, chemical, biological, and human response to and interaction with the earth system. This program is designed to prepare persons for careers in environmental science, policy or teaching or to enter graduate or professional school. Entrance requirement include a high school diploma with a good science and math background. Contact the Global Environmental Science program at <a href="http://www.soest.hawaii.edu/oceanography/GES/index.html">www.soest.hawaii.edu/oceanography/GES/index.html</a> for details.</p>	Oceanography	University of Hawaii - Manoa Campus	Honolulu	Oahu	*Changes may be made during each academic year. For more current information, please call the department chair of each unit.
<p>"OCEANOGRAPHY": Master of science (MS) and doctor of philosophy (PhD) degree programs in physical, chemical, geological, and biological oceanography, and marine biology. Applicants must have training in a basic science or engineering. Math training (calculus through first-order ordinary differential equations) and one year each of physics and chemistry are required prior to admittance. Contact the Department of Oceanography at <a href="http://www.soest.hawaii.edu/oceanography/">www.soest.hawaii.edu/oceanography/</a> for details.</p>	Oceanography	University of Hawaii - Manoa Campus	Honolulu	Oahu	*Changes may be made during each academic year. For more current information, please call the department chair of each unit.
<p>"OCEAN &amp; RESOURCES ENGINEERING": Master of science (MS) and doctor of philosophy (PhD) degree programs. Both programs prepare students for the engineering profession with the understanding and ability to work in the ocean and resources engineering disciplines. The Department offers an academic program leading to graduate degrees in three disciplines: coastal engineering, offshore engineering, and ocean resources engineering. Admission requirements include a BS degree in engineering, applied mathematics, physics, or applied sciences. Contact the Department of Ocean Resources and Engineering at <a href="http://www.ore.soest.hawaii.edu">www.ore.soest.hawaii.edu</a> for details.</p>	Oceanography	University of Hawaii - Manoa Campus	Honolulu	Oahu	*Changes may be made during each academic year. For more current information, please call the department chair of each unit.
<p>"PLANT AND SOIL SCIENCES": The program offers a BS degree in Tropical Plant and Soil Sciences with specializations in (1) Plant Sciences and Genetics, (2) Plant Production and Management, and (3) Environmental Soil Science. Students have an opportunity to take courses in tropical flower, fruit, vegetable and crop production, turf and landscape management, plant physiology, breeding and genetics, and soil science. They learn about the full spectrum of subjects and activities required to understand and responsibly manage land, water, crops, and their environments for the benefit of humankind. In addition, they learn about the adaptation and application of new technologies, such as molecular biotechnology, computer-based systems, and the Internet, to enhance plant production systems, assure a safe food supply, and protect the environment. For more information, call 956-8909 or 956-5900. The department offers graduate study leading to the MS (Plan A, Plan B, and Plan C) and PhD degrees. The TPSS graduate program has three options: Plant Science, Horticulture, and Soil Science. All three options emphasize the development of problem-solving skills that integrate molecular, biochemical, physiological, chemical, genetic and ecological approaches to collaborative research in plant and soil sciences. The Horticulture option explores the many facets of tropical food and ornamental crop production and requires the understanding of agricultural systems, plant production, soil fertility, and protection of the environment, as well as supporting disciplines such as crop ecology, plant physiology, and molecular biology. For more information, call 956-5698 or 956-5900. The Plant Science option develops the adaptation and application of biotechnology to tropical crop plant production and requires understanding of fundamental biological processes, molecular and organism biology, genetics, plant physiology, and crop production systems.</p>	Plant and Soil Sciences	University of Hawaii - Manoa Campus	Honolulu	Oahu	<p>Programs offered by the College of Tropical Agriculture and Human Resources (CTAHR) intend to prepare students for effective service in business, research, government, and the community, and teaching. Contact the CTAHR Office of Academic and Student Affairs, or individual department offices for more information.</p> <p>*Changes may be made during each academic year. Please call the department chair of each unit for more information.</p>

Program Name and Description	Agricultural Category	School	Location	Island	Notes About the Program
"PLANT AND ENVIRONMENTAL PROTECTION SCIENCES": The bachelor of science (BS) degree program offers the opportunity to take courses in environmental issues, pest management, plant protection, entomology, plant pathology and application of biotechnology to applied biological issues. Graduates are prepared for careers in state and federal agricultural and environmental agencies, pest management in the private sector, field and laboratory research, or further graduate study in the biological, agricultural, and environmental sciences. Contact the Department of Plant and Environmental Protection Sciences, College of Tropical Agriculture and Human Resources for program details.	Plant and Soil Sciences	University of Hawaii - Manoa Campus	Honolulu	Oahu	Programs offered by the College of Tropical Agriculture and Human Resources (CTAHR) intend to prepare students for effective service in business, research, government, and the community, and teaching. Contact the CTAHR Office of Academic and Student Affairs, or individual department offices for more information. *Changes may be made during each academic year. Please call the department chair of each unit for more information.
"ENTOMOLOGY": Master of science (MS) and doctor of philosophy (PhD) degree programs. Instruction is offered in insect biology, ecology, pest management, biological control, and a variety of other topics related to agriculture and environmental protection and the study of insects in natural, agricultural, and urban situations. Contact the Department of Plant and Environmental Protection Sciences College of Tropical Agriculture and Human Resources for program details.	Plant and Soil Sciences	University of Hawaii - Manoa Campus	Honolulu	Oahu	Programs offered by the College of Tropical Agriculture and Human Resources (CTAHR) intend to prepare students for effective service in business, research, government, and the community, and teaching. Contact the CTAHR Office of Academic and Student Affairs, or individual department offices for more information. *Changes may be made during each academic year. Please call the department chair of each unit for more information.
"TROPICAL PLANT PATHOLOGY": Master of science (MS) and doctor of philosophy (PhD) degree programs offer instruction in the biology, ecology, and management of plant pathogens, including nematodes, fungi, bacteria, and viruses. Contact the Department of Plant and Environmental Protection Sciences, College of Tropical Agriculture and Human Resources for program details.	Plant and Soil Sciences	University of Hawaii - Manoa Campus	Honolulu	Oahu	Programs offered by the College of Tropical Agriculture and Human Resources (CTAHR) intend to prepare students for effective service in business, research, government, and the community, and teaching. Contact the CTAHR Office of Academic and Student Affairs, or individual department offices for more information. *Changes may be made during each academic year. Please call the department chair of each unit for more information.
"BIOLOGY": 124-credit bachelor of science degree program. Students may choose from one of two options. Option 1 is the general biology program of study which provides a broad, yet integrated curriculum. It provides the background and preparation for a variety of biological careers and further areas of studies including wildlife biology, conservation ecology, molecular biology, zoology, botany, and physiology. Option 2 is the human and health sciences program of study. This option prepares students for entry into medical, dental, and veterinary schools, pharmacy and health care training programs, and graduate studies in health related fields. It also provides the scientific background for careers in biotechnology, cell and molecular biology, and biomedicine.	Biological Sciences	Hawaii Pacific University	Honolulu/ Kaneohe	Oahu	
"BIOCHEMISTRY": 124-credit bachelor of science degree program. Graduates of this program will have a deeper understanding of the molecular basis of life that has resulted in the rise of biotechnology companies, the advent of cloning techniques, DNA synthesis and amplification, new drug production, DNA fingerprinting, and a molecular understanding of many diseases.	Chemistry	Hawaii Pacific University	Honolulu/ Kaneohe	Oahu	
ENVIRONMENTAL SCIENCE: 4-year bachelor of science degree program. Designed to prepare students for careers as environmental scientists.	Natural Resources and Conservation	Hawaii Pacific University	Honolulu/ Kaneohe	Oahu	
"ENVIRONMENTAL STUDIES": 4-year bachelor of arts degree program. Designed to prepare students for careers with both private and public organizations that have significant environmental concerns or that deal with development and implementation of environmental policies.	Natural Resources and Conservation	Hawaii Pacific University	Honolulu/ Kaneohe	Oahu	
"OCEANOGRAPHY": 4-year bachelor of science degree program. Curriculum emphasizes the physical, chemical, geological, and biological processes governing the functioning of the world's oceans.	Oceanography	Hawaii Pacific University	Honolulu/ Kaneohe	Oahu	
"MARINE SCIENCE": 2-year master of science degree program. This program fosters a broad understanding of marine systems through an interdisciplinary program of study and research-based education in marine science preparing students for careers or entry into Ph.D. programs in related fields.	Oceanography	Hawaii Pacific University	Honolulu/ Kaneohe	Oahu	
"BIOLOGY": 4-year bachelor of arts degree programs. Designed for students planning to pursue a master's, doctorate, or a professional degree. This program allows for more electives within the major and liberal arts areas.	Biological Sciences	Chaminade University of Honolulu	Kaimuki	Oahu	

Program Name and Description	Agricultural Category	School	Location	Island	Notes About the Program
"BIOLOGY": 4-year bachelor of science degree program. Designed for students interested in graduate and professional programs.	Biological Sciences	Chaminade University of Honolulu	Kaimuki	Oahu	
"ENVIRONMENTAL STUDIES": 4-year bachelor of science degree program. Intends to prepare students for careers in environmental service, science, business, communications, consulting, ethics, health, law, policy, as well as careers in government and non-profit environmental sectors. Students receive the broad-based knowledge required to fully comprehend and successfully problem-solve environmental challenges, work in the environmental industry, and run environmental businesses and organizations.	Natural Resources and Conservation	Chaminade University of Honolulu	Kaimuki	Oahu	
AGRICULTURAL TECHNOLOGY": 15-credit certificate of completion. This program is designed for individuals who want entry-level employment or to enhance their skills in the field of plant landscaping (landscape maintenance, turfgrass maintenance, nursery operations, and/or retail plant outlets). All classes are taught with a hands-on, learn-by-doing" philosophy.	Applied Horticulture / Horticultural Operations, General	Windward Community College	Kaneohe	Oahu	
"PLANT LANDSCAPING": 16-credit certificate of completion. This program is designed for individuals who want entry-level employment or to enhance their skills in the field of plant landscaping (landscaping maintenance, turfgrass maintenance, nursery operations, and/or retail plant outlets). Students must complete 12 credits of required courses then select a 4-credit area of specialization (Landscape Maintenance and/or Turfgrass Maintenance).	Applied Horticulture / Horticultural Operations, General	Windward Community College	Kaneohe	Oahu	
"SUBTROPICAL URBAN TREE CARE": 12-14 credit certificate of completion program. This program is designed for individuals who want to learn more about tree care and get involved in the green industry. Completion of this program will help students prepare for the International Society of Arboriculture certification exams.	Applied Horticulture / Horticultural Operations, General	Windward Community College	Kaneohe	Oahu	
"PLANT BIOTECHNOLOGY": 26-credit academic subject certificate. This program prepares students for careers in biotechnology and qualifies them to transfer to bachelor of science degree programs with majors in biotechnology, agriculture, horticulture, botany, aquaculture, pharmacy, or pre-medicine.	Plant and Soil Sciences	Windward Community College	Kaneohe	Oahu	
"CULINARY MANAGEMENT": Bachelor of applied science degree program with a concentration in culinary management. This program is designed to supplement Kapiolani Community College's culinary arts associate's program. It provides culinary students and those already working in the industry the strong business background needed to excel in the workforce. In addition to developing an understanding of the management, marketing, ethical, and legal aspects of running a food service operation, students will also learn valuable communication and leadership skills that are essential for higher level management positions.	Food Services/ Culinary Arts	University of Hawaii - West Oahu	Kapolei	Oahu	Distance learning available
"CERTIFICATE IN INTERDISCIPLINARY ENVIRONMENTAL STUDIES": 18-credit upper division certificate program which provide students with an understanding of the underlying scientific and societal roles to finding solutions. Entry into this certificate program requires admission to UHWO and completion of a minimum of 54 transferable lower division credits.	Natural Resources and Conservation	University of Hawaii - West Oahu	Kapolei	Oahu	
"BIOLOGICAL SCIENCES": 4-year bachelor of science degree program. Emphasis is on current developments in physiology, ecology, molecular biology, genetics, taxonomy, and anatomy of living organisms. Students may specialize in either general biology or pre-professional biology.	Biological Sciences	Brigham Young University - Hawaii	Laie	Oahu	
"BIOLOGY EDUCATION": Bachelor of science degree program. Designed to prepare teachers to teach biology in intermediate and high schools. This is a cooperative program administered by the School of Education. The biology content covers zoology, anatomy, genetics, physiology, and related chemistry and biology. See online catalog at <a href="http://www.byuh.edu">www.byuh.edu</a> .	Biological Sciences	Brigham Young University - Hawaii	Laie	Oahu	

Program Name and Description	Agricultural Category	School	Location	Island	Notes About the Program
"BIOCHEMISTRY": 4-year bachelor of science degree program. The biochemistry major is administered by the Chemistry Department with close coordination with the Biology Department. The degree provides a background for those interested in professional work in biochemistry and those planning to attend a professional or graduate school. A core of courses includes offerings in chemistry and biology which yield a solid background in biochemistry and strong foundations in organic chemistry, analytical chemistry, instrumental analysis, and spectroscopy. Based on his or her professional goals, the student selects a minimum of eight additional elective credits from a selection of courses in chemistry and biology. Those planning to go to graduate schools and professional schools are strongly advised to obtain appropriate backgrounds in mathematics, physics and computers. All students are required to do an undergraduate research project.	Biological Sciences	Brigham Young University - Hawaii	Laie	Oahu	
"CHEMISTRY EDUCATION": Bachelor of science degree program. Designed to prepare teachers to teach chemistry in high schools. This is a cooperative program administered by the School of Education. See online catalog at www.byuh.edu.	Chemistry	Brigham Young University - Hawaii	Laie	Oahu	
"CULINARY ARTS": 10-credit to 16-credit certificate of completion program offered in prep cook, baking, and dining room supervision.	Food Services/Culinary Arts	Leeward Community College	Pearl City	Oahu	
"CULINARY ARTS": 33-credit certificate of achievement program. Intends to prepare students with basic skills for entry-level food service positions.	Food Services/Culinary Arts	Leeward Community College	Pearl City	Oahu	
"CULINARY ARTS": 67-credit associate in applied science degree program. Includes the certificate of achievement program courses plus general education and additional food service courses.	Food Services/Culinary Arts	Leeward Community College	Pearl City	Oahu	
"PLANT BIOSCIENCE TECHNOLOGY": 27-credit academic subject certificate. This program is designed to provide plant science and laboratory knowledge and skills to facilitate employment to further education in agricultural business.	Plant and Soil Sciences	Leeward Community College	Pearl City	Oahu	
"HORTICULTURE /LANDSCAPING": Estimated 6-month to 24-month certificate program. Provides on-center training and work-based learning off-center in how to care for a variety of turfs, plants, and trees. Students also learn landscaping using a variety of plants, irrigation systems, and planning for drainage.	Applied Horticulture / Horticultural Operations, General	Hawaii Job Corps Center	Waimanalo	Oahu	
"HORTICULTURE/LANDSCAPING": Estimated 12-month to 24-month certificate program. Provides on-center training and to include but not limited to: General safety, chemical spills, pesticide safety, plant physiology, woody ornamentals, soil preparation and maintenance, installing and maintaining trees, shrubs, groundcover and turf grass, fertilizers, irrigation systems and equipment operations and maintenance. Includes 12 weeks of work-based learning off center.	Applied Horticulture / Horticultural Operations, General	Hawaii Job Corps Center	Waimanalo	Oahu	
"CULINARY ARTS": Estimated 10-month to 24-month certificate program. Provides on-center training in a variety of skills to include, but not limited to: counter and customer service skills, food safety, ServSafe certification, cleaning and sanitization, nutrition, knife skills, culinary fundamentals, preparing and cooking meat, poultry, and fish/shellfish, preparation of stocks, soups, and sauces, and introduction to pantry, station sauté and panfry cooking and baking. Program includes 12 weeks of work-based learning off-center.	Food Services/Culinary Arts	Hawaii Job Corps Center	Waimanalo	Oahu	

## APPENDIX B: Agricultural Resources Flyer

Published November 2012



### Workforce Development Resources for Agricultural Businesses in Hawai'i

#### Funding Assistance

##### (1) Employment & Training Fund (ETF)

Upgrade the skills of your current workforce by referring them to pre-approved non-credit, short-term training offered through training providers. ETF will fund up to 50% of tuition costs for qualified referrals.

##### (2) Workforce Investment Act (WIA)

Free vocational training for laid-off workers, disadvantaged youth and other target groups are offered through selected state, county and non-profit agencies. Program offerings vary by county.

##### (3) On the Job Training Program (OJT)

Hire from pre-screened candidates and claim reimbursement of up to 50% of the employee's wages during the training period.

#### No-Cost Internships

##### Volunteer Internship Program (VIP)

Staff will help you find the right intern for your agricultural business at no cost to you.

Workforce Development Division and its partners look forward to helping you and your agricultural business find the resources you need to help grow your business!



For more information, contact one of the following:

#### Honolulu

Norma McDonald  
830 Punchbowl Street, Room 112  
Honolulu, HI 96813  
Ph: (808) 586-8700  
Fax: (808) 586-8724  
Email: Norma.V.McDonald@hawaii.gov

#### Dillingham Plaza

Terri Young  
1505 Dillingham Blvd., #110  
Honolulu, HI 96817  
Ph: (808) 768-5710  
Fax: (808) 843-0256  
Email: tyoung@honolulu.gov

#### Kona

Lori Sasaki  
74-5565 Luhia Street, Bldg. C,  
Bay 4  
Kailua-Kona, HI 96740  
Ph: (808) 327-4770  
Fax: (808) 327-4774  
Email: ddir.wdd.kona@hawaii.gov

#### Kaua'i

Eric Nordmeier  
4444 Rice Street, Room 302  
Lihu'e, HI 96766  
Ph: (808) 274-3056  
Fax: (808) 274-3059  
Email: ddir.wdd.kauai@hawaii.gov

#### Waipahu Civic Center

Alvin Tsukayama  
94-275 Mokuola Street, Room 300  
Waipahu, HI 96797  
Ph: (808) 675-0010  
Fax: (808) 675-0011  
Email: Alvin.Z.Tsukayama@hawaii.gov

#### Waianae Neighborhood Community Center

Sandra Dyel  
85-670 Farrington Hwy.  
Waianae, HI 96792  
Ph: (808) 768-5808  
Fax: (808) 696-7060  
Email: sdyel@honolulu.gov

#### Maui

Kevin Kimizuka  
2064 Wells Street, Suite 108  
Wailuku, HI 96793  
Ph: (808) 984-2091  
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*Equal Opportunity Employer/  
Program; and auxiliary aids and  
services are available upon re-  
quest to individuals with disabili-  
ties.*

#### Hilo

Blayne Hanagami  
1990 Kino'ole Street., Suite 102  
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Ph: (808) 981-2860  
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Email: ddir.wdd.hilo@hawaii.gov

#### Moloka'i

Alberta Patchen  
55 Makaena Place, Room 4  
Kaunakakai, HI 96748  
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WDD 11/14/12

**APPENDIX C:****Agriculture, Food, and Natural Resources  
Occupations in Hawaii***Published December 2011*

Occupations in the Agriculture, Food, and Natural Resources cluster raise plants and animals as sources for food and shelter. They also include occupations that sell and make products from plants and animals. These products include food, lumber, and fabrics. Other occupations in this cluster provide advice and services that farmers and ranchers need to improve products. Another option in this cluster is to work to conserve natural resources and protect the environment.

<b>Occupations in this cluster:</b>	<b>Level of Education</b>
Agricultural Inspectors	Work experience in a related occupation Bachelor's degree
Agricultural Products Graders and Sorters	Work experience in a related occupation
Agricultural Scientists	Bachelor's degree
Agricultural Worker Supervisors	Work experience in a related occupation
Animal Caretakers	Short-term on-the-job training (less than 1 month) Moderate-term on-the-job training (1 to 12 months)
Animal Scientists	Bachelor's degree
Animal Trainers	Moderate-term on-the-job training (1 to 12 months)
Aquaculture Workers	Short-term on-the-job training (less than 1 month) Moderate-term on-the-job training (1 to 12 months) Postsecondary vocational training Bachelor's degree
Bakers	Long-term on-the-job training (over 1 year)
Commercial Fishers	Moderate-term on-the-job training (1 to 12 months)
Conservation Scientists	Bachelor's degree
Farm and Ranch Workers	Short-term on-the-job training (less than 1 month) Moderate-term on-the-job training (1 to 12 months)
Farmers and Farm Managers	Long-term on-the-job training (over 1 year) Work experience plus a bachelor's or higher degree
Food Processing Workers	Short-term on-the-job training (less than 1 month)
Food Scientists	Bachelor's degree
Foresters	Bachelor's degree
Forestry Technicians	Associate degree
Meat Cutters	Short-term on-the-job training (less than 1 month) Moderate-term on-the-job training (1 to 12 months) Long-term on-the-job training (over 1 year)
Nursery Workers	Short-term on-the-job training (less than 1 month)
Park Naturalists	Bachelor's degree
Precision Agriculture Technicians	Postsecondary vocational training Associate degree
Recycling and Reclamation Workers	Moderate-term on-the-job training (1 to 12 months)
Trash Collectors	Short-term on-the-job training (less than 1 month)
Veterinarians	Professional degree
Veterinary Assistants	Short-term on-the-job training (less than 1 month)
Water Treatment Plant Operators	Long-term on-the-job training (over 1 year)
Zoologists	Bachelor's degree

The training or education required varies for careers in agriculture, food, or natural resources. Some occupations require less than one month of on-the-job training. However, some scientists need a doctoral degree to do research. The amount of training or education required depends on the type of work one would be doing.

The table above presents the level of education or training required to work in the occupations. Note that some occupations may have more than one required level of education because the type of work performed may vary in specific jobs.

Check the related programs of study to explore the educational programs that would prepare you to work in this cluster.

**AGRICULTURAL INSPECTORS** determine if farmers and food processors are using safe methods to care for livestock and to process food.

**Preparation**

Depending on specialty, a bachelor's degree with coursework in biological, agricultural or physical science may be required. Major areas of study may include entomology, plant pathology, biology, animal science, and agricultural science. For some specialties, persons may qualify with a high school diploma or equivalent and several years of related experience. Persons may begin as trainees.

**Wages**

Wages vary by area of the country and the inspector's area of specialization.

Agricultural inspectors who work full time generally receive benefits. Common benefits include paid vacation, sick leave, health insurance, and a retirement plan.

Location	Pay Period	25%	Median	75%
Hawaii	Hourly	(1)	(1)	(1)
	Yearly	(1)	(1)	(1)
Honolulu	Hourly	(1)	(1)	(1)
	Yearly	(1)	(1)	(1)
United States	Hourly	\$15.25	\$20.03	\$24.24
	Yearly	\$31,730	\$41,670	\$50,430

(1) Wage estimate is not available.

**Outlook**

Little change is expected in the number of jobs for agricultural inspectors in Hawaii through the year 2018. Outlook in Hawaii depends on budgetary constraints, industry growth or decline, economic conditions, the number of qualified applicants, government regulations, technological advances, availability of training, and replacement needs.

Nationally, the number of jobs for agricultural inspectors is expected to increase about as fast as average through the year 2018.

About three-quarters of all inspectors work for a government agency.

Major employers:

- Federal, state, and local government agencies
- Meat processing companies

Most inspectors work for the government. These government agencies are not expected to hire many new workers. Instead they expect businesses to do the routine inspections. Some new jobs will occur in the meat processing industry as consumers call for better inspection of their food.

Many agricultural inspectors are expected to retire in the next decade. Thus, job prospects should be good for recent graduates in this field.

	Employment		Employment Change	
	2008	2018	Number	Percent
National	16,600	18,700	2,100	12.8
State	120	120	0	0

**AGRICULTURAL PRODUCTS GRADERS AND SORTERS** examine products such as fruits, vegetables, and textiles. They assign items to quality levels before they are sold to the public.

### Preparation

To work as an agricultural products grader or sorter, you need:

- good eye-hand coordination;
- little or no previous work experience;
- to complete on-the-job training; and
- the ability to work independently (although a supervisor is usually present).

### On-the-job training

Sorters and graders usually receive informal training on the job from experienced workers. On the job, you learn to grade and sort produce as well as test samples. Training may last one to four weeks. After training, you may be closely supervised by another worker for a short time.

### Wages

Wages vary by employer, area of the country, and the grader's level of skill.

Graders and sorters who work full time may receive benefits. Common benefits include paid vacation, sick leave, and health insurance.

Location	Pay Period	25%	Median	75%
Hawaii	Hourly	(1)	(1)	(1)
	Yearly	(1)	(1)	(1)
Honolulu	Hourly	(1)	(1)	(1)
	Yearly	(1)	(1)	(1)
United States	Hourly	\$8.57	\$9.22	\$10.98
	Yearly	\$17,830	\$19,180	\$22,850

(1) Wage estimate is not available.

### Outlook

Outlook information for agricultural products graders and sorters in Hawaii is not available. Outlook for agricultural products graders and sorters in Hawaii is affected by industry growth, the number of qualified applicants, economic conditions, wages, and technological advances.

Nationally, little change is expected in the number of jobs for agricultural products graders and sorters through the year 2018.

Major employers:

- Grocery stores
- Wholesale grocery sales companies
- Agricultural and food products companies
- Produce processing and packaging plants

Some grading and sorting jobs can be done by machines. In addition, an increasing amount of agricultural products are imported from other countries. These items are graded and sorted before they are shipped here. Both of these factors are likely to limit the number of new jobs in this occupation.

	Employment		Employment Change	
	2008	2018	Number	Percent
National	33,400	33,500	100	0.2

**AGRICULTURAL SCIENTISTS** study plants and soils. They use science to protect, develop, and manage these resources.

### Preparation

To work as an agricultural scientist, you must:

- have a high school diploma or GED;
- complete at least a bachelor's degree in agriculture science;
- have excellent written and oral communication skills; and
- be self-motivated.

### Education after high school

A bachelor's degree in agricultural science is required for jobs in research. In agricultural science, you study communications, economics, and business. You also take courses in physical and life sciences, plant pathology, and soil chemistry. In addition, you study plant physiology and biochemistry.

A doctoral degree (Ph.D.) is required to lead research projects or teach at a college or university. To earn an advanced degree you complete more courses, do fieldwork, and do laboratory research. More jobs will require advanced degrees in the future.

All states have land-grant colleges that offer agricultural science degrees. However, not all colleges offer every specialty area.

The table below lists the level of education attained by a subset of workers in this occupation. The workers surveyed were between ages 25 and 44.

Education level attained	Percentage of workers in this occupation*
Less than high school diploma	0
High school diploma or equivalent	4
Some college, no degree	9
Associate degree	7
Bachelor's degree	41
Master's degree	23
Doctoral (Ph.D.) or professional degree	14

\* National data for agricultural and food scientists (SOC 19-1010).

### Wages

Agricultural scientists who have a Ph.D. earn more than those with a master's or bachelor's degree. Agricultural scientists who work for the federal government are paid on a stair step pay scale. The more education and experience they have, the more they are paid. Federal employees need to apply and take a test to move up the scale.

Agricultural scientists who work full time usually receive benefits. Common benefits include paid vacation, health and dental insurance, and a retirement plan.

Location	Pay Period	25%	Median	75%
Hawaii	Hourly	\$26.17	\$30.98	\$38.65
	Yearly	\$54,430	\$64,430	\$80,400
Honolulu	Hourly	(1)	(1)	(1)
	Yearly	(1)	(1)	(1)
United States	Hourly	\$21.34	\$27.57	\$35.88
	Yearly	\$44,390	\$57,340	\$74,630

(1) Wage estimate is not available.

### Outlook

In Hawaii, average employment growth is expected for agriculture scientists through the year 2018. Job openings should arise from replacement needs. Factors affecting the outlook include federal and state funding for agricultural research and industry, economic conditions, growth of the agricultural industry, government regulations, technological and scientific advances, the number of qualified applicants, earnings, and replacement needs. Growth in the agricultural industry may be spurred by interest in local food self-sufficiency and demand for improved diversified agriculture products grown in Hawaii. In addition, Hawaii's geographic location is ideal for tropical agricultural research aimed at agricultural development in tropical regions. However, the high cost of land and other resources affects the profitability of growing crops locally. Having broad exposure to plant and environmental science may be helpful. Knowledge of basic sciences and good communication skills are important.

Nationally, the number of jobs for soil and plant scientists is expected to grow faster than average through the year 2018.

About 12 percent of agricultural scientists are self-employed.

Agricultural scientists work in varied settings. Those who work for the federal government are mainly with the Department of Agriculture. Others work for state governments and help farmers and others who need information. Some agricultural scientists work for seed or food product companies.

Major employers:

- Federal, state, and local government agencies
- Research and testing services

Past agriculture research has created higher-yielding crops. More research will be necessary as insects adapt to pesticides, and as soil and water quality decrease. Agricultural scientists will be needed to protect and preserve the soil, water, and ecosystems. In addition, demand for biofuels is expected to increase. Scientists will be needed to find new ways for turning plant material into usable energy sources.

Employment of agricultural scientists doesn't vary much with the state of the economy. Layoffs are less likely among these workers than some other occupations. This is because food is a staple item. Its demand changes very little with economic activity.

	Employment		Employment Change	
	2008	2018	Number	Percent
National	13,900	16,100	2,200	15.5
State	190	200	10	5.3

**AGRICULTURAL WORKER SUPERVISORS** hire and supervise workers who tend and harvest crops, animals, ornamental plants, and trees.

### Preparation

To work as an agricultural worker supervisor, you must:

- have a high school diploma or GED;
- have experience working as an agricultural worker;
- complete on-the-job training;

- have good interpersonal and communication skills; and
- enjoy working outdoors in all conditions.

Education after high school

No formal education is required beyond high school.

Work experience

Most people become supervisors after working for many years as an agricultural worker. Growing up on a farm provides good work experience. It is also helpful if you join clubs such as 4-H or Future Farmers of America while in high school.

On-the-job training

Agricultural worker supervisors usually receive informal training on the job from experienced workers. During training, you learn:

- human resources policies such as how to hire, train, or fire workers;
- methods used for agricultural production;
- how to use and maintain equipment; and
- company policies.

Training may last up to a month.

In certain specialized agricultural fields, higher levels of education and training may be required.

**Wages**

Some supervisors are paid by seasonal contracts. For example, supervisors contract with a farmer to harvest a crop. Supervisors supply the crew, pay the crew, and keep the remaining money as their income. Wages vary by area of the country, crop, and employer.

Few jobs on farms and ranches provide benefits such as retirement and health care. In addition, because many agricultural worker supervisors travel the country following the crops, they have several employers during the year. Thus, agricultural worker supervisors must provide their own insurance and other benefits.

**First-Line Supervisors of Farming, Fishing, and Forestry Workers**

Location	Pay Period	25%	Median	75%
Hawaii	Hourly	\$20.54	\$24.27	\$31.20
	Yearly	\$42,730	\$50,480	\$64,890
Honolulu	Hourly	(1)	(1)	(1)
	Yearly	(1)	(1)	(1)
United States	Hourly	\$14.94	\$20.10	\$26.99
	Yearly	\$31,070	\$41,800	\$56,140

(1) Wage estimate is not available.

**Outlook**

Outlook information for agriculture worker supervisors in Hawaii and nationally is not available.

About 25 percent of agricultural worker supervisors are self-employed.

Major employers:

- Farms and ranches

The number of small farms is decreasing. They are being sold to large farming companies. One result of this change is that more farm work is being done by hired workers rather than family members. Additional supervisors will be needed to oversee these hired workers. Because many small farms have already been sold, the need for additional supervisors will grow slowly.

**ANIMAL SCIENTISTS** conduct research. They try to develop better animal products and healthier animals.

**Preparation**

To work as an animal scientist, you must:

- have a high school diploma or GED;
- complete at least a bachelor's degree in agriculture or animal science;
- have a good eye for detail; and
- be self-motivated.

**Education after high school**

You need a bachelor's degree in animal or agriculture science if you want to work in research. In animal science programs, you study economics, business, and physical and life sciences. You also study animal breeding, reproductive physiology, and nutrition.

A doctoral degree (Ph.D.) is required to lead research projects or teach at a college or university. To complete an advanced degree, you take more courses, do fieldwork, and conduct laboratory research.

All states have land-grant colleges that offer animal science degrees. Most schools offer bachelor's, master's, and doctoral degrees in this field. All degree levels offer students opportunities to specialize in areas such as genetics, nutrition, poultry, or livestock.

The table below lists the level of education attained by a subset of workers in this occupation. The workers surveyed were between ages 25 and 44.

Education level attained	Percentage of workers in this occupation*
Less than high school diploma	0
High school diploma or equivalent	4
Some college, no degree	9
Associate degree	7
Bachelor's degree	41
Master's degree	23
Doctoral (Ph.D.) or professional degree	14

\* National data for agricultural and food scientists (SOC 19-1010).

**Work experience**

Work experience as an animal caretaker is helpful. Similarly, volunteering at an animal hospital or clinic is also valuable.

**On-the-job training**

Because most jobs in this field are research-based, on-the-job training is limited. New employees may be oriented to the lab and the company's policies. Orientation may last up to a month.

**Wages**

Wages vary by employer and area of the country. The scientist's level of education and experience also affect wages. In general, animal scientists who have a doctoral degree (Ph.D.) and postgraduate training earn higher wages.

Animal scientists who work full time usually receive benefits. Typical benefits include sick leave, paid vacation, and health insurance. Some employers also provide a retirement plan. Self-employed animal scientists must provide their own insurance.

Location	Pay Period	25%	Median	75%
Hawaii	Hourly	(1)	(1)	(1)
	Yearly	(1)	(1)	(1)
Honolulu	Hourly	(1)	(1)	(1)
	Yearly	(1)	(1)	(1)
United States	Hourly	\$20.63	\$28.00	\$41.60
	Yearly	\$42,910	\$58,250	\$86,530

(1) Wage estimate is not available.

### Outlook

Specific information about the outlook for animal scientists in Hawaii is not available. Factors affecting the outlook include the number of qualified applicants, economic conditions, industry decline, and replacement needs.

Nationally, the number of jobs for animal scientists is expected to grow as fast as average through the year 2018.

About 12 percent of animal scientists are self-employed.

Major employers:

- State government agencies
- Research and testing services

Farmers and food production companies spend a lot of money on breeding, raising, and feeding animals. They are interested in faster, cheaper methods of raising animals. Thus, they will hire animal scientists at research firms to study new methods.

Job openings will occur as current animal scientists retire or leave this occupation. Opportunities will be best for those who have an advanced degree.

	Employment		Employment Change	
	2008	2018	Number	Percent
National	3,700	4,200	500	13.2

**AQUACULTURE WORKERS** are responsible for the breeding and raising of aquatic life.

### Preparation

A high school education or equivalent is generally preferred or required. Some post high school training including a biology course may be preferred. Depending on specialty, some employers may prefer persons with a bachelor's degree.

Employers often look for persons with related experience which provided practical knowledge, skills, and abilities. Background in biological sciences is usually necessary. Some jobs may require only on-the-job training while others may require knowledge of basic laboratory procedures including sampling and measuring techniques. For some positions, "hands on" farming experience plus college course work in such areas as marine biology, agriculture, aquaculture, fisheries biology, zoology, oceanography, and chemistry are suggested. In addition, trade skills such as carpentry and plumbing may be preferred. A business background may also be helpful in commercial farming. Volunteer or part time work or an internship is recommended. Experience working with aquariums as a hobbyist is also helpful. Related programs of study and courses are available in Hawaii. Employers may provide on the job training which may be from a few weeks to a year in length.

### Wages

Earnings may vary with the type of work and type of aquatic life grown.

### Outlook

Outlook information for aquaculture workers in Hawaii is not available. The outlook in Hawaii depends on economic conditions, construction and expansion of aquaculture operations, consumer demand for aquaculture products, the number of qualified applicants, wages, government regulations, technological advances, fewer grants available, and

replacement needs. Factors such as high start up and operating costs, site availability, water quality, environmental regulations, weather, and disease may affect the outlook for local farms. Opportunities may be best on the Big Island. Opportunities vary with specialty. The success of new open ocean fish farms may increase opportunities.

**BAKERS** mix and bake ingredients to produce breads, pastries, and other baked goods.

### Preparation

To work as a baker, you must:

- have a high school diploma or GED;
- complete formal training;
- complete on-the-job training; and
- have a good sense of smell and taste.

### Education after high school

No formal education is required beyond high school for bakers. However, some bakers enroll in formal training programs. Professional-technical schools, two-year colleges, and special culinary schools offer courses.

Culinary training includes courses in menu planning, food preparation, and the selection and storage of food. Some programs teach you how to bake specialty items such as pastries and gourmet breads. Training includes hands-on experience. Many programs include courses in business management.

### On-the-job training

Most bakers learn their skills on the job from an experienced worker. You begin as a baker trainee. Training includes:

- selecting and preparing ingredients;
- baking;
- decorating cakes;
- baking processes; and
- handling food.

Training can last for several years. Some employers train apprentices. After training, an experienced baker supervises your work. As you gain experience you receive more difficult tasks and more independence.

### Military training

The military trains people to be food service specialists. This occupation includes bakers. Training takes nine to 14 weeks, depending on the specialty. Further training occurs on the job.

### Wages

Wages vary greatly depending on the area of the country and the employer. In general, bakers who work for manufacturing companies tend to earn higher wages than those who work for small bakeries.

Benefits also vary by employer. Full-time bakers often receive typical benefits, but part-time bakers usually do not. Typical benefits include paid vacation, sick leave, and health insurance. Some employers provide uniforms. Bakers who work for restaurants may receive free meals.

Location	Pay Period	25%	Median	75%
Hawaii	Hourly	\$10.73	\$14.44	\$19.85
	Yearly	\$22,310	\$30,030	\$41,280
Honolulu	Hourly	\$10.31	\$13.51	\$18.92
	Yearly	\$21,440	\$28,100	\$39,350
United States	Hourly	\$9.18	\$11.27	\$14.38
	Yearly	\$19,090	\$23,450	\$29,910

## Outlook

Locally, slower than average employment growth is expected for bakers through the year 2018. Job openings should arise from replacement needs. Outlook depends on replacement needs, economic conditions, wages, the number of qualified applicants, and demand for baked food products. Persons with formal training or related experience should fare best.

Nationally, little change in the number of jobs for bakers is expected through the year 2018.

Major employers:

- Grocery stores
- Bakeries and pastry stores
- Bakery products manufacturers
- Restaurants

Growth will be due to increases in population, household income, and leisure time. These factors will allow people to dine out more often. However, employment for bakers can be sensitive to the state of the economy. When money is tight, people are less likely to dine out.

The popularity of fresh baked breads and pastries should spur the growth in jobs for bakers. The popularity of specialty bakeries will also provide more jobs. Growth will be slower for bakers who work in manufacturing. This is because production equipment is efficient and bakers can produce a lot of bread quickly.

	Employment		Employment Change	
	2008	2018	Number	Percent
National	151,600	151,900	300	0.2
State	1,550	1,580	30	1.9

**COMMERCIAL FISHERS** catch ocean fish and other marine life using nets, hooks, and traps.

## Preparation

There are no formal education requirements. Many fishers learn fishing methods and operations through on-the-job training or experience. The length of on-the-job training depends on the individual's ability and the type of fishing. Persons must learn specific techniques for each type of fishing done. Helpful high school courses include marine science, biology, mechanics, and electronics. Related programs in seamanship are offered in Hawaii. Persons interested in owning or managing a fishing operation should have good business skills.

## Wages

Nationally, most commercial fishers earn between \$300 and \$700 per week.

Pay varies with the worker's duties and experience as well as the type of operation. Pay also varies with the size of the boat and the amount and value of the catch. Wages also vary by season. In general, wages are lowest in the winter, when the weather is bad and fishers go out less often. Some fishers have other jobs during the winter.

The cost of operating the ship, repairing and maintaining the equipment, and feeding the crew is subtracted from the sale of the catch. The remaining money is divided as shares among the crew members. Generally, the ship's owner (usually its captain) receives half of the net proceeds. This amount covers any profit, as well as ship maintenance and repair. Crew shares are generally between five and 12 percent.

Commercial fishers who are self-employed must provide their own health insurance and retirement plan.

Location	Pay Period	25%	Median	75%
Hawaii	Hourly	(1)	(1)	(1)
	Yearly	(1)	(1)	(1)
Honolulu	Hourly	(1)	(1)	(1)
	Yearly	(1)	(1)	(1)
United States	Hourly	\$9.56	\$12.30	\$15.98
	Yearly	\$19,880	\$25,590	\$33,250

(1) Wage estimate is not available.

### Outlook

Outlook information for commercial fishers in Hawaii is not available. Outlook depends on fishing conditions, weather conditions, government regulations, market conditions, industry growth, economic conditions, the number of qualified applicants, wages, and replacement needs.

Nationally, slow to moderate decline in the number of jobs for commercial fishers is expected through 2018.

About 56 percent of all commercial fishers are self-employed. Most of the rest work for commercial fishing companies. Some commercial fishers are involved in sport fishing activities.

The fishing industry depends on the ability of fish stock to replenish itself through growth and reproduction. Many types of fish are below the level at which they can replenish themselves easily. Thus, fishing for these types of fish has been reduced or prohibited. Because fishers are limited in the type of fish they can catch, fewer commercial fishers will be needed.

	Employment		Employment Change	
	2008	2018	Number	Percent
National	35,600	32,900	-2,700	-7.7

Employment growth for commercial fishers will continue to be limited by three factors. First, the number of large fishing vessels is growing. Second, the use of electronic equipment for navigation, communication, and location of fish is increasing. Third, fishing gear is improving. All of these factors have increased the efficiency of fishing operations. As a result, boats can have fewer crew members. Similarly, the use of boats on which the catch is processed aboard the vessel may limit employment opportunities.

Despite the predicted decline in jobs, openings will occur. Some fishers will leave the occupation because of the strenuous, hazardous nature of the job. Others will leave because of the lack of steady, year-round income. Most job openings will arise from the need to replace workers who retire or leave the occupation. Sport fishing boats will continue to provide some job opportunities.

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**CONSERVATION SCIENTISTS** manage, develop, and help protect soil and rangelands.

To work as a conservation scientist, you must:

- have a high school diploma or GED;
- complete at least a bachelor's degree in an agricultural science;
- have excellent written and oral communication skills;
- be self-motivated; and
- enjoy working outdoors.

### Education after high school

Most conservation scientists have a bachelor's degree. Relatively few colleges and universities offer a degree in soil conservation. About 40 schools offer a degree in range management. Thus, many conservation scientists have a degree in a related field and take courses in their area of interest. Suggested areas of study include environmental studies, agronomy, general agriculture, or hydrology. You can also study crop or soil science, wildlife biology, forestry, or range management.

A doctoral degree (Ph.D.) is required to lead research projects or teach at a college or university. In order to complete an advanced degree, you take more classes, do fieldwork, and conduct laboratory research.

The table below lists the level of education attained by a subset of workers in this occupation. The workers surveyed were between ages 25 and 44.

Education level attained	Percentage of workers in this occupation*
Less than high school diploma	1
High school diploma or equivalent	1
Some college, no degree	7
Associate degree	7
Bachelor's degree	63
Master's degree	18
Doctoral (Ph.D.) or professional degree	4

\* National data for conservation scientists and foresters (SOC 19-1030).

#### On-the-job training

Many conservation scientists undergo more training once on the job. The training may be conducted through classroom work, strictly on the job, or a combination of both. Training usually lasts a few months, and will depend on the employer.

#### Wages

Wages vary by area of specialization and employer. Those who work for the federal government often receive higher wages than those who work for state or local government agencies.

Conservation scientists usually receive benefits. Typical benefits include health insurance, sick leave, paid vacation, and a retirement plan. Benefit packages tend to be better in government agencies than in small, private firms.

Location	Pay Period	25%	Median	75%
Hawaii	Hourly	\$22.58	\$29.94	\$37.62
	Yearly	\$49,960	\$62,280	\$78,250
Honolulu	Hourly	(1)	(1)	(1)
	Yearly	(1)	(1)	(1)
United States	Hourly	\$21.71	\$28.51	\$35.86
	Yearly	\$45,150	\$59,310	\$74,590

(1) Wage estimate is not available.

#### Outlook

In Hawaii, average employment growth is expected for conservation scientists through the year 2018.

Nationally, the number of jobs for conservation scientists is expected to grow as fast as the average through the year 2018.

Major employers:

- Federal, state, and local government agencies
- Forestry companies

Public concern over water and soil pollution from farms and industrial plants is increasing. This is likely to lead to more government regulations. If this happens, more conservation scientists will be needed. Farms and industrial plants will hire

conservation scientists to help them comply with these regulations. In addition, research firms will hire conservation scientists to help them prepare environmental impact statements.

Fire prevention and suppression will become more important for those employed with the Federal Government. The Federal Government is the main employer of conservation scientists, and growth will be limited by budget concerns.

The number of jobs created through growth will be small. However, positions will occur with all government agencies as current workers retire or switch jobs.

	Employment		Employment Change	
	2008	2018	Number	Percent
National	18,300	20,500	2,200	11.9
State	130	140	10	7.7

**FARM AND RANCH WORKERS** help raise crops and livestock for market.

### Preparation

Many learn skills on the job. A high school diploma or equivalent is often preferred. Applicants should enjoy working outdoors, be dependable, and have good communication skills. Farming/ranching experience is helpful. A driver's license may be required. Related programs of study are offered in Hawaii at community colleges. Auto or diesel mechanics and welding courses may be helpful. Obtaining a commercial driver's license (CDL) is helpful for persons interested in driving trucks. Supervisory skills are helpful for advancement.

### Wages

Wages for farm and ranch workers varies by the type of work they do. Wage information for several types of farm and ranch workers are given below:

Some farm and ranch workers may receive less pay in exchange for housing, utilities, and farm products.

Pay varies with the area of the country and the crop worked. In general, workers in the southern and mountain states receive lower wages. Wages may be higher in areas where workers are in short supply.

Wages also vary by time of the year. During planting and harvest times, farm and ranch workers have many opportunities to work overtime and earn higher wages. However, they may not work at all during some of the winter months.

Farm and ranch workers who work full time on large farms are likely to receive benefits. These benefits may include health insurance, paid vacation, and sick leave. Those who work on small farms often must provide their own insurance. Similarly, those who travel around the country following the crops must provide their own insurance.

### Agricultural Equipment Operators

Location	Pay Period	25%	Median	75%
Hawaii	Hourly	\$10.69	\$16.11	\$18.96
	Yearly	\$22,240	\$33,510	\$39,440
Honolulu	Hourly	(1)	(1)	(1)
	Yearly	(1)	(1)	(1)
United States	Hourly	\$9.22	\$11.71	\$14.77
	Yearly	\$19,180	\$24,360	\$30,720

(1) Wage estimate is not available.

**Farmworkers and Laborers, Crop, Nursery, and Greenhouse**

Location	Pay Period	25%	Median	75%
Hawaii	Hourly	\$10.11	\$12.11	\$15.95
	Yearly	\$21,020	\$25,180	\$33,170
Honolulu	Hourly	\$11.90	\$15.39	\$17.91
	Yearly	\$24,750	\$32,000	\$37,250
United States	Hourly	\$8.46	\$8.98	\$9.80
	Yearly	\$17,600	\$18,690	\$20,390

**Farmworkers, Farm, Ranch, and Aquacultural Animals**

Location	Pay Period	25%	Median	75%
Hawaii	Hourly	\$9.79	\$11.30	\$15.95
	Yearly	\$20,370	\$23,500	\$33,180
Honolulu	Hourly	(1)	(1)	(1)
	Yearly	(1)	(1)	(1)
United States	Hourly	\$8.77	\$10.56	\$13.39
	Yearly	\$18,240	\$21,970	\$27,840

(1) Wage estimate is not available.

**Outlook**

Faster than average employment growth is expected for crop, nursery, and greenhouse farmworkers and laborers through the year 2018. Little change in employment is expected for agricultural equipment operators during this same period. However, employment of farm and ranch animal farmworkers is expected to decline through 2018. Outlook depends on economic conditions, production costs, availability of land and water, foreign competition, land costs, plant diseases, alien pests, replacement needs, the number of qualified applicants, wages, demand for products, and weather conditions. In Hawaii, most of the hired work force has continued to be in the diversified agricultural sector. Further mechanization of farm work may result in fewer workers employed. Because most of Hawaii's produce is imported, agriculture in Hawaii may increasingly focus on crops that will make Hawaii self-sustaining for some of its food.

Many farm and ranch workers work only part of the year. Workers are in demand from spring to fall, but not in winter. About half as many farm and ranch workers are employed during the winter. Farm and ranch worker jobs are available in all areas of the country.

Major employers:

- Commercial farms
- Agriculture worker supply services

Technological advances in farm machinery have produced machines that plant and harvest more quickly. Farms that have these machines need fewer workers to operate them. As more small farms are sold to large farming companies, machines will be used on more land. In addition, larger farms may coordinate the work of farm and ranch workers better than smaller farms. Thus, fewer workers can get more work done.

Some employment for farm and ranch workers is seasonal. There tend to be a lot of job openings in seasonal work because people move on to other jobs. In part, this is due to the low pay and the high level of physical labor in this occupation.

Despite the decline, many job openings will become available as current workers leave this occupation for various reasons.

**Agricultural Equipment Operators**

	Employment		Employment Change	
	2008	2018	Number	Percent
State	130	130	0	0

**Farmworkers and Laborers, Crop, Nursery, and Greenhouse**

	Employment		Employment Change	
	2008	2018	Number	Percent
State	3,430	3,770	340	9.9

**Farmworkers, Farm, Ranch, and Aquacultural Animals**

	Employment		Employment Change	
	2008	2018	Number	Percent
State	540	530	-10	-1.9

**FARMERS AND FARM MANAGERS** raise crops and livestock for market.

**Preparation**

A high school diploma or equivalent may be preferred. Post-high school education may also be preferred. Employers may train assistants on the job. Practical experience and knowledge of farming/ranching practices are important. Time spent on a farm/ranch and in youth programs, such as FFA or 4-H, is helpful. High school agriculture courses are suggested. Because farming/ranching increasingly requires more complex decisions, college-level training is suggested and may be required. College courses can provide a strong background in science, agriculture, and business management. Such skills are important for both self-employed and hired managers. Programs in agriculture and specific fields of study are available at universities and community colleges throughout Hawaii. Experience working on several farms may be helpful. Those who wish to become farmers/ranchers should be prepared to make a large initial investment for land, machinery, buildings, livestock, seed, feed, fertilizers, herbicides, and/or supplies. It may take several years or longer to receive a return on investment. Having good math and analytical skills may be very helpful.

**Wages**

Farm income varies greatly depending upon the type and size of farm. For example, vegetable and cotton farms generally produce the highest income. Beef and hog farms generate some of the lowest income. Large farms generally produce more income than smaller farms. However, some small farms that produce specialty crops have high incomes.

Farmers' incomes vary greatly from year to year. The prices of farm products change depending upon weather and other factors. These factors influence the quantity of farm products produced and the demand for those products. Farms that show a large profit in one year may show a loss in the following year.

Many farmers receive payments from the government that supplement their incomes. Some of these price supports are being phased out and may result in lower incomes for these farmers. Thus, many farmers have business activities away from the farm to supplement their income.

Farmers and self-employed farm managers must supply their own benefits. As members of farm organizations, they may receive group discounts on health and life insurance. Farm managers who are not self-employed may receive housing as a benefit. They may also receive paid vacations and health insurance.

**Farmers, Ranchers, and Other Agricultural Managers**

Location	Pay Period	25%	Median	75%
Hawaii	Hourly	(1)	(1)	(1)
	Yearly	(1)	(1)	(1)
Honolulu	Hourly	(1)	(1)	(1)
	Yearly	(1)	(1)	(1)
United States	Hourly	\$19.54	\$29.21	\$39.30
	Yearly	\$40,640	\$60,750	\$81,750

(1) Wage estimate is not available.

**Outlook**

Varies with geographic area and specialty. Outlook depends mainly on the availability of land and water, economic conditions, demand for such agricultural products as fruits and flowers, production and transportation costs, developments in equipment and methods, government regulations, earnings, interest in farming/ranching, the number of qualified applicants, and replacement needs. Weather conditions, plant diseases, alien pests, and seasonal productions on some farms may also affect the outlook. A large capital investment is necessary to purchase or lease land, equipment, buildings, stock, and supplies. In some markets, it may be difficult for local farmers/ranchers to compete with large suppliers from elsewhere. Many small farmers have found it helpful to have working partnerships with restaurants. In addition, many farms have ag-tourism activities which provide education and activities for visitors to farms and generate additional income. Opportunities may be favorable in diversified crops and in crops that make Hawaii less dependent on other places for some of its food. There may also be potential markets overseas for Hawaii's products. Farmers and ranchers may be faced with a need to relocate as residential and other developments occur. Outlook information for farm managers in Hawaii is not available. However, employment of farmers and ranchers is expected to grow slower than average through the year 2018.

Nationally, a slow to moderate decline in the number of jobs for farmers is expected through the year 2018. However, the number of jobs for farm managers is expected to grow slower than average during the same period.

Nearly all farmers are self-employed.

Farm managers tend to work for large commercial farms. Others may work for companies that supply agricultural goods to farms. Some may work for agricultural worker supply services. These service companies contract with farms to help with the harvest or other services.

**Outlook**

As the population continues to grow, the demand for food will grow as well. However, new technology is allowing farmers to produce larger crops than in the past. In addition, large farming companies are buying smaller farms. Some farms are sold because the farmer's children do not want to farm the land. Others are sold because the farm has too much debt. The end result is that there are fewer farms and farmers. Most job openings will result from the need to replace farmers who retire or leave the occupation for other reasons.

There are an increasing number of small-scale farmers who are finding success by meeting the demands of specific markets. For example, many small farmers grow foods without pesticides or chemicals because there is a demand for organic food. Other farmers are starting to raise trees or plants for nurseries.

Aquaculture is another area that is offering new job opportunities for farmers. This type of farming involves raising fish for sale. Fish are raised in the ocean, lakes, or in very large tanks. Because of over-fishing of many types of fish, this type of farming is likely to grow.

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**FOOD PROCESSING WORKERS** prepare raw food items and combine ingredients to make food products.

**Preparation**

To work as a food processing worker, you need:

- on-the-job training; and
- little or no previous work experience.

Education after high school

No formal education is required for this job. However, many employers prefer that you have a high school diploma or its equivalent.

On-the-job training

Food processing workers usually receive informal training on the job from experienced workers. You begin by doing simple tasks, such as loading and unloading materials. As you get experience, you learn to do more complex tasks, such as operating machinery.

Training may last up to one month. After training, another worker supervises your work for a short time.

**Wages**

Wages for food processing workers vary by the type of work they do. The wages for several types of workers are given below.

Wages vary with the type of food processed, the employer, and the area of the country. Workers who are members of unions generally earn more than non-union workers.

Food processing workers who work full time usually receive benefits. Typical benefits include sick leave, paid vacation, and health insurance.

**Food and tobacco roasting, baking, and drying machine operators and tenders**

Location	Pay Period	25%	Median	75%
Hawaii	Hourly	\$13.30	\$14.35	\$15.33
	Yearly	\$27,660	\$29,860	\$31,890
Honolulu	Hourly	\$13.23	\$14.21	\$15.17
	Yearly	\$27,510	\$29,560	\$31,550
United States	Hourly	\$10.15	\$13.05	\$17.20
	Yearly	\$21,110	\$27,140	\$35,780

**Food batchmakers**

Location	Pay Period	25%	Median	75%
Hawaii	Hourly	\$8.67	\$9.92	\$11.44
	Yearly	\$18,030	\$20,630	\$23,800
Honolulu	Hourly	\$8.34	\$9.19	\$10.78
	Yearly	\$17,340	\$19,120	\$22,420
United States	Hourly	\$9.36	\$11.85	\$15.46
	Yearly	\$19,470	\$24,640	\$32,160

**Food cooking machine operators and tenders**

Location	Pay Period	25%	Median	75%
Hawaii	Hourly	\$8.93	\$10.40	\$14.88
	Yearly	\$18,580	\$21,640	\$30,950
Honolulu	Hourly	\$8.66	\$9.67	\$11.73
	Yearly	\$18,010	\$20,120	\$24,410
United States	Hourly	\$9.22	\$11.24	\$14.45
	Yearly	\$19,180	\$23,380	\$30,060

**Outlook**

In Hawaii, employment of food batchmakers is expected to grow faster than the average through the year 2018. During this same period, little change in employment is expected for food cooking machine operators and tenders. Outlook depends on replacement needs, economic conditions, wages, demand for products processed locally, the number of qualified applicants, and technological changes. Increased automation may limit the demand for additional workers.

Nationally, the number of jobs for food batchmakers is expected to grow as fast as average through the year 2018. During this same period, the number of jobs for food cooking machine operators and tenders is expected to grow slower than average. Little change in the number of jobs is expected for food and tobacco roasting, baking, and drying machine operators and tenders through 2018.

Many food processing workers work only during the summer and fall harvest.

Major employers:

- Bakeries and tortilla manufacturers
- Fruit and vegetable processing companies
- Meat processing companies
- Dairy product manufacturers
- Sugar processing companies

Population growth will increase the demand for processed foods. However, automation will allow fewer workers to do the same amount of work.

Despite the slow growth, openings will become available as current workers leave this occupation.

#### Food and tobacco roasting, baking, and drying machine operators and tenders

	Employment		Employment Change	
	2008	2018	Number	Percent
National	18,100	18,200	100	0.3

#### Food batchmakers

	Employment		Employment Change	
	2008	2018	Number	Percent
National	100,500	109,200	8,700	8.7
State	690	770	80	11.6

#### Food cooking machine operators and tenders

	Employment		Employment Change	
	2008	2018	Number	Percent
National	39,300	40,800	1,500	3.8
State	70	70	0	0.0

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**FOOD SCIENTISTS** conduct research to develop and improve food products that are healthy, safe, and appealing.

#### Preparation

To work as a food scientist, you must:

- have a high school diploma or GED;
- complete at least a bachelor's degree in agriculture or food science;
- have excellent written and oral communication skills;
- be self-motivated; and
- have a good eye for detail.

#### Education after high school

You need a bachelor's degree in agricultural or food science for a job in applied research. In a food science program, you study food chemistry, food analysis, and food processing. A degree in a related science, such as biology or chemistry, also prepares you for jobs in food science.

You need a doctoral degree (Ph.D.) to lead research projects or teach at a college or university. To complete a doctoral degree, you take more courses, do fieldwork, and do your own lab research. The general trend is for food scientists to have a Ph.D.

All states have land-grant colleges that offer agricultural and food science programs. Many other colleges and universities offer similar programs.

The table below lists the level of education attained by a subset of workers in this occupation. The workers surveyed were between ages 25 and 44.

Education level attained	Percentage of workers in this occupation*
Less than high school diploma	0
High school diploma or equivalent	4
Some college, no degree	9
Associate degree	7
Bachelor's degree	41
Master's degree	23
Doctoral (Ph.D.) or professional degree	14

\* National data for agricultural and food scientists (SOC 19-1010).

Military training

The military does not provide initial training in this field. However, the military may provide work experience to food scientists who have a master's degree or higher.

**Wages**

Wages vary by employer and area of the country. Wages also vary by the scientist's level of education and experience.

Benefits also vary by employer. Most full-time food scientists receive benefits. These include vacation, sick leave, and health insurance. Self-employed food scientists must provide their own insurance.

Location	Pay Period	25%	Median	75%
Hawaii	Hourly	\$30.33	\$58.32	\$65.50
	Yearly	\$63,080	\$121,301	\$136,230
Honolulu	Hourly	\$30.64	\$58.65	\$65.66
	Yearly	\$63,730	\$122,000	\$136,570
United States	Hourly	\$21.25	\$28.93	\$39.43
	Yearly	\$44,200	\$60,180	\$82,020

**Outlook**

Outlook information for food scientists in Hawaii is not available. Factors that may affect the outlook include the number of qualified applicants, the number of manufacturing companies in Hawaii that need food scientists, availability of training, economic conditions, wages, and replacement needs.

Nationally, the number of jobs for food scientists and technologists is expected to grow faster than average through the year 2018.

About 13 percent of food scientists are self-employed.

Major employers:

- State government agencies
- Research and testing services

As the population grows, the demand for food scientists will increase. Many of the new jobs for food scientists will be at research and development services firms. Research scientists will address several areas of public concern. These areas include diet, health, and changes in food safety. It also includes biosecurity which is the study of ways to prevent animals from getting new diseases.

Competition may be strong for college teaching jobs, even for scientists with doctoral degrees. In general, food scientists who have advanced degrees will have the best chances.

	Employment		Employment Change	
	2008	2018	Number	Percent
National	13,400	15,600	2,200	16.3

**FORESTERS** manage, use, and help protect forests and other natural resources.

### Preparation

To work as a forester, you must:

- have a high school diploma or GED;
- complete a bachelor's degree in forestry or wildlife management;
- be self-motivated; and
- enjoy working outdoors.

### Education after high school

Almost all foresters have a bachelor's degree. Most land-grant colleges and universities offer programs in forestry. These programs cover science, math, communication skills, and computer science. You also study forest economics and business management. Increasingly, you take courses on policy issues and the environmental rules that affect forest management.

The table below lists the level of education attained by a subset of workers in this occupation. The workers surveyed were between ages 25 and 44.

Education level attained	Percentage of workers in this occupation*
Less than high school diploma	1
High school diploma or equivalent	1
Some college, no degree	7
Associate degree	7
Bachelor's degree	63
Master's degree	18
Doctoral (Ph.D.) or professional degree	4

\* National data for conservation scientists and foresters (SOC 19-1030).

### On-the-job training

Some employers offer varying levels of on-the-job training. This may be hands-on or classroom-based. In general, training lasts up to a year.

Many colleges require forestry students to complete an internship. You usually work in a research facility. It may be operated by the college, a government agency, or a private business.

### Work experience

Some employers accept a combination of experience and appropriate coursework as a substitute for a bachelor's degree. However, competition for jobs makes this type of position difficult to find. Summer work experience in the forest is helpful for getting a job in this field.

### Wages

Wages vary based on the forester's education level. Wages also vary by employer. Starting salaries in private industry are similar to those in the federal government. However, starting salaries in state and local government are usually lower.

Benefits also vary. Full-time foresters usually receive typical benefits. These include paid vacation, sick leave, and health insurance. Government employees usually receive a retirement plan.

Location	Pay Period	25%	Median	75%
Hawaii	Hourly	(1)	(1)	(1)
	Yearly	(1)	(1)	(1)
Honolulu	Hourly	(1)	(1)	(1)
	Yearly	(1)	(1)	(1)
United States	Hourly	\$21.01	\$26.22	\$31.97
	Yearly	\$43,700	\$54,540	\$66,510

(1) Wage estimate is not available.

**Outlook**

In Hawaii, little change in employment is expected through the year 2018. Outlook depends on replacement needs, economic conditions, the number of qualified applicants, interest in forestry, industry growth, growth of private forests and natural resource management, government regulations, availability of training, wages, and the need for improved forestry, logging, and range management practices. Concerns over environmental protection and the management of endangered species may affect local opportunities. Some positions may require a high level of expertise.

Nationally, the number of jobs for foresters is expected to grow as fast as the average through the year 2018.

Major employers:

- Federal government agencies (U.S. Department of Agriculture, Forest Service)
- State and local government agencies
- Sawmills and planing mills
- Logging companies

Growth should be strongest in state and local government agencies. Demand will be spurred by continuing emphasis on environmental protection, responsible land management, and fire prevention and suppression. Fewer opportunities for foresters are expected in the federal government, partly due to budget cuts. However, a large number of foresters are expected to retire or leave their government jobs. This should result in some job openings.

The recent reductions in timber harvests on public lands will also slow growth for private industry foresters. Most forested land is privately owned. The rising demand for timber on private lands will affect foresters. Those who work for private industry, such as paper companies and sawmills, will be needed to provide management plans to landowners.

In addition, some opportunities will be as consultants for companies that need professionals to prepare environmental impact statements.

	Employment		Employment Change	
	2008	2018	Number	Percent
National	11,500	12,900	1,400	12.1
State	20	20	1	0.0

**FORESTRY TECHNICIANS** help develop and protect forests.

To work as a forestry technician, you need:

- a high school diploma or GED;
- at least a two-year degree in a forestry-related field or on-the-job training; and
- a love of the outdoors.

Education after high school

Professional-technical schools and two-year colleges offer programs in forest technology. Programs include courses in forestry and forest resource management. You also study forest technology and environmental studies. Programs also include hands-on experience working in the field or lab.

It is becoming more common for forest technicians to enter the field with a bachelor's degree in forestry or a related field.

The table below lists the level of education attained by a subset of workers in this occupation. The workers surveyed were between ages 25 and 44.

Education level attained	Percentage of workers in this occupation*
Less than high school diploma	3
High school diploma or equivalent	17
Some college, no degree	24
Associate degree	13
Bachelor's degree	30
Master's degree	9
Doctoral (Ph.D.) or professional degree	4

\* National data for other life, physical, and social science technicians (SOC 19-4090).

Work experience

Summer jobs in parks are very helpful if you would like to work as a forestry technician. Many students in forestry programs work for the state and national forests during the summer. Experience working as a wildfire fighter is also helpful.

On-the-job training

Once hired, most forestry technicians learn additional skills on the job from experienced forestry technicians. As a new technician you begin by working as a helper or forest conservation technician. As you get experience, you begin supervising other workers. Training may last up to a year.

**Wages**

Wages vary by employer. Starting salaries in private industry are similar to those in the federal government. However, starting salaries in state and local government are usually lower. Wages also vary based on the technician's experience and education.

Benefits also vary by employer. Full-time, year-round forestry technicians may earn typical benefits, especially in government agencies. Typical benefits include vacation, sick leave, and health insurance.

Location	Pay Period	25%	Median	75%
Hawaii	Hourly	\$15.34	\$18.50	\$21.86
	Yearly	\$31,920	\$38,480	\$45,460
Honolulu	Hourly	\$15.06	\$18.34	\$23.32
	Yearly	\$31,320	\$38,150	\$48,510
United States	Hourly	\$13.45	\$16.05	\$21.14
	Yearly	\$27,990	\$33,390	\$43,970

**Outlook**

In Hawaii, little change in employment is expected through the year 2018.

Nationally, the number of jobs for forestry technicians is expected to grow as fast as average through the year 2018.

Major employers:

- Federal, state, and local government agencies

Concern about the environment will spur some demand for forestry technicians. This is more likely at the state and local government level. However, tight budgets for many state governments are expected to limit job growth.

	Employment		Employment Change	
	2008	2018	Number	Percent
National	34,000	36,900	2,900	8.6
State	140	140	0	0.0

**MEAT CUTTERS** convert animal carcasses into pieces of meat for sale to consumers.

To work as a meat cutter, you must:

- have a high school diploma or GED; and
- complete on-the-job training or a formal training program.

Education after high school

Some meat cutters learn their skills through meat cutting training programs. Professional-technical schools and two-year colleges offer these programs. You can also take courses offered by organizations in the industry.

On-the-job training

Most meat cutters learn their skills on the job from experienced workers. The length of training varies by the type of work you do. Poultry cutters and trimmers receive up to one month of training. Those who slaughter cows receive up to one year of training. Butchers receive the most training, which generally is up to two years.

**Wages**

Wages for meat cutters vary by type of work they do. Wages for several types of meat cutters are given below.

Wages vary by employer and area of the country. In addition, those who are members of a union usually receive higher wages than non-union workers.

Benefits vary by employer and specialty. Meat cutters who work full time for grocery stores usually receive benefits. Typical benefits include sick leave, health insurance, and a retirement plan. Poultry workers, however, rarely earn major benefits.

**Butchers and meat cutters**

Location	Pay Period	25%	Median	75%
Hawaii	Hourly	\$14.54	\$19.21	\$22.11
	Yearly	\$30,240	\$39,960	\$45,990
Honolulu	Hourly	\$16.61	\$19.81	\$22.36
	Yearly	\$34,560	\$41,210	\$46,500
United States	Hourly	\$10.50	\$13.75	\$17.97
	Yearly	\$21,850	\$28,600	\$37,380

**Meat, poultry, and fish cutters and trimmers**

Location	Pay Period	25%	Median	75%
Hawaii	Hourly	\$9.81	\$13.27	\$15.95
	Yearly	\$20,400	\$27,610	\$33,180
Honolulu	Hourly	\$9.49	\$13.45	\$16.00
	Yearly	\$19,730	\$27,970	\$33,280
United States	Hourly	\$9.37	\$10.74	\$12.49
	Yearly	\$19,500	\$22,330	\$25,980

**Slaughterers and meat packers**

Location	Pay Period	25%	Median	75%
Hawaii	Hourly	(1)	(1)	(1)
	Yearly	(1)	(1)	(1)
Honolulu	Hourly	(1)	(1)	(1)
	Yearly	(1)	(1)	(1)
United States	Hourly	\$9.51	\$11.24	\$13.46
	Yearly	\$19,790	\$23,380	\$27,990

(1) Wage estimate is not available.

**Outlook**

In Hawaii, average employment growth of employment of butchers and meat cutters is expected through the year 2018 while much faster than average employment growth is forecast for meat, poultry, and fish cutters and trimmers during the same period. Outlook depends on new processing methods, economic conditions, demand for meat, growth of retail food stores, the number of qualified applicants, and replacement needs.

Nationally, the number of jobs for meat, poultry, and fish cutters and trimmers and slaughterers and meat packers is expected to grow slower than average through the year 2018. During this same period, little change in the number of jobs is expected for butchers and meat cutters.

Major employers:

- Animal processing companies
- Grocery stores
- Butcher shops and fish markets
- Seafood processing companies

Most job growth will be for slaughterers and lower-skilled meat, poultry, and fish cutters. In contrast, the number of jobs for skilled butchers, who work primarily in grocery stores, is expected to grow more slowly.

The meat processing industry is changing. In the past, a lot of meat cutting was done at retail stores, such as butcher shops and grocery stores. However, it now costs less for meat to be processed at food processing plants, then sent to stores. Thus, there will be fewer jobs for butchers, but more jobs for other types of meat cutters.

Opportunities for meat, poultry, and fish cutters will be good because this occupation has a high rate of turnover.

**Butchers and meat cutters**

	Employment		Employment Change	
	2008	2018	Number	Percent
National	129,100	131,000	1,900	1.5
State	510	540	30	5.9

**Meat, poultry, and fish cutters and trimmers**

	Employment		Employment Change	
	2008	2018	Number	Percent
National	169,600	180,400	10,800	6.4
State	420	480	60	14.3

**Slaughterers and meat packers**

	Employment		Employment Change	
	2008	2018	Number	Percent
National	98,400	102,500	4,100	4.2

**NURSERY WORKERS** grow, transplant, and care for plants and trees for sale.

To work as a nursery worker, you must:

- have little or no previous work experience;
- be self-motivated;
- have good interpersonal skills; and
- enjoy working outdoors.

Education after high school

No formal education is required for this job. However, many employers prefer that you have a high school diploma or its equivalent.

You may need a certificate before you can apply pesticides to plants. Certification programs are available through nursery associations or your state agriculture department.

On-the-job training

Nursery workers usually receive informal training on the job from experienced workers. On the job, you learn to:

- use equipment and tools;
- plant and water; and
- provide customer service.

Training may last up to one month. However, it's important to remember that nursery workers continually learn new skills as new flowers and plants arrive or are cultivated.

**Wages**

Wage information is not available specifically for nursery workers. However, they are part of the larger group of "farmworkers and laborers."

Pay varies by employer, area of the country, and the worker's level of experience.

Nursery workers who work full time may receive benefits. Typical benefits include health insurance, sick leave, and paid vacation.

**Farmworkers and Laborers, Crop, Nursery, and Greenhouse**

Location	Pay Period	25%	Median	75%
Hawaii	Hourly	\$10.00	\$12.11	\$15.95
	Yearly	\$21,020	\$25,180	\$33,170
Honolulu	Hourly	\$11.90	\$15.39	\$17.91
	Yearly	\$24,750	\$32,000	\$37,250
United States	Hourly	\$8.46	\$8.98	\$9.80
	Yearly	\$17,600	\$18,690	\$20,390

**Outlook**

In Hawaii, employment of crop, nursery, and greenhouse farmworkers and laborers is expected to grow faster than the average through the year 2018. Job openings are expected mainly from replacement needs. Outlook is affected by local and worldwide demand for Hawaii's nursery products, economic conditions, the number of qualified applicants, developments in equipment and horticultural techniques, wages, and replacement needs. Hawaii's geographic location may be an advantage, since costs of growing flowers and plants in Hawaii's warm climate are relatively low. However, this advantage is offset by relatively high shipping and labor costs in comparison to some countries in the global market. Economic conditions in other countries, approval by foreign governments to import plants from Hawaii, and the ability to grow new and superior varieties of plants may also affect the outlook.

Major employers:

- Nurseries

Interest in gardening has grown in recent years and is expected to continue growing. In addition, the number of professional buildings, shopping malls, and homes needing new or updated landscaping should increase as well. As a

result of these factors, more people will buy plants. The growing demand for plants should increase the number of jobs for nursery workers who tend plants. However, the number of new workers hired will be slowed by the fact that nurseries make only a small profit off plants. Nurseries must be sure not to spend too much money on labor.

Regardless of the rate of growth, job openings will occur. This occupation has a high rate of turnover because many jobs are part time.

### Farmworkers and Laborers, Crop, Nursery, and Greenhouse

	Employment		Employment Change	
	2008	2018	Number	Percent
State	3,430	3,770	340	9.9

**PARK NATURALISTS** create programs to teach park visitors about natural areas.

### Preparation

To work as a park naturalist, you must:

- have a high school diploma or GED;
- complete a bachelor's degree in a life science;
- enjoy working outdoors; and
- have good interpersonal skills.

### Education after high school

Most park naturalists have a bachelor's degree. Several fields of study provide a good background for this occupation. These include biology, forestry, and wildlife management. You can also choose history, environmental science, anthropology, or natural resource management. Some students major in education and minor in a life science program, or vice versa.

The table below lists the level of education attained by a subset of workers in this occupation. The workers surveyed were between ages 25 and 44.

Education level attained	Percentage of workers in this occupation*
Less than high school diploma	1
High school diploma or equivalent	1
Some college, no degree	7
Associate degree	7
Bachelor's degree	63
Master's degree	18
Doctoral (Ph.D.) or professional degree	4

\* National data for conservation scientists and foresters (SOC 19-1030).

### Work experience

Experience working in a park is very important in this field. You may need one to two years of work experience. While in college or high school, you might volunteer at a park, work for the forest service, or complete an internship.

### On-the-job training

Park naturalists spend up to one month learning about their place of employment. This means you may spend time learning about specifics, such as administrative duties and park procedures.

### Wages

Wage information is not available specifically for park naturalists. However they are part of the larger group of "conservation scientists."

Wages tend to be higher in some states than others. This depends on how much money the state or local government puts into their natural resources budget. Private agencies tend to pay higher wages than the government. However, some government agencies also offer housing and transportation as part of their pay.

Park naturalists usually receive benefits. Typical benefits include sick leave, paid vacation, health insurance, and a retirement plan.

**Conservation scientists**

Location	Pay Period	25%	Median	75%
Hawaii	Hourly	\$22.58	\$29.94	\$37.62
	Yearly	\$46,960	\$62,280	\$78,250
Honolulu	Hourly	(1)	(1)	(1)
	Yearly	(1)	(1)	(1)
United States	Hourly	\$21.71	\$28.51	\$35.86
	Yearly	\$45,150	\$59,310	\$74,590

(1) Wage estimate is not available.

**Outlook**

Specific information about the outlook for park naturalists in Hawaii is not available. However, this occupation is included in the larger group of “conservation scientists.” In Hawaii, average employment growth is expected for this group through the year 2018. Factors affecting the outlook include the number of qualified applicants, economic conditions, wages, government regulations, and replacement needs.

Major employers:

- Federal, state, and local government agencies

Nationally, there is an increased interest in preserving the nation's natural areas and parks. Many people are expected to donate money to private agencies that manage natural areas. This may increase the number of jobs. However, park naturalist is one of the first jobs to be cut when government agencies need to reduce their budgets. Thus, the number of job openings for park naturalists may be limited.

**PRECISION AGRICULTURE TECHNICIANS** use Geographic Information Systems (GIS) and Global Positioning System (GPS) to improve agricultural practices. They use data to make precise decisions about watering, planting, and pesticide application.

**Preparation**

To work as a precision agriculture technician, you must:

- have a high school diploma or GED;
- complete a certificate or two-year associate degree;
- have practical, hands-on skills;
- have good computer skills; and
- have good communication skills.

Education after high school

Most people prepare for this occupation by getting a certificate or associate degree in this field. Certificates typically take one year to complete while associate degrees usually take two. Many community colleges and vocational schools offer one-year programs in this field.

Because this degree combines two distinct fields, it is becoming more common for schools to offer bachelor’s degrees in precision agriculture.

Work experience

Working in jobs that give you practical experience in the areas you wish to work is good background for this occupation. The fields of civil engineering and geography are very helpful as they focus on use of the Geographic Information Software (GIS). Work on a farm or ranch setting is helpful, too.

**On-the-job training**

As a new technician, you perform routine tasks while closely supervised by an experienced technician or agricultural engineer. As you gain experience, you work on tasks that are more difficult. Training may last a month up to a year.

**Wages**

Wages vary by employer and area of the country. The individual's specialty and level of experience and responsibility also affect wages. Those who have supervisory duties usually earn higher wages.

Precision agriculture technicians who work full time usually receive benefits. Typical benefits include sick leave, paid vacation, and health insurance. Some employers also provide a retirement plan.

**Life, physical, and social science technicians, all other**

Location	Pay Period	25%	Median	75%
Hawaii	Hourly	\$18.24	\$22.67	\$28.53
	Yearly	\$37,950	\$47,150	\$59,340
Honolulu	Hourly	\$19.28	\$23.72	\$29.43
	Yearly	\$40,100	\$49,330	\$61,210
United States	Hourly	\$15.97	\$20.84	\$26.98
	Yearly	\$33,200	\$43,350	\$56,130

**Outlook**

In Hawaii, outlook information is not available specifically for precision agriculture technicians. However, they are part of a larger group of "life, physical, and social sciences technicians, all other." Little change in employment is expected for workers in this group through 2018. Nationally, employment of workers in this group is expected to grow as fast as the average through 2018.

Major employers:

- Consulting firms
- Federal, state, and local government agencies

The growing number of people in the world will increase demands for food and energy. Precision agriculture technicians will be needed to find better ways to produce food. They will also work to save natural resources such as soil, air, and water. Opportunities will be best for technicians with strong technical, computing, and communication skills.

The use of advanced technologies, such as GPS and GIS, will continue to increase both the accuracy and productivity of these workers. This will limit job growth to some extent. However, job openings will continue to arise from the need to replace workers who leave this occupation.

**Life, physical, and social science technicians, all other**

	Employment		Employment Change	
	2008	2018	Number	Percent
National	64,700	73,300	8,600	13.3
State	430	430	0	0.0

**WATER TREATMENT PLANT OPERATORS** treat water so that it is safe to drink. Wastewater treatment plant operators remove pollutants from wastewater so it is safe to return to the environment.

**Preparation**

For county government positions, a high school education or equivalent is generally required. High school courses in biology, physics, chemistry, and math are helpful. Employers often prefer applicants with post-high school training or related experience in such areas as water treatment or electricity and mechanical repair. Work experience in industrial or fuel plants may be helpful. Mechanical experience gained through the military and through such jobs as stationary equipment operator, mechanic, or boiler operator is helpful. Bachelor's degree programs in water quality, chemistry, or civil or mechanical engineering may be helpful in some cases. In some settings, skills may be gained through on-the-job

training. Related courses are offered in Hawaii. Courses on how to monitor, sample, and test water samples may be helpful.

### Wages

Wages vary by area of the country. Operators who work at water treatment plants in big cities tend to earn more. The operator's level of experience and training also affect wages.

Operators usually receive benefits that include health and life insurance, paid vacation, and a retirement plan. Some employers also pay for job-related training courses.

### Water and Wastewater Treatment Plant and System Operators

Location	Pay Period	25%	Median	75%
Hawaii	Hourly	\$19.43	\$22.71	\$26.17
	Yearly	\$40,410	\$47,250	\$54,440
Honolulu	Hourly	\$19.86	\$23.28	\$26.76
	Yearly	\$41,320	\$48,420	\$55,650
United States	Hourly	\$15.14	\$19.60	\$24.99
	Yearly	\$31,480	\$40,770	\$51,970

### Outlook

In Hawaii, employment is expected to grow much faster than average through the year 2018. Job openings are expected to arise from both employment growth and replacement needs. Outlook depends on economic conditions, government regulations, industry growth, the number of qualified applicants, earnings, technological advances, and replacement needs.

Nationally, the number of jobs for water treatment plant operators is expected to grow much faster than average through the year 2018.

Major employers:

- Local government agencies (water treatment agencies)
- Water supply services

As the population increases, so will the demand for water. Many cities are responding to this demand by building more treatment plants. In addition, many manufacturers are beginning to treat wastewater before it leaves their plants. Both of these factors should increase the demand for operators.

Opportunities for water treatment plant operators should be good. While this occupation has a low turnover rate, it also has a low number of applicants for jobs. Thus, qualified applicants should have good job prospects. Water and wastewater treatment plant operators generally have steady employment. This is because their services are needed regardless of the state of the economy.

### Water and Wastewater Treatment Plant and System Operators

	Employment		Employment Change	
	2008	2018	Number	Percent
National	113,400	135,900	22,500	19.8
State	350	430	80	22.9

**APPENDIX D:**  
**H.B. No. 749 HD1 –**  
**Relating to workforce development**

*Published February 2013*

NEIL ABERCROMBIE  
GOVERNOR



DWIGHT Y. TAKAMINE  
DIRECTOR

AUDREY HIDANO  
DEPUTY DIRECTOR

**STATE OF HAWAII**  
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February 19, 2013

To: The Honorable Sylvia Luke, Chair, the Honorable Scott Y. Nishimoto, Vice Chair, the Honorable Aaron Ling Johanson, Vice Chair, and Members of the House Committee on Finance

Date: Wednesday, February 20, 2013  
 Time: 3:30 p.m.  
 Place: Conference Room 308, State Capitol

From: Dwight Y. Takamine, Director  
 Department of Labor and Industrial Relations (DLIR)

**Re: H.B. No. 749 HD1, Relating to Workforce Development**

**I OVERVIEW OF PROPOSED LEGISLATION**

H.B. 749 HD1 proposes to establish a Hawaii Agriculture Workforce Advisory Board composed of representatives from Departments of Labor and Industrial Relations, Agriculture, and Education; University of Hawaii, Community Colleges, Farm Bureau, and a representative of the farming community selected by the chair to promote agricultural self-sufficiency in the State and develop an agricultural workforce. To accomplish these goals, an agricultural workforce plan would cover the following:

- Introduce Hawaii's youth to agriculture-related activities that would promote interest and aptitude in agricultural sustainability;
- Promote the development of future leaders in the agricultural sector;
- Identify training opportunities for future workforce participants; and
- Develop a seamless Hawaii P-20 program to transition future agricultural workforce participants into the workforce.
- Appropriate funds to assist in establishing and supporting the board.

DLIR supports this proposal provided that its passage does not replace or adversely impact priorities in the Executive Budget.

H.B. 749, HD 1  
February 19, 2013  
Page 2

**II. CURRENT LAW**

Chapter 226, HRS, establishes that it shall be the policy of the State to promote economically competitive activities that increase Hawaii's agricultural workforce and livelihood.

**III. COMMENTS ON THE HOUSE BILL**

This bill would support the Governor's priorities to build a self-sustaining agricultural industry. The proposal also would expand the successful collaborations developed among several state, local, and private businesses to promote a more competitive and trained agricultural workforce. For example, a Veteran-to-Farmer pilot project resulted in the recent graduation of 14 Big Island Hawaiian homesteaders, including 7 military veterans, from a new college course that provided classroom and hands-on experience in establishing a productive farm.

Besides learning farming techniques, these graduates acquired skills for managing their own businesses, which are critical for successful farming. Resources used in the project were leveraged among different funding sources of all partners. The goal of the project is to replicate the program statewide so that every University campus can offer similar training in their area, provided sufficient land and water are available.

Preceding the pilot project was a series of Agricultural Skill Panels conducted in each county that were co-sponsored by the Departments of Labor and Industrial Relations and Agriculture to solicit local input and recommendations toward development of an agricultural workforce plan in Hawaii. Over 600 individuals, including farmers and agribusinesses, participated. Their recommendations were considered and incorporated into legislative proposals that became part of the Governor's Package.

These efforts would not have been possible without the contributions of all agencies involved. To sustain and build upon this effort, the partnerships must be supported and strengthened so that separate and disparate workforce training programs among different institutions become comprehensive and well-defined career pathways.

A major cause of insufficient agricultural workers is a common but no longer accurate image of farming as a low-skilled and low-paying job. This perception can only be dispelled by a collective effort among educators, training organizations, and the community in delivering more accurate, updated information about the increasingly complex nature of farming, and through the development of multiple career ladders to address different skill levels required in the agricultural industry.

Therefore, DLIR supports this measure provided that its passage does not replace or adversely impact priorities in our Executive Budget.

## APPENDIX E:

# Skill Panel Participants by Area and Breakout Group

### OAHU AGRICULTURE SKILL PANEL Growing Diversified Agriculture

**Jamie Barton**, Hawaii Agriculture Research Center  
**Heidi Bornhorst**, Heidi Bornhorst Landscape Consultant  
**Robin Campaniano**, Ulupono Initiative  
**Natalie Cash**, Olomana Gardens  
**Uriah Dombrowski**, Green Earth LLC  
**Warren Dominy**, Oceanic Institute  
**Delpha Estrada**, University of Hawaii  
**John Farias**, Former State Ag. Director  
**Bradley “Kai” Fox**, University of Hawaii CTAHR  
**Jeffrey Garvey**, Waipahu High School  
**Jie Gonsowski**, University of Hawaii  
**Justin Hahn**  
**Mark Hashem**, State House of Representatives  
**Carolyn Hildebrand**, DLIR – Research & Statistics  
**Sandy Hoshino**, Leeward Community College  
**Keith Ideoka**, Lahainalua High School  
**Allison Inouye**, Department of Education  
**Matt Johnson**, Pacific Biodiesel  
**Ronald Keith**, Hawaii County Economic Opportunity Council  
**Edward Kenney**, TOWN Restaurant  
**Yukio Kitagawa**, Member, Ag Task Force, C&C of Honolulu  
**Todd Low**, Department of Agriculture  
**Steven Lupkes**, Kauai Workforce Investment Board  
**Glenn Martinez**, Olomana Gardens  
**Damian McPherson**, University of Hawaii  
**Fred Mencher**, Hawaii Marine Enterprises  
**Sam Moku**, City and County of Honolulu  
**Anthony Ostrowski**, Oceanic Institute  
**David Rietow**, Agro Resources Inc.  
**Suzette Robinson**, University of Hawaii Community College  
**Marissa Sandblom**, Grove Farm Company  
**Phyllis Shimabukuro-Geiser**, Mikiloa Poultry Farms  
**Clyde Tamaru**, University of Hawaii – CTAHR  
**Wayne Thom**, Dept. of Business, Econ. Dev. & Tourism  
**David Walfish**, University of Hawaii  
**Jennifer Wooton**, Office of Senator Daniel K. Inouye

### OAHU AGRICULTURE SKILL PANEL Expanding Regulatory Capacity

**Michael Barros**, University of Hawaii  
**Craig Bowden**, Hawaiian Pineapple Co.  
**Amy Brinker**, KYA Sustainability Studio  
**Jean Brokish**, Oahu Resource Conservation & Dev. Council  
**Phyllis Dayao**, DLIR – Research & Statistics  
**Cindy Goldstein**, Pioneer Hi-Bred  
**Dennis Hwang**, Fat Law Farms  
**Jeri Kahana**, Department of Agriculture  
**Kenneth Kamiya**, Kamiya Gold  
**Susan Matsushima**, Alluvion, Inc  
**Brian Miyamoto**, Hawaii Farm Bureau Federation  
**Daniel Nellis**, Dole Food Company Hawaii  
**Carol Okada**, Department of Agriculture  
**Elyse Petersen**, UH Shidler College of Business  
**Glenn Sakamoto**, Department of Agriculture  
**Malia Smith**, Hawaii Pacific University  
**Tish Uyehara**, Armstrong Produce  
**Mike Yonemura**, Diamond Head Seafood Wholesale Inc

## OAHU AGRICULTURE SKILL PANEL

### Increasing Opportunities for Farmers and Farm Workers

**Tamara Armstrong**, KYA Sustainability Studio  
**Jeri Arucan**, DLIR – Research & Statistics  
**Melanie Bondera**, The Laulima Center  
**Steven Chiang**, University of Hawaii Ag Incubator Program  
**Ann Emmsley**, University of Hawaii Maui College  
**Richard Fulton**, Windward Community College  
**Alan Gottlieb**, Ponoholo Ranch  
**Ronald Han**, Office of Veteran Services  
**Peter Hanohano**, Hi‘ilei Aloha LLC  
**Clarice Hashimoto**, State Reapportionment Commission  
**Shin Ho**, Ho Farms  
**Neil Ho**, Ho Farms  
**Bernadette Howard**, UH – Career and Technical Education  
**Ken Kajihara**, Kalani High School  
**Diane Ley**, U.S. Department of Agriculture

**Kehaulani Lum**  
**Tricia Malloy**, Workforce Development Division  
**Jeff Matsu**, DLIR  
**Dean Matsukawa**, Department of Agriculture  
**Jan Miyamoto**, Kauai Workforce Investment Board  
**David Morgan**, Kualoa Ranch  
**Lydi Morgan Bernal**, AINA In Schools  
**Leslie Nawahine**, Nalo Farms  
**John Nunnari**, Ho‘omau Ke Ola  
**Theodore Radovitch**, University of Hawaii  
**Andrei Soto**, Retired – DLIR  
**Laura Thielen**, Mayor’s Office, City & County of Honolulu  
**Noah Unabia**, Hoamoia Farms  
**Jared Washkowitz**, Fat Law Farms

## OAHU AGRICULTURE SKILLS PANEL

### Practical Application of Agriculture Skills

**Marc Alexander**, State of Hawaii – Governor’s Office  
**Joe Booker**, State of Hawaii – PSD  
**Jamie Boyd**, Windward Community College  
**Rolanse Crisafulli**, WorkHawaii Division, C&C of Honolulu  
**Jeff Davis**, The Solar Guy  
**Nina Enomoto**, University of Hawaii – CTE  
**Deanna Espinas**, State of Hawaii – PSD  
**Betty Geran**, The Greenhouse  
**Reginald Gorham**, Institute for Human Services  
**Betty Gorham**, Institute for Human Services  
**Patti Isaacs**, Ho‘omau Ke Ola  
**Darin Kawazoe**, State of Hawaii – PSD  
**Milton Kotsubo**, PSD Womans Community Correctional Center  
**Stephen Kow**, Kalani High School  
**Frank Lopez**, State of Hawaii – PSD  
**Felix Mata**, Federal Probation Program  
**Wayne Ogasawara**, Mililani Agricultural Park  
**Melonie Ogata**, DLIR – Research & Statistics  
**Nancy Redfeather**, Hawaii Island School Garden Network  
**David Ringuette**, University of Hawaii  
**Dan Rudoy**, Pacific Biodiesel  
**Ted Sakai**, Ted I. Sakai and Associates  
**Pauline Sato**, Agricultural Leadership Foundation of HI  
**Milton Sato**, State of Hawaii – PSD  
**Garrett Takahashi**, State of Hawaii – PSD  
**Ramsay Taum**, Sustain Hawaii  
**Ernest Tottori**, HPC Foods Ltd.  
**James Wataru**, HCI Advisory Board  
**Sylvia Yuen**, University of Hawaii

## OAHU AGRICULTURE SKILL PANEL

### Full Build Out of Agriculture Infrastructure

**David Arakawa**, Land Use Research Foundation of Hawaii  
**Kim Coffee-Isaak**, Agriculture Leadership Foundation of Hawaii  
**Sean Connelly**, KYA Sustainability Studio  
**Claire Cooper**, Hawaii Pacific University  
**George Costa**, County of Kauai  
**Scott Enright**, ADC  
**Nicole Fisher**, Private Citizen  
**Mark Fox**, The Nature Conservancy, Hawaii Program  
**Joy Gold**, Hawaii Farm Bureau Federation  
**Richard Ha**, Hamakua Springs  
**Scott Harrington**, Waiawa Correctional Facility  
**Jacqui Hoover**, Hawaii Island Economic Development Board  
**Sharon Hurd**, Department of Agriculture  
**Mike Irish**, Diamond Head Seafood Wholesale Inc  
**Tasha Kawamata-Ryan**, UH – Career and Technical Education  
**Kaniu Kinimaka-Stocksdale**, Hawaii County Economic Opportunity Council  
**Vicki Lau**, DLIR - Research & Statistics  
**Shane Lee**, Second City Property Management  
**Matthew Loke**, Department of Agriculture  
**Thom Matsuda**, Department of Agriculture  
**James McCay**, RevoluSun  
**Robert Osgood**, Private Agricultural Consultant, AgResult  
**Glenna Owens**, Dept. of Education  
**Karl Rhoades**, WDC Member/State House of Representatives  
**Alan Takemoto**, Monsanto  
**Mark Tonini**, HFA  
**Stephanie Whalen**, Hawaii Agriculture Research Center  
**Lyle Wong**, Department of Agriculture  
**Lauren Zirbel**, Hawaii Food Industry Association

## HILO AGRICULTURE SKILL PANEL

### Education and Training

**Bunnie Au-Suehiro**, DLIR – Workforce Development Division  
**Brian Baldwin**, Office of Housing and Community Development  
**Dan Banks**, University of Hawaii – CTE  
**Kim Chang**, Natural Farming Inputs and Wellness  
**Michael Duponte**, University of Hawaii  
**Memmo Fornaciari**, Home Gardeners  
**Velma Joy Francisco**, Farmer  
**Julia Garrison**, Farmer  
**Graceson Ghen**, Hawaii Community College  
**Michael Gibson**, Hamakua North Hilo Ag Co-op & Hamakua Harvest  
**Reginald Hasegawa**, Crop Production Services  
**Bernadette Howard**, University of Hawaii – CTE  
**Donald Ikeda**, Councilmember, County of Hawaii, District 2  
**Chris Jacobson**, Hawaii Community College  
**Manuel Jadulang**, Honokaa High School  
**Donovanlee Jenkins**, Probation Office, United States Judiciary  
**Dalen Kawakami**, Big Island Plant & Foliage  
**Harvey Keliikoa**, Manu O Ku Hawaii  
**Tony Kent**, Hawaii Community College  
**Stephen Kow**, Kalani High School  
**Vicki Lau**, DLIR – Research & Statistics  
**Nem Lau**, Department of Education – State of Hawaii  
**Diane Ley**, U.S. Department of Agriculture  
**Althea Magno**, Kea'au High School  
**Bruce Matthews**, UH Hilo CAFNRM  
**Jack Mermel**, Mermel Ecological  
**Cam Muirs**, Big Island Tea / University of Hawaii Hilo  
**Darrell Nekoba**, Department of Education – State of Hawaii  
**Kathleen Nielsen**, Office of Housing and Community Development  
**Ken Ogawa**, Crop Production Services  
**Kaiulani Pahio**, Kanu O Ka Aina Learning Ohana  
**William Sakai**, U.H. Hilo CAFNRM  
**Sorren Sayles**, Strongroots Farm  
**Serrylee Kanakaole-Wong**, DLIR – Workforce Development Division  
**Becky Settlage**, 4-H Youth Development at UH Manoa  
**Deborah Shigehara**, Hawaii Community College  
**Steve Sparks**, Center for Magnesium Education and Research  
**Valerie Taketa**, Department of Education – State of Hawaii  
**Mark Thorne**, University of Hawaii  
**Sharon Ziegler-Chong**, University of Hawaii

## HILO AGRICULTURE SKILL PANEL

### Infrastructure and Marketing

**Luana Beck**, Hilo Farm Bureau  
**Phil Becker**, Aikane Plantation  
**Clarissa Berger**, California Hawaii Foilage  
**Melanie Bondera**, The Laulima Center  
**Cassandra Cho**, Hawaii Community College  
**Ellen Ciacci-Lono**, Home Gardeners  
**Kimo Dacalio**, Kuahiwi Ranch  
**Lorie Farrell**, Big Island Farm Bureau  
**Michele Galimba**, Kuahiwi Ranch  
**Al Galimba**, Kuahiwi Ranch  
**Guy Galimba**, Kuahiwi Ranch  
**Louie Hau**, Farmer  
**Adin Hester**, Hester Farms  
**Dayday Hopkins**, County of Hawaii  
**Grayson Inouye**, Pacific Floral Exchange  
**George Leonard**, Home Gardeners  
**Rachel Leyva**, Big Island Daylily Co.  
**Milnor Lum**, Milnor Lum and Associates  
**Ted Matsuda**, Kohala Nursery  
**Joan Obra**, Rusty's Hawaiian  
**Melonie Ogata**, DLIR – Research & Statistics  
**Leanne Okamoto**, Farmer  
**Mark Olds**, DLIR – Workforce Development Division  
**Fred Pollock**, Kihalani Orchids  
**Alan Richmond**, Hula Moon Organics  
**Carol Richmond**, Hula Moon Organics  
**Judy Schilling**, Big Island Nuseryman's Association  
**Katie Schwind**, Rivertop Solutions LLC  
**Renee Siracusa**, Malama O Puna  
**Dan Springer**, MacFarms of Hawaii  
**Raymond Tanouye**, Mountain Meadows  
**Felice Vamas**, Natural Farmer  
**James Weatherford**

## HILO AGRICULTURE SKILL PANEL

### Innovation and Sustainability

**Randy Ahuna**, Panaewa Farmers Association  
**Virginia Alderson**, Home Gardeners  
**Jeri Arucan**, DLIR – Research & Statistics  
**Clayton Benevides**, Hawaii Community College  
**Dan Brown**, University of Hawaii  
**Jana Bryan**, Tradewinds Hawaiian Woods  
**Clive Cheetham**, Ama  
**Sampson Davidson**, Hawaii Community College  
**Romel Dela Cruz**, Home Gardeners  
**Kyson Dunn**, Hawaii Community College  
**Barbara Fornaciari**, Home Gardeners  
**Andrea Furuli**, Home Gardeners  
**Dennis Gonsalves**, U.S. Department of Agriculture  
**Ellis Hester**, Hester Farms  
**Hans Himmelsbach**, Hawaii Community College  
**Kevin Hopkins**, UH Hilo CAFNRM  
**Jane Horike**, County of Hawaii  
**Matt Johnson**, Pacific Biodiesel  
**Donna Johnson**, Rural South Hilo Community Association  
**Mahealani Kauahi**  
**Punahele Kawamae**, Hawaii Community College  
**Ron Keith**, Hawaii County Economic Opportunity Council  
**John Kekahuna**, Farmer  
**Diedre Kent**, Home Gardeners  
**Kaniu Kinimaka-Stocksdale**, Hawaii County Economic Opportunity Council  
**Robert Kobayashi**, Department of Education – State of Hawaii  
**Barbara Leonard**, Home Gardeners  
**Sophia Maikui-Cabral**, Tradewinds Hawaiian Woods  
**Ernest Matsumura**, East Hawaii Community Development Corp.  
**Jeff Melrose**, Island Planning  
**Matthew Nanoe**, Hawaii Community College  
**Lorie Obra**, Rusty's Hawaiian  
**Desmond Pagen**, Niu Loa Hiki Nursery  
**Hoon Park**, Hawaii Natural Farms LLC  
**Lokelani Parker**, Home Gardeners  
**Vince Pelanca**, Hawaii Community College  
**Scott Perry**, Hawaii Community College  
**Michael Rawls**  
**Mike Robinson**, State of Hawaii – Dept. of Hawaiian Home Lands  
**William Stormont**, American Forrest Management Inc.  
**Derek Supnet**, Hawaii Community College  
**Eric Tanouye**, Hawaii Floriculture and Nursery Association  
**Stephen Wakefield**, Hawaii Community College  
**Patrick Walsh**, Estate Noni  
**Pualani Woo**, Home Gardeners  
**Amber Woolsey**, Hawaii Community College  
**Byron Yogi**, Hawaii Business Fairs

## HILO AGRICULTURE SKILL PANEL

### Regulatory Issues

**Lori Beach**, Hamakua North Hilo Agricultural Cooperative  
**Jim Cain**, King Laulau  
**Phyllis Dayao**, DLIR – Research & Statistics  
**David DeLuz**, Big Island Toyota  
**Jeff Enriques Ikeda**, Garden Exchange  
**Richard Ha**, Hamakua Springs  
**Kori Hisashima**, Natural Resources Conservation Services  
**David Ikeda**, Retired Instructor, HCC  
**Milton Iopa**, Farmer  
**Jeri Kahana**, Department of Agriculture  
**Kent Kawakami**, Hilo Mac Nut Association  
**Enriques Martinez**, California Hawaii Foilage  
**Felix Mata**, U.S. District Court for Hawaii  
**Tricia Molloy**, DLIR – Workforce Development Division  
**Emily Naeole**, Hawaiian Homes  
**Mark Nakashima**, Representative, State Legislature District 1  
**Delan Perry**  
**Nancy Redfeather**, Hawaii Island School Garden Network  
**David Ruf**, Rivertop Solutions LLC

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## KONA AGRICULTURE SKILL PANEL

### Education and Training

**Tracy Armillei**, T & A Farm  
**Bondera Colehour**, Kona Coffee Farmers Association  
**Nina Enomoto**, University of Hawaii  
**Mariana Garcia**, Sustainable Hawaii Youth Leadership Initiative  
**Bert Kanoa**, PIDF  
**Andrea Kawabata**, University of Hawaii  
**Marianne Larned**, Sustainable Hawaii Youth Leadership Initiative  
**Nem Lau**, CTE Resource Teacher  
**Marcie Montgomery**, One Island Sustainable Living  
**Rae Nakamura**, Kona Community School for Adults  
**Melonie Ogata**, DLIR – Research & Statistics  
**Neil Sims**, Kampachi Farms  
**Greg Smith**, Earth Matters Farm  
**Chris Wada**, DOE

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## KONA AGRICULTURE SKILL PANEL

### Food Distribution

**Stephanie Amick**, Po'okela Farm  
**Greg Colden**, Kokoleka Lani Farms  
**Mark Crawford**, MacFarms of Hawaii  
**Tim Dubitsky**, Private Citizen  
**Lani Eubank**, Farmer  
**Whendi Grad**, Big Island Bees  
**Dayday Hopkins**, County of Hawaii  
**Steve Hough**, Kona Coffee and Tea Co.  
**Patricia Hudson**, WOW Farms  
**Doreen Ikeno**, DLIR – Workforce Development Division  
**Larry Nakamoto**, Nakamoto Farms  
**Joachim Oster**, Athena of Hawaii LLC  
**Mark Outcault**, Private Citizen  
**Kathie Pomeroy**, Department of Health  
**Arnie Rabin**, Private Citizen  
**Sandra Scarr**, Daily Fix Coffee  
**Betty Spense**, Hawaii Cattle Producers Cooperative Association  
**Eric Tanouye**, HFNA  
**John Wilkie**, MacFarms of Hawaii

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## KONA AGRICULTURE SKILL PANEL

### Infrastructure

**Susan Cox**, County of Hawaii  
**Kaeo Duarte**, Kamehameha Schools  
**Esta Feedora**, Feedora Farm  
**David Fuertes**, Community Harvest Hawaii  
**Michele Galimba**, Kuahiwi Ranch  
**Kally Gotschke**, One Island Sustainable Living  
**Nahua Guilloz**, Parker Ranch  
**Serrylee Kanakaole-Wong**, DLIR – Workforce Development Division  
**Lily Kong**, Mama's Kona Coffee  
**Malian Lahey**, Heleakala Brands  
**Vicki Lau**, DLIR – Research & Statistics  
**Diane Ley**, U.S. Department of Agriculture  
**Neil Logan**, Integrated Living Systems Design LLC  
**Herbert Richards**, Kahua Ranch, Ltd.  
**David Ruf**, Rivertop Solutions  
**Steve Sakala**, Honaunau Farm and Eco Retreat  
**Steven Shrader**, One Island Sustainable Living  
**Dan Springer**, MacFarms of Hawaii  
**Bradley Westervelt**, Hawaii Sustainable Communities Alliance  
**Lewis Whitney**, Kokolulu Farm and Cancer Retreats in Hawaii  
**Louise Winn**, Alii Pride Farm  
**Puanani Woo**, Private Citizen

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## **KONA AGRICULTURE SKILL PANEL**

### **Innovation and Sustainability**

**Jeri Arucan**, DLIR – Research & Statistics  
**Theo Bacon**, One Island Sustainable Living  
**Dave Bateman**, Heavenly Hawaiian Farms  
**Jana Bogs**, BeyondOrganicResearch.com  
**Raven Bolas**, One Island Sustainable Living  
**Karin Cooke**, Kokolulu Farm and Cancer Retreats in Hawaii  
**Stefanie Delmont**, Kona County Farm Bureau  
**Beverly Fraser**, HIWEDO  
**Graceson Ghen**, Hawaii Community College  
**Barclay Gobel**, Ohana Living Farms  
**Una Greenway**, Kuaiwi Farms  
**Nancy Griffith**, A‘ama Organic Farm  
**Michael Hudson**, WOW Farms  
**Bert Kanoa**, Partners in Development  
**Carey Lillis Tinsley**, Sky Ranch  
**Kent Love**, Love Family Farms  
**Kawika Marquez**, Big Island Resource Conservation & Development Council  
**Steve Olson**, Kohala High School  
**Desmond Pagen**, Niu Loa Hiki Nursery  
**Randy Rupar**, Private Citizen  
**Midori Satoh**, Private Citizen  
**Nicole Skilling**, Farmer  
**Nikki Spencer**, Farmer  
**William Steiner**, University of Hawaii  
**Carolyn Wong**, Natural Resources Conservation Service – USDA

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## **KONA AGRICULTURE SKILL PANEL**

### **Recruitment and Retention**

**Tracy Armillei**, Private Citizen  
**Boyd Bond**, Private Citizen  
**Serena Chamberlain**, Cellana  
**Maria da Silva**, KonaRising.com  
**Phyllis Dayao**, DLIR – Research & Statistics  
**Allison Farr**, USDOL – Wage & Hour Division  
**Diane Heinlein**, Farmer  
**Michael Hough**, Kona Coffee and Tea Co.  
**Paul Johnson**, Kekela Farms  
**Joel Kriner**, West Hawaii Explorations Academy  
**Clare Loprinzi**, Ke Kula ‘o ‘Ehunuikaimalino  
**Kodo Miyaoka**, Bird Feather Hawaii, Inc  
**Hatsuko Miyaoka**, Bird Feather Hawaii, Inc  
**Kamuela Naihe**, Afterschool Youth Ag Program teacher  
**Kealoha Perry**, Kamehameha Schools  
**Mary Robblee**, U.S. Department of Agriculture  
**Neil Sims**, Kampachi Farms LLC  
**Jessica Tamaribuchi**, DLIR – Workforce Development Division  
**Bruce Terry**, Big Island Beekeeper Association

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## **KAUAI AGRICULTURE SKILL PANEL**

### **Business Development**

**Cheryl Ambrozic**, Maui Workforce Investment Board  
**Acharya Arumuganathaswami**, Hinduism Today  
**David Bown**, Financial Strategies Hawaii  
**Anabella Bruch**  
**George Costa**, Mayor's Office, County of Kauai  
**Phyllis Dayao**, DLIR – Research & Statistics  
**Deanna Espinas**, Hawaii Correctional Industries  
**Nataraj Gajanan**, Hinduism Today  
**John Gordines**, Tropical Flowers Express  
**Glenn Hontz**, University of Hawaii – Kauai Community College  
**Leanora Kaiaokamaile**, County of Kauai – Planning Department  
**Wayne Katayama**, Kaua'i Coffee Company  
**John Latkiewicz**, Hawaii SBDC – Kauai Center  
**Diane Ley**, U.S. Department of Agriculture – Farm Service Agency  
**Jodie Maesaka-Hirata**, State Department of Public Safety  
**Owen Moe**, Garden Island Resource Conservation and Development, Inc.  
**Corey Moriyama**, Maui Workforce Investment Board  
**Michael Newgent**, U.S. Department of Agriculture – Rural Development  
**Eric Nordmeier**, DLIR – Workforce Development Division  
**Charles Okamoto**, Gay & Robinson  
**Shanmuganathaswami**, Hinduism Today  
**Carol Shikada**, Department of Education – Kauai Complex Area  
**Ed Sindt**, Kauai Roots Farm Co-Op  
**Susan Tai Kaneko**, Kaua'i Economic Development Board – Food & Agriculture  
**Wayne Thom**, Workforce Development Council  
**Keith Yap**, Gay & Robinson

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## **KAUAI AGRICULTURE SKILL PANEL**

### **Increasing Productivity**

**Sara Bowen**, University of Hawai'i – CTAHR Kaua'i  
**Micah Finnila**, Syngenta  
**Cindy Goldstein**, Pioneer Hi-Bred International, Inc.  
**Scott Hanief**, BEI Hawaii  
**Jorienda Johnson**, Global Ag Labor  
**Kirby Kester**, BASF Plant Science  
**Palo Lockett**, Pacific Light and Power  
**Adele Manera**, Employment Specialist  
**Charles McFarlane**, BASF Plant Science  
**Melonie Ogata**, DLIR – Research & Statistics  
**Jerry Ornellas**, Farmer  
**Ryan Oyama**, Pioneer Hi-Bred International, Inc.  
**Eli Pablo**, BEI Hawaii  
**Bruce Ryland**, Pioneer Hi-Bred International, Inc.  
**Sia Salausa**, Kauai Community Correctional Center  
**Markeeta Smith**, Kauai Fresh Farms  
**Bernie Tsao**, University of Hawaii – Kauai Community College  
**Roy Yamakawa**, University of Hawai'i – CTAHR Kaua'i  
**Jillian Yasutake**, DLIR - Workforce Development Council

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## **KAUAI AGRICULTURE SKILL PANEL**

### **Food Safety**

**Jeri Arucan**, DLIR – Research & Statistics  
**Joseph Dunsmoor**, Waipa Foundation  
**Toni Kaaa**, Retired, USDA and QLCC  
**Sandi Kato-Klutke**, Kauai County Farm Bureau  
**Charles Kinoshita**, University of Hawaii – CTAHR  
**Carolyn Lum**, Garden Island Resource Conservation and Development, Inc.  
**Desiree Macabeo**, Goodwill Industries of Hawaii – Kauai  
**Scott McFarland**, Dow Agrosciences  
**Melissa McFerrin Warrack**, Kaua'i County Farm Bureau Administrator  
**Tek Nickerson**, Coco Mana  
**Terri Phillips**, Sunshine Market  
**Judith Rivera**, Pioneer Hi-Bred International, Inc.  
**Traci Silva**, University of Hawaii – CTAHR  
**Leilani Spencer**, Goodwill Industries of Hawaii – Kauai  
**Darren Strand**, Haliimaile Pineapple Co. Ltd.  
**Warren Watanabe**, Maui Workforce investment Board  
**Peter Wiederoder**, Dow AgroSciences Kauai  
**Mattie Yoshioka**, Kauai Economic Development Board Inc

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## **KAUAI AGRICULTURE SKILL PANEL**

### **Application of Automation**

**Bobbie Bolt**, Global Ag Labor  
**Daniel Chapp**, Self employed  
**Bruce Getzan**, University of Hawaii – Kauai Community College  
**Brent Godshalk**, Syngenta  
**Josh Hager**, Pioneer Hi-Bred International, Inc.  
**Laurie Ho**, Kaua'i County Farm Bureau  
**Keith Horton**, Dow Agrosciences  
**Elizabeth Ito**, Kalamaina Farms and Woods  
**Chris Kauwe Honi**, Honi Honey  
**Gilbert Kea**, Garden Island Resource Conservation and Development, Inc.  
**Herbert Keamoai**, Department of Education – Kauai High School  
**Vicki Lau**, DLIR – Research & Statistics  
**Tim Low**, BEI Hawaii  
**Steve Lupkes**, BASF Plant Science  
**Joan Morita**, Kauai Coffee Company, LLC  
**Lelan Nishek**, Kauai Nursery and Landscaping Inc.  
**Roy Oyama**  
**Bill Spitz**, County of Kaua'i, Office of Economic Development – Agriculture  
**Randy Uyehara**

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## MAUI AGRICULTURE SKILL PANEL

### Best Management Practices

**Lynn Nakamura-Tengan**, University of Hawaii Maui College – CTAHR  
**Courtney Bruch**, Upcountry Sustainability  
**Rosie Davis**, University of Hawaii  
**Douglas Duarte**, Kekaulike High School  
**Anne Emmsley**, Agriculture and Natural Resources – UHMC  
**Jose Faraon**, Kailoalani Organic Farm  
**Greg Friel**, Haleakala Ranch Company  
**Bill Greenleaf**, Maui Aloha Aina  
**Clark Hashimoto**, Hashimoto Persimmon Products LLC  
**James Hirano**, Maui Community Correctional Center  
**Gregory Hopkins**, Maui County Farm Bureau  
**Brian Igersheim**, Haliimaile Pineapple Company  
**Jennifer Jacobs**, Hawaii Aquaponics Workforce – Maui project  
**Harold Keyser**, University of Hawaii – CTAHR  
**Michelle LeJuene**, Hawaii Aquaponics Workforce – Maui project  
**Doug MacCluer**, Private Citizen  
**Susan Miller**, Hawaii Aquaponics Workforce – Maui project  
**Mae Nakahata**, HC&S  
**Annette Niles**, Maui Mamaki Tea  
**Angela Reichert**, Surfing Goat Dairy  
**Alina Rhoades**, Student, University of Hawaii Maui College  
**Hugh Starr**, Consultant  
**Faith Umetsu**, USDA Farm Service Agency  
**Cheryl Vasconcellos**, Hana Health  
**Warren Watanabe**, Maui County Farm Bureau  
**Kenneth Yamamura**, County of Maui Office of Economic Development  
**Lehn Huff**, Maui School Garden Network

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## MAUI AGRICULTURE SKILL PANEL

### Labor Issues

**Corey Moriyama**, HC&S  
**Bobby Brooks**, Haleakala Ranch Company  
**Rodney Chin**, HC&S  
**Phyllis Dayao**, DLIR – Research & Statistics  
**V. Pualani Enos**, Hui Malama Learning School  
**Barbara Haliniak**, Maui County Workforce Investment Board  
**Carrie Hautamaki**, Haliimaile Pineapple Company  
**Jennifer Hawkins**, Molokai Extension Service UH – CTAHR  
**Keith Isagawa**, Maui High School  
**Ken Kakesako**, Department of Agriculture  
**Samuel Kalalau**, Hana Health  
**Lisa Knutson**, Maui Memorial Medical Center  
**Michael Leone**, Aloha Renewables LLC  
**Penny Levin**, Pacific Biodiesel  
**Gerry Lum**, Maui Economic Opportunity  
**John McKee**, University of Hawaii Maui College  
**Gin Nary**, Alu Like  
**Cynthia Nazario-Leary**, New Farmers Network – UHMC  
**Phyllis Robinson**, Office of Continuing Education & Training, UHMC  
**Susan Scofield**, Kekaulike High School  
**Bernice Takahata**, Haiku Elementary School  
**Lori Teragawachi**, Office of Continuing Education & Training, MCC

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## **MAUI AGRICULTURE SKILL PANEL**

### **Strengthening Diversified Agriculture**

**William Jacintho**, Maui Cattlemen's Association/UH Maui College

**Cheryl Ambrozic**, Maui Flower Growers Association

**Rudy Balala**, Haliimaile Pineapple Company

**James Boswell**, University of Hawaii

**Lorraine Brooks**, University of Hawaii

**Wesley Chun**, Grower's Secret

**Dan Clegg**, Monsanto

**Gerry Dameron**, Sustainable Agriculture Foundation for Education

**Lucienne deNaie**, Private Citizen

**Deanna Espinas**, Hawaii Correctional Industries

**Marie Feliciano**, Biological Applications Inc.

**David Alexander-Ferrell**, New Farmers Network – UHMC

**Alex Franco**, Private Citizen

**Anne Jacintho**, Beef & Blooms

**Peter Kawaa**, Maui Community Correctional Center

**Debbie Kelly**, Molokai-Lanai SWCD

**Charlotte King**, Upcountry Sustainability

**Bill Linko**, Private Citizen

**Tony Liserre**, Private Citizen

**Bob Martin**, Biological Applications Inc.

**Bruce Martin**, Biological Applications Inc.

**Josiah Nishita**, Office of Council Services, Maui County

**Melonie Ogata**, DLIR – Research & Statistics

**Robert Parsons**, Office of the Mayor – Maui County

**Jack Patnode**, Kula Community Association

**Bobbie Patnode**, Kula Community Association

**Patsy Pitts**, Private Citizen

**James Robello**, USDA Farm Service Agency

**Suzette Robinson**, University of Hawaii

**Pamela Shingaki**, Maui Agriculture Research Center – CTAHR

**Amber Starr**, Hana Ranch Partners LLC

**Wayne Thom**, Workforce Development Council

**David Valdez**, Biological Applications Inc.

**Lani Weigert**, Alii Kula Lavendar Farm/Hawaii AgTourism Association

**Pomai Weigert**, Alii Kula Lavendar Farm/Hawaii AgTourism Association

**Roy Yamakawa**, University of Hawaii

**Patty Yonashiro**, Aquaponics No Ka 'O'i

**Isla Young**, Maui Economic Development Board

**Neil Abercrombie, Governor** | **State of Hawaii**

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