


HAWAII AGRICULTURE 2009

In cooperation with:
 Department
of Agriculture
STATE OF HAWAII
Agricultural Development Division


Released: January 11, 2011

2009 Farm Revenues up 4 percent from Previous Year

Farm gate revenues for 2009 totaled \$627.7 million compared to the revised 2008 level of \$605.2 million. Compared to the previous year, 9 of the 20 top ranked commodities were higher including seed crops, cattle, algae, bananas, eggs, milk, basil, sweet potatoes, and head cabbage.

The value of individually published diversified commodities rose 7 percent including a 26 percent increase for seed crops. The \$222.6 million seed revenue is a new record high as seed companies continue to expand their Hawaii based operations in response to continued demand for ethanol production. Farm gate value for cattle and calves rose 19 percent due to higher marketings in 2009. Fruit farm gate revenues rose 7 percent. Published vegetables and melons rose 2 percent, egg farm gate value rose 1 percent, and milk farm revenue rose by 37 percent which is attributed to higher milk production and price. Information for some agricultural commodities is suppressed to prevent disclosing individual operation information, but is included in the total revenue number.

Revenue declines include flowers and nursery products which fell 15 percent from the previous year and 26 percent from the record \$108.7 million set in 2007. Growers commented on continued slower business due to the sluggish economy, crop losses attributed to volcanic emissions, and drought as contributing factors that caused this decline. Sixteen percent less macadamia nut production was the contributing factor for the 12 percent revenue decline. This was offset by a 3 cents per pound higher price for wet-in-shell farm price. Coffee farm gate value was down 5 percent due to lower prices.



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FACT FINDERS FOR AGRICULTURE
UNITED STATES DEPARTMENT OF AGRICULTURE

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Mark E. Hudson
Director

The equivalent farm value of sugarcane (this does not include the processed value of raw sugar) was set at \$44.0 million, unchanged from 2008.

Farm level values shown in this publication are an important measure of production agriculture, but they do not truly reflect the total contribution of agriculture to the State and county economies. For the better understanding of the overall picture, refer to "Agriculture's Contribution to Hawaii's Economy 2005" - (CTAHR Economic Issue EI 13, Jan 2008) a publication prepared jointly by the College of Tropical Agriculture and Human Resources, University of Hawaii at Manoa, and the Hawaii State Department of Agriculture.

**Top 20 commodities,
State of Hawaii, 2008-2009 ¹**

Commodity ²	Rank		Value of production	
	2008	2009	2008	2009
	-- Number --		-- 1,000 dollars --	
Seed crops	1	1	176,990	222,560
Sugarcane (unprocessed)	2	2	44,200	44,200
Macadamia nuts	3	3	33,500	29,400
Cattle	5	4	24,305	28,945
Coffee	4	5	29,240	27,840
Algae	6	6	15,740	16,995
Papayas	7	7	14,393	14,186
Bananas	9	8	8,004	10,175
Eggs	8	9	8,678	8,759
Milk	12	10	5,460	7,491
Basil	10	11	6,755	6,810
Potatoes, sweet	13	12	4,780	5,413
Palms, potted	11	13	6,635	5,251
Dendrobiums, potted	14	14	4,111	3,474
Anthuriums, cut	16	15	3,518	3,006
Hogs	17	16	3,359	2,996
Cabbage, head	19	17	2,820	2,976
Dracaena, potted	15	18	3,919	2,766
Taro	20	19	2,666	2,440
Ginger root	18	20	2,880	2,240

¹ Pineapples, sod, tomatoes, and watermelons not ranked due to disclosure of individual operations.

² Floriculture categories include only growers with total sales of \$10,000 or more.

Farm values, State of Hawaii, 1990-2009

Year	Sugar (unprocessed cane)	Pineapples (fresh equivalent)	Diversified agriculture ¹	Total ²
1990	213,800	106,365	275,789	595,954
1991	174,900	107,775	268,707	551,382
1992	153,700	102,100	264,427	520,227
1993	163,000	79,850	271,094	513,944
1994	160,100	78,890	273,826	512,816
1995	127,700	87,360	291,632	506,692
1996	108,100	95,914	307,329	511,343
1997	85,500	91,721	327,484	504,705
1998	87,300	92,776	329,886	509,962
1999	86,800	101,448	342,846	531,094
2000	62,200	101,530	358,170	521,900
2001	57,800	96,337	370,241	524,378
2002	64,300	100,616	374,602	539,518
2003	64,400	101,470	382,253	548,123
2004	61,500	83,104	407,453	552,057
2005	58,900	79,288	444,597	582,785
2006	50,200	73,652	455,738	579,590
2007	47,600	³	³	577,999
2008	44,200	³	³	605,230
2009	44,200	³	³	627,690

¹ Aquaculture included beginning 1993.

² Includes all agricultural commodities.

³ Pineapples and diversified agriculture not shown separately to avoid disclosure of individual operations.

Diversified agriculture ranked by value, State of Hawaii, 2008-2009

Commodity	Rank		Value of production			Percent of diversified agriculture ¹	
	2008	2009	2008	2009	Year-to-year percent change	2008	2009
	-- Number --		-- 1,000 dollars --		Percent		
Seed crops	1	1	176,990	222,560	+26	38.8	45.6
Flowers and nursery products	2	2	94,662	80,092	-15	20.7	16.4
Aquaculture	3	3	34,650	32,330	-7	7.6	6.6
Macadamia nuts	4	4	33,500	29,400	-12	7.3	6.0
Cattle	6	5	24,305	28,945	+19	5.3	5.9
Coffee	5	6	29,240	27,840	-5	6.5	5.7
Fruits (excluding pineapples)	7	7	23,680	25,373	+7	5.2	5.2
Vegetables and melons ²	8	8	21,898	22,410	+2	4.8	4.6
Eggs	9	9	8,678	8,759	+1	1.9	1.8
Milk	10	10	5,460	7,491	+37	1.2	1.6
Hogs	11	11	3,359	2,996	-11	.7	.6
Total			³	³		100.0	100.0

¹ Percentages are of displayed items only. ² Includes ginger root and herbs. Beginning 2007, non-published vegetable commodities not included to avoid disclosure of individual operations, but included in total farm value. ³ Data not shown separately to avoid disclosure of individual operations but included in total farm value.



January 18, 2011

Informational Hearing-Interim 2011/Regular Session of 2011

The Twenty-Sixth Legislature

Joint Committee on Agriculture- Honorable Senator Clarence Nishihara,
Honorable Representative Clift Tsuji

Aloha Senator Clarence Nishihara and Representative Clift Tsuji.

Mahalo for allowing me to update our State Legislature at this Informational Hearing regarding to the Tourism/Hotel industry perspective as it relates to our valuable sister industry, Agriculture.

The State Legislature, specifically the House of Representatives, initiated House Bill 1471- Food Safety Certification, Pilot Program for the Farming Industry in the 2008/2009 session, which: 1) highlighted the need for the future of Agriculture's sustainability and increasing Agriculture's support; 2) the need to have the crops grown by the local farmers to be Food Safety Certified as a condition for the community's safety in order to increase the purchasing of "Safe" crop products by the local Kama'aina and the hotel/tourism industry; 3) with the knowledge that there would be pending Federal Legislation regarding to having farmers nationwide following "GAP" practices, which has now become a reality, effective of the new year 2011. The support received by the Hawaii Tourism Authority (HTA) was invaluable, as the

cooperation received to move this initiative forward could not have been done without the HTA's support. The Hawaii Hotel & Lodging Association, Nalo Farms, Alluvian Farms, Armstrong Produce, the College of Tropical Agriculture (CTAR) and Hawaii State Department of Agriculture provided backbone support of this priority

The key measure of where we are today, is by reviewing the Food Safety Certified Farms website at: <http://www.hifarmsafe.org/audited-farmscompanies>. This website, as of last week, reports a total of 45 farms certified, and 12 packinghouse/storage/distribution organizations in the State of Hawaii with certification, for a total of 57 certified farms and packinghouse/storage/distribution organizations. If we compare, where we were in the 2008/2009 timeframe, the estimated number of 32 farms and packinghouse/storage/distribution facilities certified has increased. However, with an estimated 3,000 + farms in the State of Hawaii, these numbers do not look promising.

The hotel industry, with Kyo-ya piloting this effort to assist our sister industry, has been focused on food safety certification in order to increase the total volume purchased of local agriculturally grown products. We have stated in the past, that approximately 28-32% of local purchases including pineapple and papaya is not enough to help the local crop growers. The local crop purchasing, back in 2008/2009, of approximately 17-18% (without pineapple and papaya) did not tangibly reflect the true support of our Agricultural industry. Further, our continued dependence on importing food safety certified crops from the mainland of approximately 82% needs to be re-directed to local purchasing, however the limitation is the number of food safety certified farms in the State of Hawaii.

The Hotel Industry, requires diversity in crops, as a number of the current farms certified are growers of crops such as cucumbers and tomatoes which are common to other certified farms. Our interest, from our Chefs, is to continue to design and create, for our tourists and kama'aina new menus featuring our local culture, talent and community, "Uniquely only in Hawaii". The "From the Farm to the Plate" initiative, as piloted at the Sheraton Waikiki Hotel's Kai Market restaurant and the banquet facilities, has generated tremendous recognition, compliments and interest by both the visitor and local guests. The limitations on creativity is the lack of diversity of crops that are Food Safety Certified in the State of Hawaii.

Kyo-ya has been tracking the efforts of "Buying Local- Food Safety Certified" crops. We have great news of where the numbers are:

2006	2008	2009	2010
20%	29.8%	36.4%	41.7%

Back in 2006, when we reviewed, investigated, and studied, how the hotel industry can assist our fledging Agriculture industry, the first area was to also review what/how/and from where are the Kyo-ya purchases on crops. Back in 2006, including pineapple and papaya, our total percentage was 20%. This equated to approximately \$475,000 of local food safety agricultural products. As of the closing of 2010, with the 41.7% of total crop purchase, we are \$1,150,000. Over the period of 5 years, we have increased the local purchase by \$675,000. Our goal is to achieve a targeted 60% of local agricultural crop purchases. Now, how do we get there?

It is recommended that the focus for this year and the future be on mandatory certifications for all farms in the State of Hawaii. This would be in support of the Food Safety Act by Congress, and support increased purchasing of local Agricultural crops. Kyo-ya will continue to support:

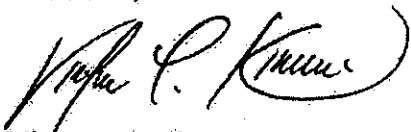
- 1) Confirming the purchase of any crop farm in the process of food safety certification under the coaching of the University of Hawaii College of Tropical Agriculture with encouraging progress reports; and the certification of the farm by the HDOA/Primus Labs.
- 2) Diversification of crops of local nature, to continue to promote, market and provide recognition to the farm and its food safety products.
- 3) Conversion of the "Seal of Quality" initiative from HDOA to be all food safety certified farms as members.
- 4) Our GROW Hawaii Initiative with the Hawaii Association of Independent Schools (HAIS) for a 3 year partnership with the Hawaii State Departments Education & Agriculture and the Ulupono Initiative which "kicked off" in November of 2010.
- 5) The creation of a State of Hawaii calendar event: the Hawaii Food and Wine Festival, with focus on local farms and crops with exciting and attractive menus featuring our local farmers and unique to Hawaii. This initiative will create a new benchmark calendarized event for HTA/HVCB to market with the hotel industry, wholesalers, restaurants and travel partners.
- 6) Continue focus and support for the Culinary Institute of the Pacific through the University of Hawaii Community College system to nurture and develop outstanding culinary skills as a career for the

future with a strong background of crops and food safety certification process.

- 7) Dialogue with Produce/Farm Associations that feature Food Safety Certification as a priority to their membership, and coordinate and assist with these affiliations to improve our Farm practices to GAP practices uniformly in the State of Hawaii.

I wish to thank Senator Nishihara and Representative Tsuji for inviting me today to speak on the initiatives from the hospitality/hotel industry's commitment and support to continue our endeavors to buy local. It is the parting thought of having "safe and quality" as part of our Island's Culture.

Mahalo,

A handwritten signature in black ink, appearing to read "Victor T. Kimura", written in a cursive style.

Victor T. Kimura

Vice President

Kyo-ya Management Company, Ltd.

2255 Kalakaua Avenue

Honolulu, Hawaii 96815



Cooperative Extension Service
College of Tropical Agriculture and Human Resources
University of Hawaii at Manoa



Department of Agriculture
STATE OF HAWAII

FREE ON-FARM FOOD SAFETY Coaching and Audit

CTAHR faculty will come to your farm to coach you on ways to reduce the risk of foodborne illnesses coming from your farm operation. Over the course of a few weeks, we prepare you for a 3rd party audit. Until December 15, 2008, we will pay for the audit. **Contact us today for more details!**

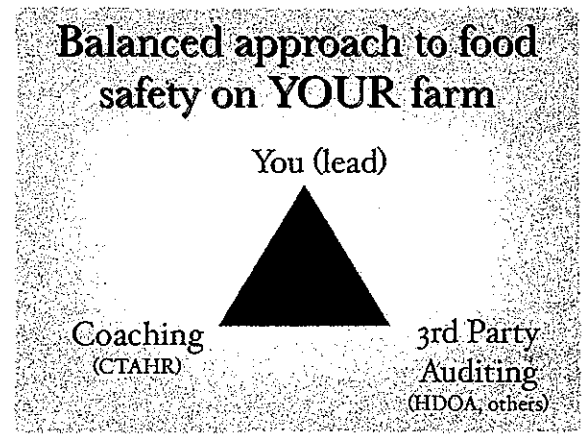
On-farm Food Safety Coaches

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Kahului, **Maui**
808-244-3242, ext 233 (lynnnaka@hawaii.edu)

Jim Hollyer, CTAHR/ADAP Program Manager
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Luisa Castro, CTAHR Educational Specialist
Hilo, **Hawaii**
808-981-8281 (luisac@hawaii.edu)



Third-Party Food Safety Auditors

Auditors from HDOA – Commodities Branch provide mock audits and third party certification audits for food safety certification through Primus Labs (<http://www.primuslabs.com/>).

Oahu Albert Louie, 808-832-0700 Thad Kanegawa Paul Watanabe	Maui Robert Coffey, 808-873-3554 John Frostad, 808-873-3948
Hilo Duane DeLima, 808-974-6500	Kauai Sherwood Conant, 808-274-3069

CTAHR Good Agricultural Practices Coaching

Science-based, on-location, one-to-one advising for Hawaii's world-class food growers and handlers.

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Get your farm on GAPs! (Good Agricultural Practices)

At the College of Tropical Agriculture and Human Resources at the University of Hawaii at Manoa, we believe that Hawaii farmers can produce the safest, freshest food in the world. It can be one of Hawaii's competitive advantages! We coach highly motivated farmers, packers, and processors to elevate their business and their products to world-class standards. Those standards have been set by agricultural industry trade groups, farm companies, scientists, different government agencies, as well as from recent consumer demands. World-class food means local children and adults, as well as visitors, get the best product possible! Good agricultural practices are for conventional and organic growers – “certified organic” is not the same as Good Agricultural Practices which focuses on the sources of human and animal pathogens on a farm. [Contact us](#) for a coaching visit – you will be amazed what you learn about your farm and how you can turn it into a world-class operation that will make you and your family proud. The produce industry's best practices include:

- Making sure the farm has well-maintained toilets and hand-washing facilities with potable water & hand soap for hand washing.
- Using a proactive pest management strategy for rodents, birds, deer, pigs, slugs and snails.
- Using the right crop protection chemicals, fertilizers and composts according their labeled (legal) directions, and recording every use. And, educating growers on how to follow the US EPA Worker Protection Standard rules.
- Using sanitized harvest baskets and tools and making sure that harvest bins with holes do not come in contact with soil.
- Making sure employees are washing their hands before harvesting and handling produce.
- Keeping animals and their fresh manures away from active fields and orchards.



This is how to identify a Hawaii farm operating under a third-party GAPs audit.

January 2011

M	T	W	T	F	S	S
					1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30
31						

Food Safety Info Ctr
FoodSafety

[FDARecalls] MS Fish Corp Issues Alert On Listeria In <http://bit.ly/gNOYuh>
3 hours ago · reply

BfR (Germany): Enterohaemorrhagic E. coli (EHEC) infections can have serious consequences for children <http://bit.ly/g6ClvW>
10 hours ago · reply

Hong Kong Centre for Food Safety: 5 samples of imported German food products pass dioxin tests <http://bit.ly/g6dzvL>
10 hours ago · reply

Reuters: Germany announces anti-dioxin action plan <http://reut.rs/g2rfvH>
10 hours ago · reply

Join the conversation

- Using appropriate quality water for irrigation and crop rinse as indicated by a test of their water at an approved laboratory.
- Making sure the packing shed, food contact packing surfaces, and refrigerators are well maintained and not a potential source of contamination.
- Labeling each sell unit with farmer contact information, "Grown in Hawaii," and the appropriate field and harvest information to allow trace-back to a specific field within 2 hours.

Starting from no records, but a fairly organized farm and packing shed, you could be ready for an internationally-recognized third party audit in as little as 2 weeks – if you are highly motivated to make it happen. Our coaching (audit preparation) services are free (for now) and the average audit price for our clients from the Hawaii Department of Agriculture is about \$250 (plus a \$25 fee for website use). If the auditors need to travel to another island, travel costs are extra. We work with the following auditing companies and are willing to tune you up for any auditing company.

- [Hawaii Department of Agriculture's Commodity Branch](#) (performs Primuslabs.com "Affiliate" audits and USDA Plant Systems Audits).
- [ASH, Inc. and Organic Certifiers – Maile Sacarob](#) (performs Primuslabs.com GAP and GlobalGAP "Affiliate" audits, as well as being an Organic Certifier).
- [PrimusLabs.com](#) (for those farmers who sell to specific buyers who require a "Contracted" audit).



FSRIO at NAL
SafeFoodScience

[FA&C] Development of a quantitative lateral flow immunoassay for the detection of aflatoxins in maize
<http://bit.ly/f8RknF>
9 hours ago · reply

[FA&C] Simultaneous determination of bisphenol A and bisphenol B in beverages and powdered infant formula by dis...
<http://bit.ly/eRDysB>
9 hours ago · reply

Bayesian Temporal Source Attribution of Foodborne Zoonoses: Campylobacter in Finland and Norway:
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CTAHR Good Agricultural Practices Coaching

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Portable Hand Washing Station

Key features:

- . Foot-pedal operated water dispenser
- . Pump hand soap
- . Single-use paper towel dispenser
- . Collection container for the water
(*Don't dispose of the waste water on the crop.*)

Bacteria on produce can make people sick!

Questions for growers...

Separate fruit and vegetables from animals

Animals can spread germs to people through their feces. Are animals kept out of the food growing and packing areas of your farm at all times?



Cat on packing box.

Ducks for weed and pest control.



Goats up-slope from lettuce patch.

Dogs room free on a lettuce farm.

Do workers have easy access to clean toilets?



Are harvest containers cleaned and sanitized before each harvest, and are they off the soil/cement at all times?



Is your water safe for irrigation and washing produce?



Coliforms: >250 cfu/100ml
E.coli: 33 cfu/100 ml

Do workers wash hands with soap and water after using the toilet, smoking, eating, and before harvest and packing?



Are chemicals used and disposed of safely?



Questions for consumers...

CLEAN

Are your hands, utensils and cutting boards clean?
Is fresh produce washed with clean water before preparing or eating?



SEPARATE

Do you keep produce separate from raw foods when shopping, in the refrigerator and while preparing food?

Separate raw fruit and vegetables from raw meat



COOK

Do you throw away or cook fruits and vegetables that have touched raw meats, poultry and seafood?



CHILL

Are all cut, peeled or cooked produce refrigerated at 40°F within 2 hours?



**When in doubt,
throw it out!**



Food safety is everyone's responsibility.

For more information, contact your UHM Cooperative Extension office:

Hawaii: 808.981.5199

Mauai: 808.244.3242

Molokai: 808.567.6929

Kauai: 808.274.3471

Oahu: 808.956.7138, 808.956.9539



Good Food Safety Practices: Managing Risks to Reduce or Avoid Legal Liability

Elizabeth Haws Connally, Esq.¹

(This publication was prepared for the CTAHR project,
Enhancing On-Farm Performance in Food Safety to Market the Highest Quality Produce)

Consumers today demand that the food they eat be safe and free from harmful contaminants that cause illness. They require growers, shippers, wholesalers, retailers, and restaurants to take appropriate actions to ensure a safe food supply. Consumers have also demonstrated that they will hold all these “food suppliers”—indeed, all segments of the food supply chain—accountable for foodborne illnesses. Aside from their potentially devastating public health effects, these illnesses are costly to the consumer and the food industry. For the food industry, the impact may last beyond the resolution of the food illness outbreak. Once consumer confidence is lost, it may take a long time before consumers return to buying the product.

This publication reviews the potential liabilities that the food industry (“from farm to table”) faces from the increasing spread of foodborne illnesses. In addition, it addresses ways to manage these risks through using the Good Food Safety Practices and purchasing insurance.

Foodborne illness: origins and impacts

The most harmful of potential contaminants that can cause foodborne illness are disease-causing microbes (pathogens) of human or animal origin (these pathogens are commonly called “germs”). Food suppliers and handlers must do all they can to reduce the chance of contaminating food products with pathogens.

One pathogen, *Escherichia coli*, commonly referred to as *E. coli*, is currently the leading cause of foodborne illness in the United States. The U.S. Department of Agriculture

(USDA) Economic Research Service estimates that more than 73,000 cases of illness caused by *E. coli* strain O157 occur annually, resulting in health-related costs of more than \$450 million.² *E. coli* is just one of several pathogens that have contaminated food and caused illnesses.³

Recent food scares such as the one involving spinach contaminated with *E. coli* O157:H7⁴ have heightened interest in food safety and awareness of food industry vulnerabilities. In September 2006, the Centers for Disease Control and Prevention informed the U.S. Food and Drug Administration (FDA) that it linked the outbreak of *E. coli* O157:H7 to contaminated prepackaged, fresh-cut spinach packed for Dole Foods by Natural Selection Foods LLC, a California specialty lettuce processing company.⁵ This *E. coli* outbreak spread to 26 states and resulted in 204 confirmed illnesses and three deaths.⁶ This one incident caused economic losses in California estimated at \$37–74 million.⁷ In addition, everyone in the spinach supply chain was exposed to and/or embroiled in litigation for more than two years. The total amounts paid out in legal settlements are not known.

Lawsuits in the food industry are on the rise, as attorneys are becoming more successful in proving foodborne illness causation, thanks to better science. In February 2008, one law firm in Seattle, Washington claimed to be handling more than 1,000 active foodborne illness cases, originating in all 50 states.⁸ Many lawsuits settle before trial, but not without significant expense.

In 2003, more than 650 people were sickened and four died from hepatitis A, contracted from Mexican green onions served at the Chi-

This publication is intended for educational and informational purposes only. It is designed to provide only general information regarding the subject matters covered. It is not a substitute for legal advice or other professional services. Due to the rapidly changing nature of the law, information contained in this publication may become outdated.

Chi's Mexican restaurant near Pittsburg, Pennsylvania.⁹ FDA attributed the outbreak to poor sanitation. This was the largest single-source epidemic of hepatitis A in U.S. history.¹⁰ The total compensation paid by Chi-Chi's was \$50 million.¹¹

Foodborne illness litigation

A person affected by a foodborne illness may attempt to obtain financial compensation for his or her illness by pursuing legal action against the firms that produce, process, distribute, cook, or sell the food product that allegedly caused the illness.¹²

In order to prevail in foodborne illness litigation, people filing the lawsuit, (plaintiffs) must prove by a preponderance of the evidence that the food supplier (defendants) committed wrongful acts that caused harm to the plaintiffs.

Potential causes of legal action

A plaintiff in these lawsuits will identify specific claims ("causes of action") and must cite facts that support these claims and a demand for damages. There are three common causes of action in foodborne illness lawsuits: product liability, breach of express or implied warranty, and negligence. These, however, are not the only causes of actions that a plaintiff may allege. All food suppliers are subject to these legal claims.

Product liability

Product liability law is invoked in most foodborne illness lawsuits. In a product liability case, the plaintiff must prove that the product was defective and unreasonably dangerous when it left the food supplier's control and that the defect was the "proximate cause" of the plaintiff's injury.¹³ Proximate cause is the legal term for linking the illness or injury to the product. Companies in the chain of production, transfer, and handling may be exposed to the claim to the extent that they participate in the "production" or alteration of the food item. The core of product liability cases is the determination that the food item and its production or alteration was the proximate cause of the illness.

Breach of warranty

A plaintiff may claim breach of warranty in a foodborne illness case by claiming that the food product does not conform to an express or implied warranty. The plaintiff may recover damages if the food product did not conform

to the warranty and the non-conformance caused the plaintiff's injury.¹⁴

Negligence

Persons who sell or supply food products for human consumption must exercise due care and diligence regarding the "fitness" of the product. Food suppliers may be held liable because of any negligence on their part that contaminated the food and caused persons who purchased the food to become ill. Negligence can be alleged in foodborne illness cases when the defendant fails to exercise "reasonable care" in the food production process and a person becomes ill.

To show that a defendant was negligent, a plaintiff must prove three elements: (1) the defendant had a legal duty to exercise "reasonable care" in producing, growing, handling, storing, or transporting the food product, and/or to warn all users of the foreseeable dangers; (2) the defendant failed to perform this duty; and (3) the defendant's failure to perform the duty caused the plaintiff's injury. The food supplier has a duty to use reasonable care and inspect the food they sell to prevent it from becoming contaminated or harmful to the consumer.

A seller of the food product may also be liable when a person consumes a food product that contains items the consumer did not expect in the product and he or she becomes ill or injured by that item. A food supplier may be held liable for negligence if they fail to warn the consumer about potential dangers in the food product. For example, food labelers may fulfill a duty to warn of known causes of severe allergies by noting on the packaging, "this product may contain peanuts" (or shellfish, etc.).

A plaintiff may pursue a "negligence *per se*" cause of action if the defendant violates a statute or regulation designed to prevent the type of illness or injury suffered by the plaintiff. For example, if the plaintiff can demonstrate that a defendant linked to a foodborne illness violated the law or deviated from proper food safety and health standards, the defendant could be automatically liable.

Good Food Safety Practices, which follow food safety and health standards, are discussed below. These are tools for the food industry to manage its legal liability risks.

Management of risks

Good Food Safety Practices

Following are four sources of food safety and health standards, policies, procedures, and guidelines that col-

lectively will be referred to in this publication as “Good Food Safety Practices”:

- *Guidance for Industry; Guide to Minimize Microbial Food Safety Hazards for Fresh Fruits and Vegetables* (“The Guide”)¹⁵
- good agricultural practices (GAPs) and good handling practices¹⁶
- good manufacturing practices (GMPs)¹⁷
- hazard analysis and critical control points (“HACCP”).¹⁸

Underlying these Good Food Safety Practices are federal guidelines and policies established to provide guidance to prevent foodborne illness. These documents apply to all segments of the food industry that grow, harvest, process, manufacturer, and distribute food. If a food supplier is compliant with these policies, as confirmed by a third-party audit, it will have an established food safety and sanitation program and documentation to support implementation.

If the Good Food Safety Practices apply to the food product, a food supplier is at risk of a legal claim, especially if the food supplier (1) does not have a safe food handling plan and/or (2) does not follow or implement the plan or document procedures.

The Guide

In 1998, FDA, in cooperation with USDA, issued The Guide. The basic principles of The Guide are to prevent microbial contamination of fresh produce through use of good quality water, proper health and hygiene, and sanitation practices. The Guide urges food suppliers to take a proactive role in minimizing food safety hazards. In February 2008, FDA issued an additional guide to provide more specific food safety practices for handling fresh produce.¹⁹

Good agricultural practices (GAPs)

The USDA and FDA also established GAPs in 1998. The GAPs program is broken down into three major sections: (1) good agricultural practices that examine farm practices; (2) good handling practices that concentrate on packing facilities, storage facilities, and wholesale

distribution centers; and (3) food defense, which provides protocols for food handling used throughout the food chain.²⁰

Good manufacturing practices (GMPs)

The current GMPs are published in the Code of Federal Regulations.²¹ GMPs describe the methods, equipment, facilities, and controls for producing processed food. The GMPs establish the minimum sanitary and processing requirements for producing safe and wholesome food. They are an important part of regulatory control over the safety of the nation’s food supply.²²

Hazard analysis critical control points (HACCP)

The FDA established the HACCP (pronounced “hassip”) rules for the food processing industry to address a variety of food safety concerns. HACCP involves the following seven principles:

- **Analyze hazards.** Analyze potential hazards that may enter the food: microbial, chemical, or physical, such as glass, or metal fragments.
- **Identify critical control points.** These are points in the food production process when the potential hazard can be controlled or eliminated during the cooking, cooling, packaging, and metal detection processes.
- **Establish preventative measures with critical limits for each control point.** For example, in cooking, minimum cooking time and temperatures can be established.
- **Establish procedures to monitor the critical control points.** These might include determining how the cooking time and temperature should be monitored.
- **Establish corrective actions to be taken when monitoring shows that a critical limit has not been met.** For example, if the minimum temperature is not

met, food may be disposed of or reprocessed in accordance with best practices.

- **Establish procedures to verify that the system is working properly.** For example, time and temperature can be tested to verify that a cooking unit is working properly.

• **Establish effective record-keeping to document the HACCP system.** This includes records of hazard control meth-

For more information on the Good Food Handling Practices—

The Guide: <http://www.foodsafety.gov/~dms/prodguid.html>

GAPs: <http://www.ams.usda.gov/AMSv1.0/getfile?dDocName=STELPRDC5050869>

GMPs: <http://www.cfsan.fda.gov/~dms/cgmps.html>

HACCP: <http://www.cfsan.fda.gov/~comm/haccpov.html>

ods and the monitoring of safety requirements.²³

Use of the above-listed Good Food Safety Practices by the entire food supply chain minimizes the chance of a foodborne illness outbreak and provides legal defenses. To manage the risk of foodborne illness, all segments of the food chain must focus on (1) good health and hygiene practices and (2) ways to maintain the viability of the business. The various members of Hawai'i's food industry can work together to adopt these practices and should seek further guidance and assistance from the University of Hawai'i College of Tropical Agriculture and Human Resources.²⁴

The Good Food Safety Practices are a defense

The best defense to any future lawsuit is prevention, through compliance with the Good Food Safety Practices. Even if the defendant is found liable, punitive damages can be avoided and the damages may be reduced if the defendant can show that (1) it took "reasonable care" when producing, handling, and selling the food product; (2) it used state-of-the art technology in producing the food product; and (3) it complied with laws, regulations, and guidelines designed to prevent the harm suffered by a plaintiff.²⁵ A defendant who follows the safe food handling requirements and has documentation to prove it is more likely to be found to have exercised reasonable care and control to prevent contamination. Thus, the defendant taking these preventative measures has better defenses than a defendant with no safe food handling procedures in place.

Use contracts with vendors

A buyer of food products may require by contract that its food supplier adopt and implement safe food handling practices to ensure safe handling of the food throughout the entire food supply chain. By requiring the food supplier use safe food handling practices, the food buyer lowers the risk that contamination will occur. If it does occur, the buyer may contractually require that the food supplier defend and indemnify the buyer against any liability caused by the food supplier's failure to use safe handling practices.

In addition, the buyer may require the food supplier to purchase sufficient insurance coverage, to cover the risks faced by the food buyer. The food buyer may also insist on being named as an additional insured on its food supplier's insurance policies.

Insurance

To manage the cost of lawsuit risks, more food processors, packagers, and distributors are requiring the food supplier to carry insurance. Owning an insurance policy, however, does not guarantee total financial protection if a lawsuit is brought against the food supplier. It is important to

- recognize that there are different types of insurance
- determine if claims from foodborne illness are covered by your insurance policy
- determine if the insurance coverage levels are sufficient to meet your potential risks, and know what the "deductible" amount is on each policy.

An insurance carrier usually has a duty to defend and indemnify the insured if the claim is within the scope of the policy. For the food supplier with insurance, the policy may require the food supplier to follow the Good Food Safety Practices and do what is possible to minimize the incident of foodborne illness. Insurance companies may also encourage safe food handling practices through the terms of the insurance policy or by reducing insurance premiums based on the level of food safety precautions taken.

Types of insurance

Insurance product coverage is diverse. The following are some standard types of business insurance:

1. commercial general liability
2. business interruption
3. product recall
4. product liability.

The following is only a brief description of these types of policies and is not intended as legal advice or to promote or recommend specific types of insurance policies.²⁶ An insurance professional can assess a food supplier's needs and provide further guidance on these various types of insurance.

- **General liability coverage.** General liability insurance protects the assets of the business when the business is sued for something it or its agents did or did not do that caused injury or property damage. The amount of coverage a business needs depends on the amount of risk associated with the business.
- **Business interruption coverage.** Business interruption insurance covers losses due to the shutdown of a product line or the entire company, but it often only

applies where there is physical damage to the facility.

- **Product recall coverage.** Product recall coverage insures a company for its own financial losses suffered because of a recall, such as the cost of physically removing the product from retailers' shelves, storing or disposing of the product, and, in some cases, the cost of rebuilding the company's reputation following a recall.
- **Product liability coverage.** Product liability insurance provides coverage to the business for claims relating to an injury from the food product. This type of coverage is important for the food supplier, as it should provide some protection if a person becomes ill or injured from the food product.

Carefully review insurance policy coverage— Does it cover your risks?

A food supplier must carefully review the terms of the policies prior to purchase, paying close attention to the items excluded from coverage, the deductible amounts, and the obligations of the policyholder. The food supplier should confirm that the final version of the policy accurately reflects the intended coverage. As mentioned above, the policy may require the food supplier to follow the Good Food Safety Practices for the coverage to apply.

Recently, the U.S. District Court for the Southern District of New York denied plaintiff Tradin Organics USA, Inc. ("Tradin"), an organic food distributor, recovery on a product liability claim filed with its insurer, defendant Maryland Casualty Company, under a policy that provided commercial general liability coverage.²⁷ The court held that a "your product" policy exclusion precluded coverage for losses caused by contaminated or defective products sold by Tradin. The court concluded that companies manufacturing or selling food products should have a separate product liability policy.

Buy enough coverage

An inexpensive insurance policy with minimal levels of coverage might cost less now, but it may prove to be very costly in the future, if the business is not adequately insured. A food supplier needs to evaluate its risks and ensure it purchases proper coverage for the risks, at levels adequate to protect the business.

Due diligence is needed

In summary, to avoid outbreaks of foodborne illness, all segments of the food supply chain must diligently use the Good Food Safety Practices to provide the safest food possible to the consumer. Unsanitary practices put consumers' health and the viability of your business at risk. To protect the financial stability of the business, the food supplier must also take steps to acquire the proper type of insurance with adequate coverages to address the risks. *Don't risk it*—use the Good Food Safety Practices.

Notes

1. Elizabeth Haws Connally is an associate with the law firm of Alston Hunt Floyd & Ing, Honolulu, Hawai'i. Her e-mail address is EHaws@AHFI.com. This article was written for UH-CTAHR with funding support from the Hawaii Farm Bureau Federation.
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3. U.S. Department of Agriculture's Economic Research Service also reports the following pathogens as causing foodborne illness: *Campylobacter*, *Salmonella*, and *Listeria*.
4. *E. coli O157:H7 and the Spinach Scare*, <http://www.ctahr.hawaii.edu/oc/freepubs/pdf/FST-19.pdf>.
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8. Article about William Marler, *E. Coli Lawyer Is Busier Than Ever*, Associate Press, February 4, 2008, <http://www.marlerblog.com/2008/02/articles/lawyer-oped/e-coli-lawyer-is-busier-than-ever/>.
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10. The Centers for Disease Control and Prevention – *Hepatitis A Outbreak Associated with Green Onions at a Restaurant – Monaca, Pennsylvania*. MMWR Nov. 21, 2003, 52 Dispatch 1-3.
11. See note 6, above.
12. Litigation may also involve food suppliers who are sued by consumers but to seek to pass on liability to other food suppliers who are "higher" in the supply chain.
13. Harl, N.E. *Agriculture Law* Through release # 50. New York, Mathew Bender, 1997.
14. The Uniform Commercial Code ("UCC") provides a warranty of merchantability that applies to food sold, if the seller is a merchant with respect to goods of that type. Under this section of the UCC, serving food or drink for value that is consumed on the premises or elsewhere is a sale. To be "merchantable," goods must be at least fit for ordinary purposes for which the goods are used. Uniform Commercial Code §2-314. Courts have applied an implied warranty of fitness for human consumption to food. Ex

- parte Morrison's Cafeteria of Montgomery, Inc.* 431 So. 2d 975, (Ala. 1983). Another court wrote, "There is simply no room for dispute with regard to the applicability of the UCC. The service of food in a restaurant is a sale. And a restaurant which sells the food to its customers warrants that the food will not be foul. The sale of food in a restaurant therefore fits perfectly within the UCC definition of the implied warranty of merchantability." *Koster v. Scotch Associates* 273 N.J. Super.102, 640 A. 2d 1225 (1993).
15. <http://www.foodsafety.gov/~dms/prodguid.html>.
 16. Additional information concerning the Good Agricultural Practices and Good Handling Practices Audits and the audit verification checklist can be found at <http://www.ams.usda.gov/AMSV1.0/getfile?dDocName=STELPRDC5050869>.
 17. FDA's current GMPs can be viewed at <http://www.cfsan.fda.gov/~dms/cgmps.html>.
 18. More information regarding HACCP can be found at <http://www.cfsan.fda.gov/~comm/haccpov.html>.
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 20. <http://www.ams.usda.gov/AMSV1.0/ams.fetchTemplateData.do?template=TemplateN& navID=Good%20Agricultural/GoodHandlingPracticesAuditVerificationProgram&rightNav1=Good%20Agricultural/GoodHandlingPracticesAuditVerificationProgram&topNav=&leftNav=&page=GAPGHPAuditVerificationProgram&resultType=&acct=freshgrdcert>.
 21. 21 CFR 110.
 22. <http://www.cfsan.fda.gov/~dms/gmp-1.html>.
 23. <http://www.cfsan.fda.gov/~lrd/bghaccp.html>.
 24. The Agricultural Development in the American Pacific project at the University of Hawai'i at Mānoa's College of Tropical Agriculture and Human Resources provides workshops and guidance for compliance with good food safety practices. Contact ADAP by phone, (808) 956-9539, or e-mail to James Hollyer, hollyer@hawaii.edu.
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 26. <http://www.iii.org/media/glossary/alfa.A/>. For additional information on product recall insurance, see *Insuring Against Product Liability*, Lemov and Hewitt, ABA Section of Business Law at <http://www.abanet.org/buslaw/blt/9-1recall.html>.
 27. *Tradin Organics, Inc. v Maryland Cas. Co.*, 2008 WL 241081 (S.D.N.Y. 2008).

This publication is available on the CTAHR website at www.ctahr.hawaii.edu/oc/freepubs/pdf/FST-32.pdf. In the pdf file, the notes contain hyperlinks to the websites cited. Funding in support of its development was provided by the Hawai'i Department of Agriculture and the Hawaii Farm Bureau Federation.

User Notes



On-Farm Food Safety: Questions Growers Frequently Ask

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Q1. Why all the attention to food safety these days?

In the past few years, recorded outbreaks* of foodborne illnesses have increased. People have died or gotten gravely ill, and extensive food recalls were necessary. According to the Center for Science in the Public Interest, outbreaks caused by contaminated produce doubled between 1998 (44 outbreaks), and 2004 (85 outbreaks). Between 1990 and 2004, a total of 639 outbreaks due to produce occurred http://www.cspinet.org/foodsafety/produce_data.pdf. A few produce-related outbreaks have occurred in Hawai'i in recent years. (*An outbreak is when more than two people get sick.)

According to the U.S. Food and Drug Administration, "About 50 years ago, there were only 5 known organisms that caused foodborne illness. Today, there are at least 25 known foodborne pathogens—including 20 newly-discovered ones." Newly discovered pathogens could represent evolution of a genuinely new pathogen, such as the strain of *Escherichia coli* called O157:H7, or other pathogens recently recognized as causing foodborne illness that probably existed for centuries. The Centers for Disease Control and Prevention's 2008 nationwide statistics estimated 87 million cases of food-related illnesses, 371,000 hospitalizations, and 5,700 deaths. The leading pathogens in the food supply are campylobacter, cryptosporidium, listeria, shiga toxin-producing *E. coli* O157:H7, salmonella, shigella, vibrio, and yersinia (<http://www.cdc.gov/mmwr/preview/mmwrhtml/mm5813a2.htm>).

Q2. What does this mean for farmers?

Buyers and consumers want to know that the foods they buy are safe to eat and that farmers are taking reasonable steps to produce safe food. *Good agricultural practices* (GAPs) developed by the produce industry, the FDA, and the USDA are voluntary guidelines on practices that

can help minimize the risk of microbial contamination of produce. However, current trends show that certain buyers seek suppliers that have third-party food safety certification; Costco, Safeway, and the U.S. Department of Defense are a few local examples. Other buyers are asking growers to provide a letter of guarantee or business liability and/or proof of product liability insurance. Professional growers and food marketers will maximize market opportunities and minimize liability risks by adopting GAPs.

Q3. I grew up on a farm and we never had to do this before. What's different now?

Yes, it's true, commercial growers must now be more careful than their predecessors, and this is the case with many professions. Many things have changed over time, as lifestyles, technology, and our knowledge have evolved.

- Today we have pathogens that didn't exist before or were not formerly identified as food-borne pathogens.
- The food system has changed significantly. More people are handling food before it is eaten, as consumers eat out more, buy take-out meals, and choose ready-to-eat foods like bagged salad greens. The more people that handle food, the greater the potential for problems. As a grower, you are responsible for your part of the chain: from the field to the next handler in the marketing chain or, in some cases, to the consumer.
- Certain populations are at greater risk of getting sick from contaminated foods because their body's immune system is not fully developed or weakened. This includes young children, older adults, pregnant women, and people with immune systems weakened due to chronic disease.
- Health advocates have successfully promoted eating

more fruits and vegetables, which is increasing everyone's possible exposure to pathogens on produce.

- Fewer people are raised on a farm, so most people are unaware of the actual growing environment. Consumers have come to expect year-round, uniform standards in the quality and safety of the produce they buy, and they may drop their guard in terms of safe food handling and preparation.
- Stricter environmental and worker safety regulations demand that farmers document efforts to care for the land and employees.

Q4. How is the UH College of Tropical Agriculture and Human Resources helping farmers?

Since 1999, CTAHR has been working on behalf of farmers and consumers (residents and visitors alike) to make sure that we are doing what we can to produce the safest food in the world. We are ahead of the nation in many respects. This goal benefits both farmers and consumers and protects the reputation of Hawai'i's agriculture as a whole.

With funding through external grants, CTAHR faculty offer individual coaching, informational tools, and basic supplies to help farmers meet the requirements of farm audits for food safety certification. As new questions and issues arise from individual farms, we actively seek clarification on regulations and interpretations of guidelines, and we advocate for science-based solutions for farmers. The goal is to enable growers to pass third-party certification using best practices based on the best science of the day and current industry guidelines.

Q5. How long does it take to prepare a farm for an audit?

An initial coaching meeting is about 1–1½ hours. From there, the timing is up to the grower's initiative.

Depending on the extent of changes needed and the grower's motivation, a farm can be ready for an audit in as few as 10 days. Others may take months, due to the condition of the facilities or, sometimes, the grower's procrastination. Common actions required are cleaning up, organizing the company food-safety manual, and making needed upgrades.

Before the audit with the Hawai'i Department of

Agriculture*, you will need to go through a mock audit. CTAHR coaches are available to assist you with the mock audit. (*You can choose to go through another audit company, but it may cost more, and the initial audit fee will not be covered through the CTAHR Farm Food Safety Program.)

Keep in mind that you need only an 80% score, not 100%, to pass the audit. CTAHR coaches encourage you to produce the safest food; therefore, most growers who have gone through coaching with us have passed with scores of 90% and above. Our best audit score to date was by a non-English speaking grower who was totally committed to maintaining his market by obtaining certification.

Q6. What is the average cost of the annual audit?

During 2008–09, the average cost for an audit on O'ahu was \$250, using an O'ahu auditor. The price varies depending on the amount of time the auditor spends on

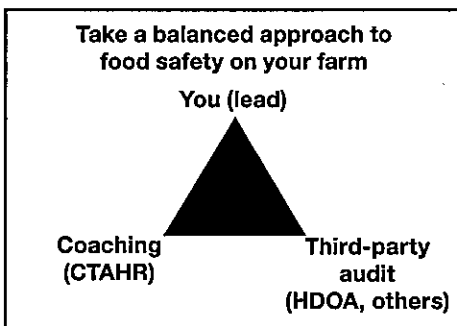
the farm and the distance that the auditor must travel. The HDOA audit costs \$31.50 an hour (for both on-farm hours and in-office hours inputting audit data), plus mileage (currently at the federal rate of \$0.55/mile). If inter-island travel was required, the average cost was \$410, depending on airfare prices. Therefore, having an organized food-safety manual and supporting

documents readily accessible during the audit can save money by saving time.

If a farmer chooses to schedule an audit directly with a private audit company, costs will be higher (\$800–\$1000) depending on the size of the operation. The resulting audit report would include the audit company banner instead of the HDOA logo. For example, you could contact Primus Labs, and once you pass the audit, you can pay a monthly fee to use the Primus Labs food-safety certification seal on your packaging. Farms having passed an audit can register with the Hawaii Food Safety Center, <http://www.hawaiifoodsafetycenter.org>.

Q7. What has been the average cost of upgrades to prepare for a first-time audit?

Costs for upgrades have varied from a few dollars to several hundred dollars, depending on the farm practices existing before coaching. For example, if a farm is



using contaminated water with high *E. coli* counts for washing produce, they will need to invest in technology to clean up that water to make it safe, or find another, uncontaminated source. For most people, what takes time is cleaning up and disposing of “stuff” that has accumulated in the fields and packing sheds. For some farms, upgrades in toilet and hand-washing facilities for workers are required. At this time, we have up to \$1000 to cover the cost of the initial audit, with the balance available to reimburse the grower’s expenses for food safety upgrades. Like most great deals, it’s for a limited time, while funds are available!

Q8. What about all these expensive upgrades I heard about: dust barriers, an enclosed packing shed with concrete floors, and all new boxes with labels?

These are mostly myths! There is no requirement for dust barriers similar those needed for construction sites. Packing sheds do not need to be enclosed or have concrete floors. They *do* need to be separated from other non-packing activities, like vehicle maintenance work. New boxes are not required but are suggested, as they project a more professional image. Used boxes should be cleaned and lined with paper or plastic before use. New box labels aren’t required if your current label includes the commodity name, weight, your farm name and address, country of origin information (e.g., “Grown in Kula, Hawaii, USA”) and a traceback code (usually added at the time of harvest to indicate the date and field of harvest).

Q9. Do farms need to be inspected by the Hawai’i Department of Health?

No. If the farm is selling raw agricultural commodities, as opposed to prepared “food” products, it does not fall under DOH oversight. For example, if you are selling your produce whole, only removing damaged or dirty outer leaves from a head of lettuce, cabbage, or similar crop, this is considered harvest trimming of a raw agricultural commodity, and you do not need to be inspected by DOH.

However, if you are removing the leaves from the main stem, rinsing, and bagging loose leaves, this can be considered minimum processing. Minimum-processed products, whether raw (requiring rinsing before eating) or “ready-to-eat,” may fall under DOH Administrative Rules Chapter 11-12. Also, if you plan to grow sprouts or make something out of your raw agricultural product (e.g., preserves, packaged mix, etc.), contact your local

DOH Food and Drug office for guidelines and regulations that may apply to your facility.

Q10. I have agricultural water at the farm. Do I need to put in a treatment system?

No, provided that (1) the water meets water standards* based on direct contact with edible parts of the produce (e.g., through overhead irrigation or a pesticide application), or (2) the water is NOT in contact with the edible part of the produce (e.g., use of drip irrigation). (*Standard based on California Leafy Greens Alliance)

All farms, regardless of water source (municipal, catchment, “ag” water) will need records of annual water tests (testing twice a year is preferred). Water tests for generic *E. coli* should average ≤ 126 MPN per 100 ml or, for a single sample, ≤ 235 MPN per 110 ml (MPN = most probable number). There should be no *E. coli* O157:H7 or salmonella. If water tests exceed acceptable pathogen levels, remedial action must be taken based on your company’s written standard operating procedures for corrective action. This could include checking for the possible source of contamination, treating water, retesting, and/or temporarily using an alternate water source.

Potable water is required at all times for hand washing and rinsing produce at the farm.

Q11. I’m a certified organic grower, so why do I need food safety certification?

Organic certification is completely separate from food safety certification. Although organic production offers certain environmental benefits and attracts certain buyers, scientific studies have shown that harmful microbial contamination can occur on organic produce if there is exposure to animal manure, contact with certain pests, or problems with poor worker hygiene.



These sources of contamination are found in both organic and conventional farm production.

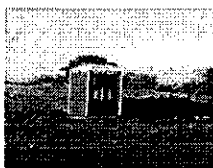
Some certified organic farms in Hawai’i have been food safety certified. One area of focus in GAPs is having current records for fertilizer and chemical applications. Fortunately, this is where the organic farms typically have a leg up on conventional farms—they have been keeping both sets of records for years.

As with conventional farms, products used in organic operations need to be approved for the specific crop, as written on the product label. Products such as dish soaps that are recommended for home gardeners are not acceptable for food-safety certification of commercial operations because these products are not specifically labeled for that use on food crops. Another issue has been animals. Ducks or cats for pest control in the food production and processing areas are not allowed because animals can shed human-infecting pathogens, and that increases the risk of microbial contamination on the farm. Fortunately, as with the issues facing conventional agriculture operations, these can be resolved.

Finally, the cost of a food safety audit is considerably less than an audit for organic standards.

Q12. What are the common food safety-related problems you are finding on Hawai'i farms?

- There is no toilet within ¼ mile of where an employee is working that includes hand-washing facilities with potable water (this is an OSHA regulation).
- Employees are not trained or expected to wash hands regularly, especially after using the bathroom.
- Animals (wild or domestic) are not excluded from production areas and packing sheds.
- Animal manures are not being managed safely based on EPA guidelines.
- Non-potable water is used to rinse harvested produce (it's against HDOH Administrative Rules 11-11-8).
- Records on chemicals and fertilizers applied to the crop are lacking.



ALL of these shortcomings have been fixed with relatively little expense and effort by growers in our program. Most growers have said to us that these things are just "common sense."

Q13. I am a small-scale farmer; why should I have to do this?

Most farms in Hawai'i are considered "small" compared to the average U.S. mainland farm. Unfortunately, harmful

pathogens do not exist only on large farms. Every commercial farm, regardless of size, supplies food for public consumption. GAPs are intended to minimize risk, not eliminate it entirely (which is not possible). As a professional food producer, adopting GAPs will minimize your potential risks from microbial pathogens. This is especially important for Hawai'i growers, where Hawai'i Regional Cuisine highlights the use of local foods. Growers need to take personal pride and responsibility in providing high-quality, safe produce, because one incident can have devastating effects on our entire Hawai'i food system. The 2006 California spinach recall took a massive toll on the entire spinach industry, not just the company involved.

One benefit of a small operation is that you probably will not be applying chemicals or fertilizers daily, so your recordkeeping is simpler compared to larger farms.

Just like in the automobile industry, small manufacturers are held to the same safety standards as large ones, and that is good news for all drivers.

Q14. I have insurance on my farm, so I'm not worried . . . right?

Wrong. If you have only a general liability policy on your farm, your for-sale food is not covered, and this exposes all your personal assets should you get into a lawsuit. If you have a product liability policy, your food is covered, *if* you can prove that you were not negligent, i.e., that you were actively using best practices like GAPs. An insurance policy is not a shield for negligence. The documentation part of our coaching becomes supporting evidence to show that you are doing the best you can. Clearly, the best policy is adopting GAPs and getting an annual third-party audit. (For more information on legal liability, see <http://www.ctahr.hawaii.edu/oc/freepubs/pdf/FST-32.pdf>.)

Q15. Do I have to do this, if it's "voluntary"?

No, you don't have to use recommended practices or get audited. It's your choice when to adopt GAPs. If you do this and it becomes mandatory on a federal or state level, however, you will be ahead of the game. If you prefer taking it in steps, you can start adopting GAPs and elect to go through third-party certification later . . . or not.

When you are ready, CTAHR coaches are ready to help you. For more information call 956-9539 (O'ahu, Kaua'i), 244-3242, ext. 233 (Maui), and 981-5199 (Hawai'i).

Mahalo to Theodore Radovich, Robert Coffey, John Frostad, and Albert Louie for help in developing this publication. Funding for its production was provided by the Hawai'i Department of Agriculture and the Hawaii Farm Bureau Federation.

Disclaimer: Mention of a company name does not imply recommendation of the company over others that may also be suitable.



On-Farm Food Safety: Aquaponics

Jim Hollyer, Clyde Tamaru, Allen Riggs, RuthEllen Klinger-Bowen, Robert Howerton, Darren Okimoto,
Luisa Castro, Tetsuzan 'Benny' Ron, B. K. 'Kai' Fox, Vanessa Troegner, and Glenn Martinez

Aquaponics is a food production system that uses nutrient-rich water from fish culture to irrigate and fertilize plants. After the plants have absorbed the nutrients, the water is recirculated to the fish rearing tanks. This combination of aquaculture and hydroponics recycles both water and nutrients, resulting in an efficient use of resources. However, when food plants are grown in the presence of fish culture effluent, food safety considerations become very important.

Why do you need to consider food safety?

While the American consumer enjoys one of the safest supplies of fresh produce in the world, outbreaks of foodborne illnesses, associated with both domestic and imported fresh fruits and vegetables, have increased. In 1997 the U.S. Food and Drug Administration (FDA) published the Food Code¹ to provide guidance based on basic principles and practices associated with minimizing microbial food safety.

The Food and Drug Administration's (FDA's) 2005 Food Code states that foodborne diseases cause an estimated 76 million illnesses, 325,000 hospitalizations, and 5000 deaths in the United States each year, and the annual cost reaches between \$10 and \$83 billion, in terms of pain and suffering, reduced productivity, and estimated medical costs.² Loss of consumer confidence negatively impacts the agricultural community long after an illness outbreak. Everyone who sells food, regardless of the amount, has both an ethical and legal obligation to ensure that the food is safe.³ Aquaponics producers, therefore, must become aware of the food safety risk factors that

might exist for their operation and should maintain the highest level of adherence to *good agricultural practices* (GAPs).⁴

How do you benefit from using GAPs?

This publication presents practical information that has been tested by experienced farmers. These farmers are often generous in sharing knowledge of their best practices to help you improve practices on your own farm. From a business perspective, when you use good agricultural practices you

- spend less time and money making mistakes
- reduce your business risk of liability (when you start selling produce, you become a commercial provider, with certain responsibilities)
- have a higher probability of keeping a customer that may require an on-farm food safety certification
- improve chances that customers will feel justified in paying a higher price for your produce.

Good practices on aquaponics farms

One of the most important principles of aquaponics systems is their reliance on beneficial bacteria. You might want to learn how these bacteria function in the

(<http://www.cfsan.fda.gov/~dms/foodcode.html#get05>;²<http://www.fda.gov/Food/FoodSafety/RetailFoodProtection/FoodCode/default.htm> and <http://www.cdc.gov/ncidod/eid/Vol5no5/pdf/mead.pdf>;³www.ctahr.hawaii.edu/oc/freepubs/pdf/FST-32.pdf;⁴<http://www.sfc.ucdavis.edu/pubs/articles/foodsafetybeginsonthefarm.pdf>)

conversion of ammonia to nitrate via the nitrogen cycle.⁵ Unfortunately, the mention of “bacteria” often conjures up thoughts of “germs,” so we need to distinguish between helpful microbes and the pathogens that can harm us. Both in nature and in aquaculture, fish excrete ammonia from their gills as part of their waste-elimination metabolism. The ammonia is then converted into nitrite and then to nitrate by beneficial bacteria (such as *Nitrosomonas* and *Nitrobacter* species). When plant roots find nitrate in the solution around their roots, it is taken up and converted into amino acids, the building blocks of proteins.

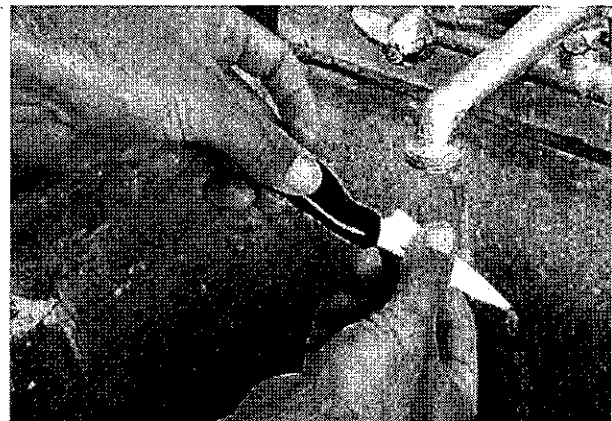
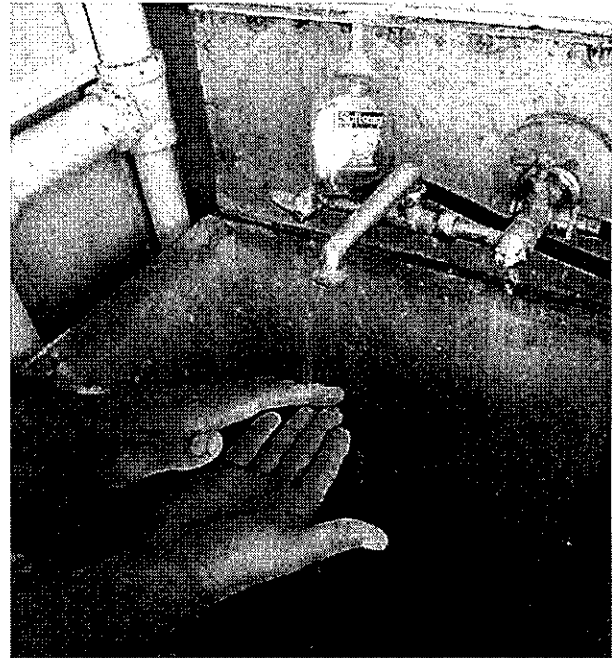
In contrast to the beneficial bacteria that help turn fish waste products into plant food, zoonoses are diseases of animals, caused by bacteria and other organisms, that can be transmitted to humans. Zoonotic pathogens represent a health risk to people contacting the water used in an aquaponic system⁶ or to people consuming food that has zoonotic pathogens on them. If the water you are using contains *E. coli*, salmonella, or other pathogens, you must take immediate steps to address potential contamination issues. You need to reduce or eliminate the risk of causing a foodborne illness in someone consuming your produce. By following some simple, basic sanitation procedures, you can significantly minimize this risk. Key areas of consideration include

- human sanitation
- harvesting produce safely
- managing warm-blooded animal feces
- water sources for fish and produce
- zoonoses prevention
- disposing of the system’s waste water.

Human sanitation

One of the biggest risks to fresh produce safety is our hands, which are in continual contact with the environment. When you harvest produce, be mindful of what you have touched before you touch the food product that you will sell or serve to others. Before harvesting your plant crops, wash your hands using liquid soap, rinse them for at least 20 seconds with potable water, and dry them with single-use paper towels. Wash hands every time after using the bathroom, eating, smoking, petting animals, shaking hands with someone, changing diapers, handling fish, putting your hands into the system’s water, touching your head (mouth, nose, ears, hair), etc.

⁵<http://freshaquarium.about.com/cs/biologicalcycle/a/nitrogencycle.htm>; ⁶<http://www.cdc.gov/ncidod/dpd/animals.htm>



Wash your hands and all harvesting tools and equipment with soap in potable water.



GOOD HARVESTING TECHNIQUE: With *washed* hands, or washed hands covered with clean disposable gloves, touch *only* the produce when harvesting.



DO NOT touch the raft or the water underneath the raft during harvesting. That contaminates your hands or gloves with bacteria, which can then contaminate the produce.



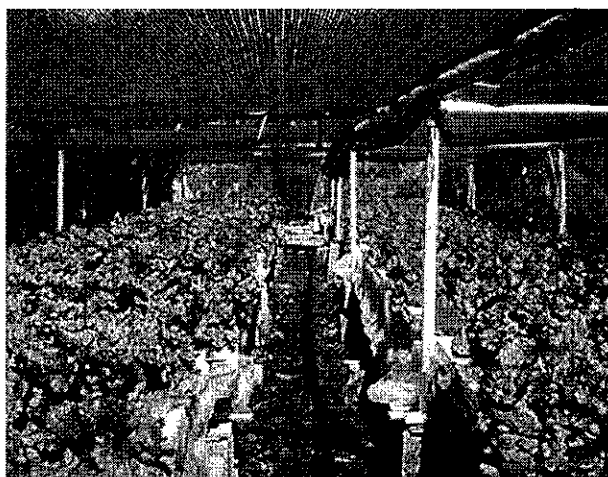
For the same reason, **DON'T** touch the root system or growing cup when harvesting.

Harvesting produce safely

You need to keep harvest bins, cutting utensils, produce-contact surfaces, and your hands clean, because you touch produce that someone might not wash before putting it into their mouth. The basics of good on-farm food safety practices require

- a toilet within ¼ mile or five minutes walk of the operation
- a sink with potable water, single-use towels, pump hand soap, and a covered trash can
- a first aid kit
- prohibiting smoking, chewing, or eating around the production or packing areas
- sanitizing all harvest tools and bins before each harvest, and keeping all harvest containers off the soil surface
- removing all pest-attracting trash from the farm and setting up a pest control system
- periodically testing fish and produce rinse water for human pathogens
- removing nests of birds or animals and excluding livestock and pets from production and packing areas
- covering all packing materials so that they don't get contaminated by insect or rodent droppings
- having an appropriate and well maintained refrigerator (if required)
- not harvesting produce that has fecal material or pest damage, because of the possibility that pathogens are left on the produce
- rinsing produce only in potable water (never aquaponic system water or other irrigation water)
- not cutting produce into a salad mix or other seemingly "read-to-eat" product for sale (of any amount) unless your facility has been approved by the Hawai'i Department of Health
- labeling all your produce bags with your farm name, address, phone number, the product name, date and location of harvest, and a statement advising consumers to "rinse before eating or serving."

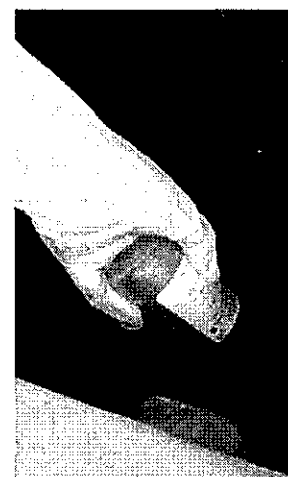
More information on best commercial produce handling practices can be found at <http://www.ctahr.hawaii.edu/adap/FoodSafety/index.htm>.



Nets help keep this lettuce aquaponics system from contamination by pests and their feces. Photo: H. Ako



Using only potable water for your aquaponics system is a good start toward food safety.



Take a water sample from the fish tank and have it tested for *E. coli* and other human pathogens.

Managing warm-blooded animal feces

It is important to keep warm-blooded animals (birds, dogs, cats, rats, sheep, goats, ducks, cattle, pigs, etc.) away from your commercial produce, because they may contain pathogens harmful to humans. Placing netting over your produce operation will reduce animal-to-plant contact. Keeping your production tanks off the ground will also limit access by animals. Cull any plants soiled with fecal droppings, such as from birds. After all harvested product has been safely removed, remove all contaminated produce and dispose of it where it will not attract additional pests.

Water sources for fish and produce

Although there are no state or federal regulations about water quality for fish production, it is a best practice to source aquaponic production water only from potable sources (city or well water). Streams, reservoirs, and roof-top rainwater catchment systems can have significant quantities of zoonotic pathogens introduced by domesticated or wild animals (e.g., rats, cats and other pets, livestock, birds), and thus it is best to never use water from these sources in your food production system. For example, salmonella carried by amphibians can contaminate non-potable water used in aquaponics production and wash waters. If catchment rainwater must be used, follow guidelines recommended for keeping the catchment system free of contamination.⁷

At present, there are no national or State of Hawai'i

Lab No.	Sample Description	Total Coliform CFU/100ml	<i>E. coli</i> CFU/100ml
65	Water Sample Tank 2 04-07-09 11:36	>2419.2	2.0
66	Water Sample Fish tank 04-07-09 11:40	>2419.2	1.0

An example of a laboratory report of an analysis of fish culture water from an aquaponics farm. A produce-safe aquaponics production system will have little or no *E. coli* bacteria in the system water. Typically, however, it will have various quantities of coliforms, which are not a good indicator of a food safety risk in an aquaponics system. The counts of *E. coli* are obtained during the test for total coliform, so both results are reported.

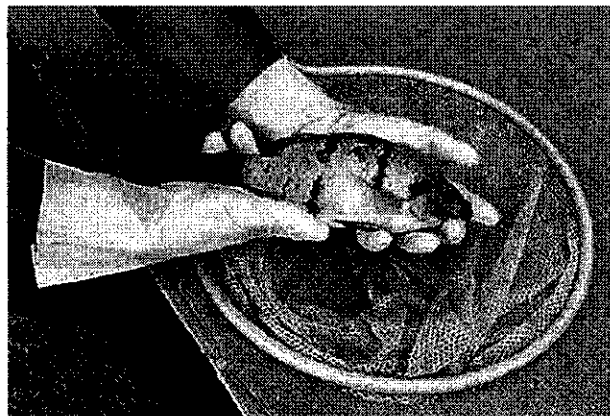
standards for the quality of irrigation water for land-based produce. Water quality standards for agriculture at this time are based on those set for recreational uses (any body of water where human activity occurs).

Based on a statistically sufficient number of samples (generally not less than five samples equally spaced over a 30-day period), the geometric mean of the indicated bacterial densities should not exceed one or the other of the following: *E. coli* 126 per 100 ml; enterococci 33 per 100 ml.⁸

⁷<http://www.ctahr.hawaii.edu/oc/freepubs/pdf/RM-12.pdf>; ⁸<http://www.epa.gov/waterscience/beaches/local/statrept.pdf>



Growing media, such as volcanic cinders, can be sharp and cause cuts that can get infected. It is wise to wear protective, waterproof gloves when digging into the media. This is especially important where youngsters are assisting.



Wear protective gloves when handling fish.

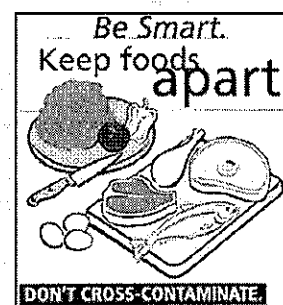
In your home kitchen

To really grasp the potential risks of diseases caused by food contamination, you can think of your aquaponics farm as though it were your kitchen. This is going to be the case with many small-scale farmers that grow and eat the food produced on their farm. As an aquaponics grower, you will be producing both fish and produce, so you need to be aware of ways to reduce cross-contamination when you consume your products.

(NOTE: This advice is for home kitchens and is not intended to promote commercial processing of fish or produce in the absence of a facility approved for the purpose by the Hawai'i Department of Health.)

It is a best sanitary practice in any kitchen to have separate cutting boards for fresh produce and for meat. The following steps are recommended when both produce and meat (including fish) are on the menu:

- Wash cutting boards and knives with soap in hot water before cutting produce. Rinse off all soap under running water for at least 20 seconds and dry as necessary with a single-use paper towel. Cloth dishtowels, once used after laundering, can hold and spread pathogens.
- Pull apart produce as appropriate and rinse it in clean, cool water. Look very carefully for small snails and slugs that might be stuck deep down in the plant. Throw away any product that has snails, slugs or their slime on it as it could have come in contact with the rat lungworm pathogen.
- Cut up the cleaned produce as desired.
- As with vegetables, wash cutting boards and knives with soap in hot water before cutting meats.
- After use, wash and dry the cutting boards as described above.
- Store cutting boards and knives in a way that animals (e.g., cats, geckos, mice) and insects (e.g., cockroaches, ants) cannot contact them.



Separate produce from meat in your kitchen.

For more information on food safety in the kitchen, see <http://www.ctahr.hawaii.edu/oc/freepubs/pdf/FN-5.pdf>.

Zoonoses prevention

Fish are cold-blooded animals whose body temperatures are the same as the water in which they live. Humans are warm-blooded mammals that expend energy to maintain an internal body temperature of 98.6°F regardless of the environmental temperature. This physiological difference is the main reason that cultured aquatic species are not considered high-probability vectors of zoonotic diseases to humans. However, a few fish pathogens can be problematic under certain circumstances. Most of these are bacteria that infect humans through skin punctures made by fish spines during handling, or through open wounds exposed to contaminated water. Humans with healthy immune systems rarely have serious or long-term problems associated with a superficial puncture. However, immune-suppressed individuals should take extra precautions to avoid possible exposure, and if one occurs, they should seek medical attention promptly. Whether you have a fish-only (aquaculture) operation or an aquaponic (fish and produce) production system, the following basic preventive guidelines should be followed when touching the production water:

- Before handling fish or fish system water, cover open wounds to prevent exposure.
- Wear pierce-proof waterproof gloves, boots, waders, and other appropriate personal protective equipment.
- Wash hands with clean water and anti-microbial soap (or waterless hand cleaner) after contact with the system water.
- Report sick fish to an aquatic animal health professional immediately so that disease management recommendations can be implemented.

If an injury occurs while handling fish or working in the system water, immediately wash the area with clean water and anti-microbial soap. A tetanus booster shot is recommended if you have been more than five years without one. Watch for any of the five signs or symptoms of inflammation: heat, redness, swelling, pain or loss of function, and fever or chills. Any indication of infection requires immediate medical attention to avoid further tissue damage or systemic disease development.

Disposing of system waste water

It is best to apply “used” fish effluent water to soil. Use it to irrigate and fertilize grassy areas, landscape plants, or crops such as papaya and banana. Do not put fish

tank water directly back into a stream, sewer, irrigation ditch, or reservoir, because you might be releasing small fish or other aquatic life forms into that stream or water system, and in so doing you will be violating the U.S. Clean Water Act and Hawai'i State Regulation S4-71-6.5(g) relative to releasing exotic or non-native species into the environment.

Summary

Growing fish and plants in an aquaponics system is a novel and attractive idea. Many people are doing it successfully worldwide, using systems that may be ancient or may rely on the latest contemporary materials and technologies. Remember, however, that once you start selling fish or plant produce from an aquaponics system, you step into the realm of commercial responsibility, regardless of the amount of your sales. Follow the advice given above to reduce risks to your personal health and the liability of your commercial operation.

Resources on aquaponics

- Aquaponics and food safety. Gordon A. Chalmers, DVM. Lethbridge, Alberta. April, 2004.
- The Backyard Aquaponics Magazine. Joel Malcolm. Western Australia. <http://www.byapmagazine.com>.
- Fish: A potential source of bacterial pathogens for human beings. L. Novotny, L. Dvorska, A. Lorencova, V. Beran, and I. Pavlik. *Vet. Med. - Czech*, 49, 2004 (9): 343-358 www.vri.cz/docs/vetmed/49-9-343.pdf.
- National Sustainable Agriculture Information Service, <http://attra.ncat.org>.
- Recirculating aquaculture tank production systems: Aquaponics—Integrating fish and plant culture. James E. Rakocy, Michale P. Masser, and Thomas M. Losordo. Southern Regional Aquaculture Center. November 2006 revision. SRAC publication no. 454.
- Tilapia farms guidelines for BAP standards. Global Aquaculture Alliance. 2009. http://www.aquaculturecertification.org/index.php?option=com_content&task=view&id=105&Itemid=47.

Follow-up contacts

The following resource persons are available to help you improve your aquaponics production and food safety practices.

Aquaculture advising

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The authors

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Best On-Farm Food Safety Practices: Reducing Risks Associated with Rat Lungworm Infection and Human Eosinophilic Meningitis

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Recent cases of eosinophilic meningitis have drawn attention to a foodborne parasitic infection that occurs in Hawai'i, the Pacific Islands, southern and eastern Asia, and elsewhere. In late 2008, the Hawai'i Department of Health reported that four people on the island of Hawai'i were diagnosed with eosinophilic meningitis, secondary to rat lungworm infection. They may have been infected after eating fresh produce grown in the region that was contaminated with snails or slugs infected with the parasite *Angiostrongylus cantonensis*. Hawai'i also

This information is primarily for commercial growers so that they can reduce the risk factors for rat lungworm contamination of their produce. The medical information presented is based on current medical knowledge and science-based literature, and it is not intended to be a substitute for a medical evaluation by a licensed professional. This publication may be updated as new knowledge is made available. For current medical findings, please consult the Centers for Disease Control and Prevention website, www.cdc.gov.

experienced a cluster of five infections by this pathogen from November 2004 to January 2005 (Hochberg et al. 2007). According to the Hawai'i Department of Health, reports of severe infections are uncommon. However, anecdotal evidence from a group of workshop attendees in the Puna district on Hawai'i in January 2009 put the incidence rate much higher. Although reporting appears to lag behind actual disease incidence rate, the threat to residents and visitors is low. Due to the possible severity of the symptoms, it is important to practice preventive measures in your home garden or commercial farm, as well as in your kitchen.

Despite the recent cases reported in Hawai'i, the worldwide incidence of rat lungworm infection (angiostrongyliasis) and the associated clinical illness (eosinophilic meningitis) is relatively low. Since 1945, there have been fewer than 3000 documented cases worldwide, with most of them occurring in Thailand and China (Wang et al. 2008). Usually, the infection is self-limiting, and the patient's clinical signs resolve without treatment. Depending on the person, the amount of time it takes to fully recover varies. Under normal circumstances, people recover from eosinophilic meningitis without

Disease Summary

Disease agent: *Angiostrongylus cantonensis*
Common name: rat lungworm disease
Medical name: human eosinophilic meningitis
Definitive hosts: rats
Intermediate hosts: slugs and snails
Accidental hosts: humans and other mammals
Paratenic hosts: frogs, prawns and other freshwater crustaceans, lizards, and planarian worms
Incubation time: usually 1–3 weeks, but may range from one day to more than 6 weeks.
Clinical signs of eosinophilic meningitis: headache, stiff neck, numbness, tingling or pain of the skin (paraesthesia), fever, nausea and vomiting, blurred vision (diplopia), weakness, joint pain, and neurologic abnormalities. More severe signs can include hyporeflexia or paralysis of the legs, bowel and bladder dysfunction, seizures, coma, and (rarely) death. It is also possible to be asymptomatic.

medical intervention, making an accurate determination of disease incidence very difficult.

Growers of produce, particularly professional growers, need to be aware of this danger and take the precautions necessary to reduce risks of transferring the pathogen to consumers. Under certain circumstances, it may take only a single exposure to the infective stage of the parasite, as in the case in Jamaica in May 2000, when nine tourists in a group of 23 required hospitalization after eating the same contaminated salad at a local restaurant; in that instance, fortunately, there were no deaths (Slom et al. 2002).

Where does this food-borne parasitic infection come from?

Angiostrongyliasis results from ingestion of the infective stage of the rat lungworm, *Angiostrongylus cantonensis*. This worm, a nematode, has a complex life cycle, involving developmental stages in rats and in slugs or snails. The nematode eggs hatch in the lungs of rats, and the

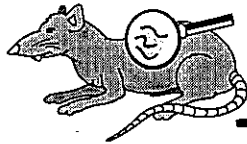
first-stage juveniles move to the digestive tract where they are passed out into the environment in rat feces. At this stage, the nematodes are microscopic and are only infectious to snails and slugs, not humans or other mammals.

Slugs and snails become infected by *A. cantonensis* in two ways. Most commonly, the slug or snail will eat contaminated rat feces. Alternatively, it is possible for the nematode to burrow into the slug or snail through the body wall, or to enter it through the respiratory pore, when the slug or snail comes into close contact with the contaminated rat feces (Cheng and Alicata 1965, Chao et al. 1987). Once inside the slug or snail, the nematode grows until it reaches the third developmental stage; it is still very small, about 400 μm (Lindo et al. 2002, Ash 1970), about the size of the period at the end of this sentence. This is the stage that can infect mammals such as rats or people.

At this point, if a rat eats the snail or slug, the nematode migrates through the rat's body until it reaches the rat's brain, where it develops to the fifth juvenile stage.

How rat lungworm infection gets transferred to people

1. A rat infected with *A. cantonensis* passes stage-1 juvenile worms in its droppings.



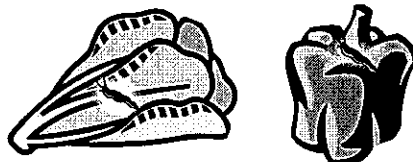
2. Snails and slugs acquire the parasite by eating rat droppings. Prawns, lizards, frogs, and flatworms can acquire the parasite from slugs and snails.



3. People may get the disease by eating infected items that are insufficiently cooked.



2. Snails and slugs may contaminate produce by hiding in the leaves or near the stem.



3. People may get the disease by accidentally eating a slug or snail, or pieces of these mollusks, or even their slime left on produce.



How to prevent the spread of rat lungworm

Eliminate rats on your farm by following a rat control program with monitoring schedules for bait stations and traps.

Stop snails and slugs from contaminating your farm or garden by removing snail hiding places, using bait traps, and hand-picking slugs and snails (wear gloves).

Cook all snails, slugs, prawns and other potential hosts to an internal temperature of 165°F before eating.

Rinse and rub all produce to remove slugs and slime. Sanitize food-contact surfaces to prevent cross-contamination.

Actual size of a third-stage nematode that can infect humans if consumed. The infective-stage nematode is very small (~400 micrometers), and that makes it extremely difficult to see if it is on produce.



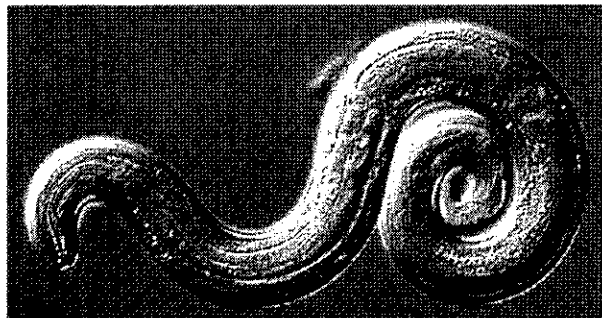
Finally, it moves from the brain to the rat's lungs, where it completes its development and lays eggs, and the cycle repeats. Other hosts that biologists call paratenic hosts, such as frogs, prawns, lizards, and planarians (free-living flatworms) can also become infected with the nematode, which helps to sustain the parasite cycle in nature. Frogs, prawns, and lizards can become infected by eating infected snails. Flatworms can become infected by coming in contact with infected rat feces. The nematode cannot develop in the paratenic hosts; however, if these animals become contaminated by snails or slugs containing the infective stage of the worm (e.g., by predation) then these paratenic hosts can be potential vehicles for angiostrongyliasis.

Of course, in the United States, eating a snail or slug is usually unintentional, but because immature slugs or snails are small and difficult to see if they are concealed within fresh produce, a slug, snail, or paratenic host might not be detected during food preparation. It is also possible for the slime or mucus of slugs and snails to contain a small number of nematodes, so it is best to avoid eating fresh produce contaminated by their slime or mucus.

Snails and slugs do not pass this parasite to their offspring. Each slug or snail must acquire it anew by eating or coming into contact with rat feces. Unfortunately, we do not have information on infection rates in rats that might be used to identify high-risk areas. In 2007, studies on semi-slugs (*Parmarion cf. martensi*) collected at survey sites in Puna found three-quarters of them to be infected, and a quarter of the Cuban slugs (*Veronicella cubensis*) tested were infected with the nematode (Hollingsworth et al. 2007).

As mentioned previously, other possible sources of human infection are the paratenic hosts, such as frogs, freshwater shrimp (prawns), land crabs, monitor lizards, and flatworms (Wang et al. 2008). These animals do not show obvious signs when infected with the rat lungworm. Anyone consuming an animal that could be a potential

Microscopic view of the third-stage infective stage worm, *Angiostrongylus cantonensis*.



[photo: Henry S. Bishop, courtesy of Alexandre J. da Silva (CDC)]

A case for vigilance

The Puna district of Hawai'i has experienced an increase in cases attributed to rat lungworm infection (angiostrongyliasis) in recent years. As there is no definitive diagnostic test available to doctors working in the Puna district, a positive diagnosis is generally based on a combination of symptoms and circumstantial evidence.

For most of the suspected cases of angiostrongyliasis reported in Puna, diagnoses have not been confirmed by the Hawai'i Department of Health or the U.S. Centers for Disease Control and Prevention. In addition, symptoms and conditions in these recent cases do not strictly fit the disease profile. Instead, much more severe symptoms, including coma, have been associated with the disease present in Puna.

Current medical literature indicates that cases of angiostrongyliasis are frequently self-limiting, meaning that symptoms will go away without medical intervention. Unfortunately, this is not always the case, as some sufferers report symptoms that are long-lasting and possibly permanent, and two recent sufferers in Puna went into comas for up to three months. *The Honolulu Advertiser* quoted Dr. Francis Pien, an infectious disease specialist, stating that he has "treated at least 20 cases of rat lungworm disease in 35 years of practice. None of the victims in the past went into comas or died. Everybody else got well." (Leone 2009a, b). As of June 2009, both patients had emerged from their comas, but recovery is expected to take many months, or even years due to brain damage. Thus, some of the Puna cases of apparent angiostrongyliasis are much more severe than commonly observed for this disease, and further investigation and research are necessary to identify the special circumstances that have led to this increase in cases.

host of the nematode should cook the item thoroughly. Anyone handling one of these potential hosts should thoroughly wash their hands and sanitize food-preparation equipment and food-contact surfaces with soap and water (Saulo 2009).

The spread of the nematode via slug or snail mucus secretions (slime) has been investigated. A study of the slime of semi-slugs collected in Hawai'i indicated that 12 percent (3 of 25 samples) of them shed nematodes in mucus secretions induced by prodding. However, it is not clear whether or not the concentration of nematodes shed was enough to cause the disease in humans (Qvarnstrom et al. 2007). Earlier studies found that rats fed mucus-contaminated lettuce had acquired small numbers of parasites (Heyneman and Lim 1967). This rapid acquisition of infection may be unique to rats or unique to the specific species of slug that was used in the study. At this time, there are no scientific studies showing that a person can contract angiostrongyliasis by eating produce having snail or slug slime on it, but there are some personal testimonies in support of this possibility. As a preventative measure and an essential part of farm food safety, all produce should be rinsed thoroughly in potable (drinkable) water before it is consumed.

Symptoms of eosinophilic meningitis caused by rat lungworm infection

In adults, the most common symptoms are headache, neck stiffness, paraesthesia (prickling or tingling sensations), vomiting, fever, nausea, and double vision (diplopia). Other symptoms reported are body pain, muscle pain, fatigue, muscle twitching and convulsion, muscle rigidity or neck pain, somnolence (sleepiness), abdominal pain, hyperaesthesia, muscle weakness, and weakness of extremities. In children, the most common symptoms are headache, fever, nausea, blurred vision, somnolence, abdominal pain, and weakness of extremities. It is also possible to be asymptomatic.

Onset of symptoms usually occurs one to three weeks after ingestion of the pathogen, but it can be as soon as one day afterward, or it may take more than six weeks (Hochberg et al. 2007, Wang et al. 2008).

How to avoid risk of infection

Whether purchased or homegrown, fruits and vegetables should be treated with caution. The best way to manage the risk of becoming infected by rat lungworm is to thoroughly rinse all fresh produce in potable water before it

is eaten or cooked. Semi-slugs have been shown to have high levels of *A. cantonensis* infection, most snails and slugs are potential carriers, and all of these should be treated with caution and controlled or managed to the best extent possible.

If a fruit has broken skin, it cannot be properly cleaned. Keep your family safe by discarding it. In Hawai'i, semi-slugs have been found, so far, on lettuce, fennel, sweetpotato, banana, passionfruit, lemongrass, and fallen fruits including avocado, guava, citrus, papaya, and mango; semi-slugs have been found on ripe papayas that are still on the plant (Hollingsworth 2007).

Wear gloves if you are going to be working outside with plants or materials commonly infested with slugs or snails. In Hawai'i, snails can be found on land, on trees, and in water (such as in a taro patch). Slugs live only on land and prefer to live under plant materials, wood, rocks, and man-made materials.

Mitigating risks on a commercial farm or in a home garden

Due to the historically low incidence of infections in humans, research focusing on limiting rat lungworm infections has not been extensive. On the other hand, managing rats, slugs, and snails has been an important agricultural endeavor for some time. The authors' recommendation is to follow the techniques below to limit your exposure to rats, slugs, and snails. The following information on best management practices is not specific to avoiding rat lungworm contamination, and you are encouraged to do your own investigations on what works best, within legal limits, on your farm.

Among the many ways to lower the chances that your commercial or home garden produce becomes contaminated with rat lungworm, the best way is to keep rats and slugs away from produce. Eliminating rats, the original source of the parasite, and the slugs and snails that carry it, is the key. Here are some steps to follow:

Controlling rats

Keep your farm or garden as rat-free as possible by removing food sources and living places. Establish and follow a comprehensive rat control program with monitoring procedures and turnover times for bait stations and traps. See Hollyer et al. (2009) for details.

Controlling slugs and snails

Slugs and snails may be responsible for transmitting the

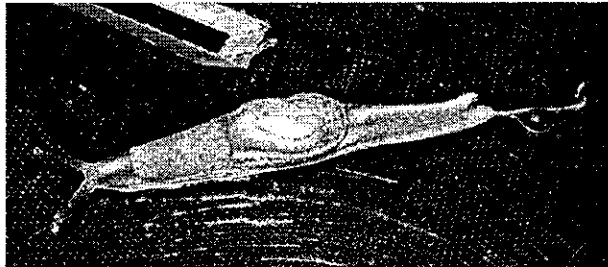
nematode to produce, and they may be harmful if accidentally eaten. For every slug you see, there might be up to 20 you did not see, so slug and snail management needs to be part of a regular, overall pest management program. The specific strategy you follow will depend on whether you are a commercial farmer or a home gardener, and a conventional grower or an organic grower. Nevertheless, the strategy for controlling slugs and snails must contain a strong prevention component and may be paired with a lethal elimination step.

Prevention is your key to success

Preventing snails and slugs from reaching your production areas or your home garden takes a multi-pronged approach.

Slugs and snails are mainly active at night. The main reason is that they quickly become dehydrated if they come out during the day. This is especially true for slugs. The best way to reduce your slug and snail population is to limit the number of moist places the slugs and snails can hide in during the day. This means removing unnec-

Rat lungworm intermediate and paratenic hosts—create a management plan to eliminate them



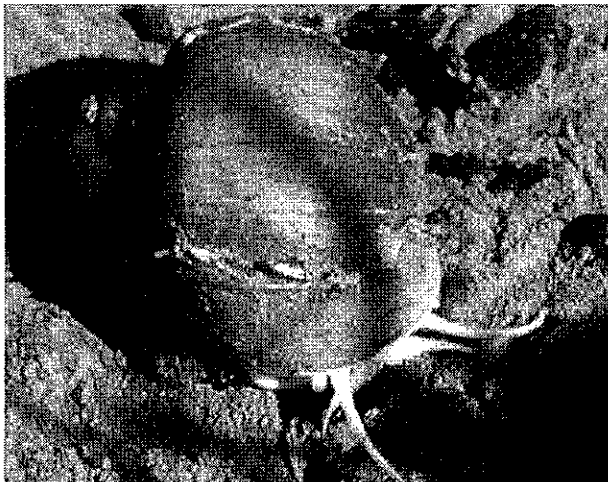
Semi-slug
[photo: Ken Hayes]



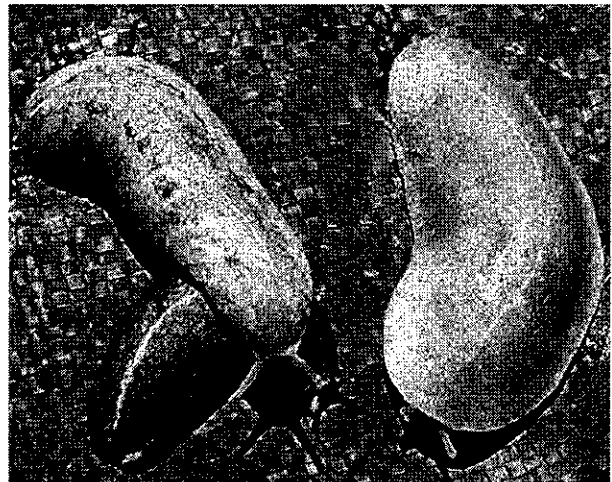
Juvenile semi-slug
[photo: Chris Jacobson]



Giant African snails, and damage from their feeding
[These are small ones—they can be about twice this size; photo: Scot Nelson]



An apple snail, photographed under water
[about actual size; photo: Ken Hayes]



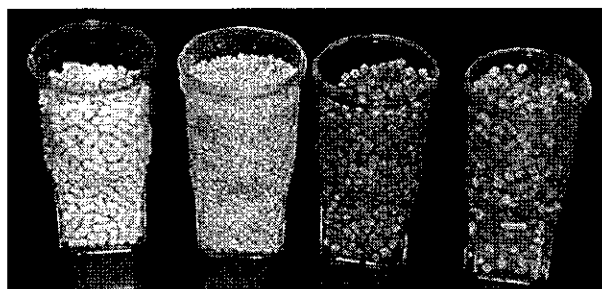
The Cuban slug comes in many colors.
[about actual size; photo: Robert Cowie]

essary groundcovers, cutting back vegetation, removing rocks and fallen wood, and removing unnecessary items that are stored in contact with the ground. Any time you store something in direct contact with the ground, you create a hiding place for slugs. So, place storage sheds on blocks and other items, instead of in direct contact with the ground.

While you should remove any hiding places within your production area, you might actually want to provide hiding places along the perimeter in order to lure and trap the slugs or snails that congregate there. Lures may be as simple as boards or pieces of plywood placed on the surface of the soil. Other lures include overturned flowerpots, overturned melon rinds, or orange peels. These lures need to be checked daily and the slugs and snails should be collected (wear gloves or use a tool, such as chopsticks or tweezers) and disposed.

To further reduce the likelihood of slugs and snails continuing past the lures at the perimeter of your field, you may consider including a bait trap. Slug and snail baits (discussed below) can be placed underneath the lure. This represents a very efficient use of the bait, because the bait will be protected from the direct effects of rain or sun, which contribute to rapid breakdown of the product. Commercial bait traps are available, but you can make your own. A quick Internet search reveals a variety of bait traps. Something as simple as a shallow bowl filled with liquid can lure and capture the slug or snail. The best lures for the liquid bait traps are beer, sugar-water, or a mixture of yeast and water. The snail or slug will drown in the liquid. Thus, bait traps also need to be checked daily, the dead slugs removed, and the liquid bait refreshed. Protect yourself from exposure when performing these tasks: wear gloves when handling the baits, wash your hands, and sanitize equipment used with soap and water.

If you are growing potted plants on benches, or if you have fruit trees you wish to protect, physical barriers may be the most effective method of keeping your crop safe. Copper in various forms is repellent to slugs and snails, and these animals will generally avoid crossing a band that is 3–4 inches wide or greater. Copper foil can be placed around bench supports. Alternatively, bench supports or the trunks of trees can be treated with a sprayable formulation of copper such as Bordeaux mixture. The incorporation of latex paint into the mix will greatly increase the length of time that the material will stay repellent. Additional information on barriers and



Various slug and snail baits (photo: R. Hollingsworth)

instructions for Bordeaux mixtures are available at the University of California Pest Notes: www.ipm.ucdavis.edu. Suggested readings are listed in References (p. 8).

Elimination steps

Growers who produce leafy green vegetables may find that the prevention measures already discussed are not sufficient to completely exclude slugs and snails from these crops, which are the favorite food of these pests. In these situations, the careful use of chemical pesticides may also be required. Always consult the product's label for authorized uses, and remember that products labeled for home garden use may not be authorized for use on commercial farms.

Pesticides lethal to slugs and snails, called molluscicides, should be part of an overall control and prevention program. In Hawai'i, the most common types of chemicals used to control slugs and snails in commercial settings are food bait pellets containing either metaldehyde or iron phosphate as the active ingredient. Many different brands of these chemicals are available. Molluscicides are reasonably priced and can cover a large area for a relatively small cost, but using molluscicides as a stand-alone control measure seldom produces adequate results. A bait application might kill only half of the slugs or snails that are present in the treated area. Significant numbers will survive the treatment because either they were buried or hidden at the time of treatment, or they were not attracted to the bait, or they did not eat enough to die. For these reasons, it is essential to use an integrated combination of measures for slug and snail control in your cropping and production areas.

Metaldehyde-containing products come in three forms: food-bait pellets, granules, and liquids. Food-bait pellets attract snails and slugs, but they may also attract domestic pets. Be aware that if consumed, metaldehyde products are very toxic to dogs, cats, and other

animals, and poisoning incidents are common. For this reason, metaldehyde is also available without the food attractants. Granules are smaller than pellets and lack a food attractant. Liquids are used as a foliar spray or pot drench, but they are not allowed on edible crops. Under moist conditions, slugs and snails sometimes recover from metaldehyde poisoning, so these products will be most effective in dry weather or if watering of the crop is delayed after their application.

Alternatively, food baits containing 1% iron phosphate as the active ingredient can be used to avoid situations where animals might accidentally be poisoned. Unlike metaldehyde baits, baits containing iron phosphate are considered safe to use around animals, including dogs. Slugs or snails that feed on iron phosphate baits will stop feeding immediately but may not die for several days. For this reason, the degree of control obtained will not be immediately apparent. Iron phosphate baits can be just as effective as metaldehyde baits, but effectiveness will depend on the pest species involved. All lethal elimination measures should be paired with prevention and control measures.

Note: Liquid formulations of metaldehyde are not allowed on edible crops. There are also legal restrictions on the use of bait formulations around edible crops. For your safety and for the safety of others, always read and follow the directions on the pesticide label. Federal law requires that pesticides be used in accordance with the directions on the product label.

Bringing produce from the field: How to keep it as safe as possible

To keep your produce as free as possible from contamination with any of the pathogens typically found on a farm, including the rat lungworm, make the following guidelines part of your general field operations, and frequently remind workers about the importance of following good food safety practices:

- Provide clean toilets and proper hand-washing facilities for workers (potable water, pump soap, single-use towels).
- Before each use, clean, sanitize, and dry plastic or wooden bins, totes, and baskets used to harvest and transport produce.
- Do not cross-contaminate. Do not grow both snails for food and produce for food in a place where handling the snails could affect the safety of the produce. Wash your hands after handling slugs and snails and before returning to your produce production areas.
- Do not smash snails or slugs near fresh produce. The pathogens are still active in the dead slug or snail and can easily be transferred by hands, tools, or via water to the fresh produce.
- Never harvest produce that has come in contact with the ground or has touched the ground on low-hanging branches (e.g., mangoes, macadamia nuts, avocados), as it could have been exposed to the rat lungworm or other pathogens (e.g., *E. coli*, *Salmonella*, etc.) from other animal sources.
- When you harvest, choose pest-free produce; look out for plants that might be contaminated, and don't include them with clean produce. A little field soil can be washed away, but signs of snail or slug slime, fecal material, bird droppings, or other contaminants are a good reason to leave that produce in the field. Do not try to wash off contamination. Avoid a foodborne illness for yourself or your customers.
- Do not sell snail- or slug-damaged produce for processing. Food processing may not kill the pathogens.
- Visually inspect all produce before packing. Look for specks on the produce; they could be immature snails. If found, do not sell or eat that piece of produce, and dispose of it in a trashcan. Do not throw out this produce where a rat could eat it and restart the infection cycle.
- Rinse and gently rub all produce in potable (drinkable) water. In addition, growers should use an FDA-approved food-grade water sanitizer when washing commercial produce. Food-grade water sanitizers are usually available from restaurant supply houses, agricultural chemical suppliers, and from companies via the Internet. Organic farmers can find food-grade water sanitizers by calling their organic certifier, or checking the Organic Materials Review Institute (OMRI) website. Items on that website meet the national regulations for organic certification and the NOP guidelines (NOP 205.270 and 205.605). From the OMRI website (www.omri.org), follow the link to "Products List" for "Processing and Handling Products." Follow the manufacturer's label for the proper use of each sanitizing agent. If you cannot rinse the harvested produce, as in the case of basil, for instance, then rub or shake the produce to dislodge any undesired materials before packaging and selling it.
- Finally, advise all buyers in writing (such as on your bag, plastic container, or box) to "wash before eating." Produce labeled "wash before eating" should be thoroughly inspected (separate the leaves), and rinsed

in potable water before using. Rinsing and rubbing produce is a best food handling practice at any time.

Acknowledgments

We thank Alexandre J. da Silva, Centers for Disease Control and Prevention, and Rebecca Kanenaka, Hawai'i Department of Health, for their contributions of time and expertise to this publication. Special appreciation goes to Ann Kobsa and Kay Howe of Puna for sharing their experiences. Funding for this publication was provided by the Agricultural Development in the American Pacific (ADAP) Project, USDA Grant 2008-38826-19179; the Hawai'i Department of Agriculture; and the Hawai'i Farm Bureau Federation.

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Summary points

Problem

Angiostrongylus cantonensis can cause harm to humans, and growers need to take precautions to limit the chance of their produce being contaminated with this pathogen.

Pest management

Remove rodent, slug and snail hiding places.

Trap and kill rodents and slugs and snails in your production fields.

Postharvest treatment of produce

Do not harvest produce with slugs or snails or their feces or slime on it.

Discard any produce that has been harvested with evidence of slugs and snails.

If you suspect that slugs and snails have been on your produce, consider rinsing the produce in water containing a sanitizer that has been approved for food contact.



January 18, 2011

TESTIMONY

Chair Nishihara, Chair Tsuji and Members of the Committees:

My name is Warren Watanabe, Executive Director for Maui County Farm Bureau, representing Maui's commercial farm and ranch families and organizations. Thank you very much for this opportunity to share one of MCFB's priorities this year. While there are several such as continued funding for irrigation infrastructure, I would like to focus on transportation today.

As a neighbor island, intrastate transportation and harbor and port infrastructure is critical to our viability. When the economy was booming, YB invested substantial sums of capital into their operations and, as a result, raised rates. At about the same time, YB lost 25 percent of its operating space to HSF at Kahului Harbor, and then, to make up for this space, YB and DOT proposed to eliminate onsite LCL consolidation at its Kahului facility. These developments came at a time when farmers had experienced other increased operating expenses, inability to increase the sales costs of their farm product and losses due to droughts. Although the proposed rate increase was eventually lowered, eligibility for and the amount of YB's island agricultural product discounts were increased and the DOT agreed to provide YB with additional operating space at Kahului Harbor (so YB withdrew its proposal relating to LCL at Kahului Harbor), the mere exposure to these and other increasing risks and expenditures, in light of already existing hardships, were seen as unacceptable by some of our third generation farmers and they left the business. Their lands which they own lie fallow. MCFB is very worried that without **focus on improvements in our transportation system**, we will lose more farmers.

In 2006, the Legislature passed HB1900 that set the path developing Hawaii's Biosecurity Plan. We appreciate the leadership and support by both Chairs and current HDOA Chair Kokubun to get this passed. The measure was created recognizing that there were various needs to ensure Hawaii's biosecurity ... protection of Hawaii's environment and agriculture to ensure increased self sufficiency. Recently, we have seen some setbacks. However, we are anxious to identify mechanisms to restore the program. All of our islands including Maui will need harbor improvements. **Implementation of the Biosecurity Plan** will ensure that concerns about invasive species will not deter approval of the plans and much needed construction while growing local agriculture to increase our self sufficiency. Concurrently, protection of our agricultural crops across the State is important. Our farmers cannot afford to face new pests for which control is unknown. Continued efforts to partner with the Federal government for infrastructure such as a joint use inspection facility to protect Hawaii are important.

(over)

Last month, the PUC approved Pasha-Hawaii's request to operate as an intrastate carrier. When they first applied for the permit, I contacted Mr. Reggie Maldonado of Pasha who said that they did not intend to transport perishable products ...most of which would be our agricultural products. Farm Bureau has opposed the approval of the certificate at every step of the way. Since the decision, a Senate informational briefing was held and we understand measures will be introduced during the session to address **PUC overhaul** and we ask for your support. At risk is loss of farming and ranching operations along lack of ability of YB to attract investment to maintain and improve their operations.

We request your strong support of the measures discussed. Timely and affordable intrastate transportation is critical to our future. We are ready and willing to work with you to identify ways to resolve these problems and enhance our intrastate transportation system. Thank you.



Hawaii Farm Bureau
F E D E R A T I O N

2343 Rose Street, Honolulu, HI 96819
Phone: (808) 848-2074; Neighbor Islands: 1-800-482-1272
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October 14, 2010

State Public Utilities Commission
465 South King Street, Room 103
Honolulu, Hawaii 96813

Consumer Advocate
P.O. Box 541
Honolulu, HI 96809

**Re: Interim Decision and Order Granting Pasha Hawaii Transport Lines
LLC a Certificate of Public Convenience and Necessity – Docket No.
2009-0059**

Chair Caliboso, Members of the Commission and Mr. Nishina:

Hawaii Farm Bureau Federation on behalf of commercial agricultural operations throughout the State has serious concerns regarding the interim decision granting Pasha Hawaii the right to provide selected interisland transportation services. We believe the entry of Pasha will have a serious negative impact on the movement of agricultural goods between islands. HFBF submitted such comments on April 28, 2009 and we strongly oppose the recent interim decision.

This is another case of State policy stating support of agriculture but in the final decisions, implementation actions continue to treat local agriculture as the "spare tire" only to be used in times of emergency. The PUC recognized the State's Constitutional provision stating the importance of local agriculture to Hawaii's self sufficiency and granted YB the ability to provide up to 35% discounts for transport of fresh local island agricultural products. This latest decision does not appear to be consistent with the PUC's prior decision.

Pasha's statement to PUC states it has wide based support including two state legislators but fails to state that this support was subsequently withdrawn when these two legislators recognized that the proposed service was not going to be complete. The change of position was sent by Speaker Say and Chair Souki on November 27 and published in the Advertiser as well. This was well within the period of document

submittals yet Pasha neglected to correct their original statement, and the PUC decision does not recognize this letter. This is to emphasize concern is not just from us as Farm Bureau. Others have equally expressed concern.

The policy within the Hawaii Water Carrier Act, governing these proceedings, clearly states that services must be provided without "unjust discrimination, undue preference or advantage or unfair or destructive competitive practices".

HFBF argues that this decision may be creating just such a situation. PASHA will not transport perishable commodities ...no refrigeration ...that means all fresh agricultural products will be left with YB. This will include refrigerated consumer goods so impact will be to the entire community.

- 1) Major agricultural production occurs on neighbor islands ...and even production on Oahu, the major population center, is shipped to the neighbor islands ...Interisland transportation is critical to Hawaii. Farm Bureau has worked with YB to implement an "Island Product" discount that is up to 35% of shipping cost. We clearly understand that this discount is being subsidized by other lines but is important to local agriculture competing with mainland imports that at times pay no freight ...Why? Because the mainland imports piggyback on other heavier cargo, taking advantage of space and getting a "free ride". YB has said this discount may go away if their revenue streams decline with Pasha's entry into the marketplace.
- 2) Frequency of Service is important to us. Our customers rely on Just in Time service. Since its implementation by the auto industry, businesses have recognized the value of not having large inventories. In the case of fresh agriculture products, the key is fresh ...they want it soon after it is harvested - not 1 week old ...so they want frequent deliveries. YB may be forced to modify the frequency of their service as shipping volume declines. This will mean less fresh product, leaving our farmers and ranchers to use air transport which tends to be significantly more expensive. YB's purchase of the larger barges has improved productivity and we have no doubt that it has contained costs. But Maui, as a tri-island County has been impacted. Cattlemen on Maui island who want to ship cows to Molokai to take advantage of the grazing lands there face higher costs. Maui cattle need to go through Oahu first before arriving in Molokai. Impacts are already happening ...with

Pasha it will get worse if the frequency between the major islands is reduced.

- 3) YB has invested in infrastructure. They have improved their barges and there will be more improvements needed as new Food Safety regulations and efforts to reduce invasive species are ramped up. While all cargo carries invasive species, it is the agricultural products that has the highest risk - so all of this cargo, left with YB is of higher cost and require more investments. How can you take away business from an entity and then ask them to invest more money for the business they have left? Currently the cargo volume is down, so even a small loss of cargo can result in major impact. Shareholders of YB may not be willing to further invest in a business that they believe is of high risk.

What to do?

PUC recognized the selective services proposed by Pasha. Yet, in the D&O, states "Given the critical importance of the inter-island shipping industry in the movement of produce, livestock, and consumer goods within the State, the commission believes that the continued reliance on only one intrastate water carrier of property places the State in an untenable position."

This does not make sense. Pasha is NOT going to carry produce, livestock and refrigerated consumer goods ...so what advantage will there be? If anything, we are putting the transport of these goods at risk. We urge PUC to reconsider the risks associated with this class of goods.

PUC has reserved the right to revoke the interim authority if it sees significant adverse effect on YB. What is "adverse effect"? The authority was granted because PUC felt that the projections provided by YB were speculative at best. So, what is adverse effect?

- 1) There could be a "boiling frog" syndrome.....where the changes may not cross an "adverse condition" test in the short term but cumulatively prove to be detrimental.
- 2) If the 35% discount is removed and the effect is not on YB, but our farmers and ranchers are hurt, will that be considered? Removal of the 35% discount will require PUC approval but will farmers and ranchers be forced to go through the hearing process - a time consuming process taking valuable time from farmers and ranchers who should be tending their crops and livestock before PUC decides that there will be an adverse effect?

We urge that "adverse effect" include impacts on agriculture as well as the consumer community and that they be clearly defined so corrections to the interim decision can be done before irreversible damage is done. These should include not just impacts due to costs to the user of the service but should also include such things as frequency of service that impacts the integrity of the agricultural products from the consumers' point of view.

We urge your serious consideration about the issues expressed and grant Young Bros. request for reconsideration and denial of the application. As the decision was rendered, HFBF found it surprising that there were no public hearings conducted. Just as it is important to get information from Pasha and YB, isn't it critical to understand all of the potential impacts of this decision? HFBF believes much of the community does not realize what could happen. Everyone deserves a right to know and opportunity to voice their opinion. Remember, after the closure of Aloha Airlines, people wanted to know why they were not informed that this was coming. If, during the consideration process, you find not to deny the application, please reopen the public comment period through a public hearing process. We will be available to answer any questions. Please contact Warren Watanabe, HFBF Transportation chair at 2819718 or by email warrenmcfb@hotmail.com. Thank you.

Respectfully submitted,

Mae Nakahata
President
Hawaii Farm Bureau Federation

cc: Mr. Robin Matsunaga, State Ombudsman
Ms. Sharon Pang, Small Business Regulatory Board
Speaker Calvin Say, House of Representatives
Chair Clift Tsuji, House of Representatives
Chair Clayton Hee, Senate
Chair Joseph Souki, House of Representatives
Chair Kalani English, Senate



January 18, 2011

TESTIMONY

SENATE AND HOUSE JOINT INFORMATIONAL BRIEFING ON AGRICULTURE

Chair Nishihara, Chair Tsuji and Members of the Committees:

My name is Mae Nakahata, agronomist at HC&S. Thank you very much for this opportunity to share our vision for HC&S' future and what can be done during the legislative session to promote our viability.

This year marks 145 years that A&B has been growing sugarcane on Maui. The growth of Maui's community paralleled our expansion from a 15 acre farm to over 35,000 acres today, with HC&S intertwined with the community in so many ways—as a provider of electricity, water, jobs, housing and support for community non-profits throughout our history. Today, HC&S is at a critical decision point. Over the next few years, we expect to make a decision regarding our future direction ... will HC&S continue to produce sugar? For food, or for energy or both? Will it be primarily a renewable energy company? Will sugarcane be the crop or will HC&S grow another type of perennial grass?

2010 was a critical year for HC&S. After consecutive years of losses, totaling tens of millions of dollars, largely due to the lack of water caused by back to back severe drought years, we expect to show a modest profit for the year. It was not easy. All workers – whether management or bargaining unit, worked as one for a common goal - to keep HC&S in business for the future. At the same time, we captured the attention of government agencies focused on furthering renewable energy production in Hawaii and in the nation. Doors opened for us, and we established working partnerships with the University of Hawaii – CTAHR with U.S. Department of Energy, U.S. Department of Agriculture, and the Office of Naval Research, obtaining federal funding that will allow us to accelerate our efforts to define our future direction in renewable energy. Like HC&S, biofuels using new technologies, for a commercial activity, is at a critical juncture. While small test or pilot projects have been in place, key to the future of biofuels as a sustainable industry are conversion technologies—to convert the plants we grow into energy, efficiently. You've probably heard about a few of these efforts—to partner emerging technology with biomass production here in Hawaii. Many uncertainties remain. And for HC&S, it's a completely different decision than for a non-operating farm. Because we have an on-going business, a working farm that for now is holding its own, it is a very different decision to pursue a new venture than if we were a start-up business. For HC&S, this decision is a one way street – the change must work—there is no going back. We have 800 workers and many, many Maui businesses who depend on that decision being THE right one. Further, we expect that a right decision will not only benefit HC&S and Maui, but others in the state and across the nation who may want to pursue a similar direction. As we identify our future roadmap, timely permitting and compliance with other regulatory requirements for construction will be important.

(over)

Some may ask why we focus on biomass. If you look back into Hawaii's history, electrical generation in the islands was largely from renewable sources. Maui Electric formed to distribute electricity produced by HC&S. In 2005, during a catastrophic earthquake, Maui was able to resume power production due to the HC&S power plant. Our power plant has also played a critical role as First Wind started wind power on Maui, providing the extra back-up to stabilize the grid from this intermittent source of electrical power. We have a model that works; our goal now is to make it better.

For HC&S to achieve its future goals, we will need adequate water. In 2009 and 2010, regulatory proceedings regarding our access to water caused created concerns about the certainty of water for agriculture on the part of farmers. It is extremely important that as HC&S moves forward, and as agriculture in Hawaii moves forward, that governmental (legislative and administrative) water decisions and policies reflect the importance of agriculture to this entire state—for food security, for energy security, for the protection of green open space that defines many of our rural communities. None of it can happen unless agriculture is viable. Agriculture cannot be viable without affordable supplies of adequate water which are impacted by the new laws that are passed, and by how existing laws are implemented. This includes things like the State Water Code and the Dams and Reservoir law. At all times, a balance must be struck to ensure agriculture can remain viable while meeting other public goals of these laws. Dams and reservoirs are absolutely essential element of farming, particularly given the goals of the State Water Code that calls for efficient use of water, water storage, etc., but they have to be affordable.

And, there needs to be increased political will and support to develop new water sources for our communities. Many of our water issues today are premised on the thought that we have finite sources of water—that are being fully used, and now that pie must be split between more and more uses. In fact, Hawaii, as an tropical island state, by definition has significant untapped water resources. It is just a matter of investing in their development and transmission to where the water is needed. This is a community-wide need. Society has grown. We need new sources to meet the growing demand. Depending on existing sources will increase our vulnerability to droughts and exacerbate competing uses. Hawaii has a Drought Plan. Implementing this systematic process to address mitigative actions will be critical to avoid losing farms during the next extended drought.

Finally, many capital improvement projects in Hawaii depend on federal earmarks. Hawaii is especially vulnerable. Hawaii's late entry into statehood has left us out of many Federal programs, leaving us dependent on earmarks. In light of current events at the federal level, working with the Congressional delegation to identify ways to include Hawaii in existing federal programs will be critical for everyone's future.

We appreciate this opportunity to share our future outlook and issues to facilitate our viability. Our issues are not unique and are shared with others in the State. We hope to work with you to identify implementing solutions. Thank you



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2011 Legislative Priorities
(As of 1/17/11)

Part 1: Priorities to be introduced by Hawaii Farm Bureau Federation

1. Relating to Public Utilities

Purpose: To mandate reduced electrical rates for agricultural use.

Justification: In order for farmers and ranchers to be competitive and self sustaining, an environment in which agriculture can expand and succeed is critical to the long term viability of the agricultural sector. Recently proposed Dam and Reservoir safety rules threaten the operation of many water systems; in turn these threaten agriculture as a whole. A major impediment to the use of ground water is the cost of electricity for pumping. The Public Utilities Commission oversees areas such as water rates, interisland shipping rates, and electrical rates. There is already a discounted rate for interisland shipping that aids Hawaii's competitiveness by reducing the cost of production and distribution which helps strengthen the sector. Likewise, a reduction in electric rates for agricultural use would help encourage the use of ground water while simultaneously alleviating environmental pressures.

Action: Introduce a bill.

2. Relating to Agricultural Water

Purpose: To clarify the status of water for agriculture in the Water Code.

Justification: Diversions of surface water for agriculture are competing with environmental arguments for preserving water in streams to support native biota and for the cultivation of wetland taro. Contrary to the Hawaii State Constitution, recent actions by CWRM suggest a bias in favor of stream biota and taro cultivation at the expense of the agricultural sector as a whole. This results in insecurity surrounding the availability of water and inability to plan for the future, which is counterproductive to food security, diversity and sustainability. An amendment to Chapter 174C; the State Water code that identifies and elevates agricultural water as a public trust use is consistent with the Hawaii Constitution.

Action: Introduce a bill.

3. Relating to Dam and Reservoir Safety Rules

Purpose: To develop dam and reservoir safety rules that enhance public safety while protecting agricultural viability.

Justification: Hawaii's Farmers and ranchers support dam and reservoir safety regulations, but the proposed rules place an unreasonable burden on businesses. The cost of complying with the safety rules regulating dams and reservoirs will significantly raise the cost for owners of reservoirs. These costs will be passed on to farmers and ranchers, and ultimately consumers, reducing Hawaii's competitiveness. They will lead to fewer and smaller reservoirs that will further reduce agricultural production.

Action: Introduce a bill/support bill(s) advanced by others

4. Relating to Irrigation Systems

Purpose: To appropriate funding for capital improvement projects to various irrigation systems statewide.

Justification:

- A. Upcountry Dual Line System and Storage Development, Maui
Secure State funds for Federal Match
- B. Waiahole Irrigation System, Oahu
\$2 MM (FY11/12 and FY 12/13) for repairs
- C. East Kauai Irrigation System, Kauai
\$50K for maintenance

Action: Introduce a Bill.

5. Relating to 3rd Party Commodity Inspectors

Purpose: To allow the licensure of third party commodity inspectors to serve rural locations.

Justification: Prior to recent HDOA budget cuts and resultant lay-offs, growers in remote locations were underserved by commodity inspectors, placing them at a disadvantage. Additional costs in terms of time and fees place an undue burden on these growers. The licensure of private 3rd party commodity inspectors would serve to alleviate the stresses placed on them and the HDOA that is unable to adequately and efficiently serve them. Budget cuts to the HDOA have further exacerbated this problem.

Action: Reintroduce language from portions of HB 2290 & SB 2527

6. Relating to Building Permits for Agricultural and Aquacultural Structures

Purpose: To exempt from the county building permit requirement construction of nonresidential agricultural and aquacultural structures on state lands and large privately-owned land parcels leased for agricultural or aquacultural operations.

Justification: Extensive delays and costs to process building permits for low-risk agricultural structures places unnecessary strain on businesses and families that rely on agricultural production; increasing the cost of production of locally produced food stuffs and work against competitive pricing for local products versus imports from mainland suppliers. Farmers and ranchers require flexibility in materials and construction methods when constructing low risk non-residential structures in remote locations.

Action: Re-Introduce a bill. (HB 2825)

7. Relating to Protection of Agricultural Leased Land

Purpose: To protect valuable agricultural land (lands with productivity ratings of "A" or "B") by providing for the conditional mandatory extension of State agricultural leases.

Justification: Agricultural lands with a land classification rating of A or B are vital to food security and sustainability efforts. Prime agricultural lands are being lost to development, especially in heavily populated areas. Protecting and preserving prime agricultural land is vital to the future of agriculture and also promotes and supports food security and sustainability.

Action: Re-Introduce a bill. (HB 2290 HD2, SD1)

8. Relating to Commercial Aquaculture Leases

Purpose: To promote commercial aquaculture operations by providing favorable lease terms for aquaculture ventures by extending the maximum term from 35 to 45 years. This measure also permits aquaculture lessees in good standing the right of first refusal and allows for supportive aquaculture activities.

Justification: The direct leasing of public lands is the cornerstone for building a successful aquaculture industry. The current maximum lease term does not lend itself to aquaculture ventures striving to reach economic viability. Consequently, aquaculture ventures have a difficult time securing long-term financing.

Action: Re-Introduce portions of bill HB 2409 HD2, SD1/support bill(s) introduced by others

9. Relating to Livestock Feed Subsidy Extension

Purpose: To create a livestock revitalization and food security program to administer and disburse funds to qualified sheep, goat, cattle, dairy, hog, and poultry farms.

Justification: Hawaii's livestock industry faces numerous challenges. One of those challenges is the rising cost of feed for livestock, which is a contributing factor to the decline of the state's livestock industry. The cost of feed for livestock production in Hawaii can comprise up to seventy per cent of total production costs versus close to fifty per cent for mainland producers.

Action: Introduce a Bill. Funding Goal \$3MM

Part II: Priorities supported by Hawaii Farm Bureau Federation

1. Relating to the College of Tropical Agriculture and Human Resources

Purpose: To encourage the Legislature to restore the funding to UH CTAHR that has been dramatically reduced over the past several years.

Justification: CTAHR has a century-long history of supporting agriculture in Hawaii, caring for the environment and enhancing and sustaining ecosystems.. CTAHR's scientific community has been crucial to the development of the agricultural sector. Deep budget cuts have impacted CTAHR's ability to grow agriculture and to respond to new threats. CTAHR's mandate to engage in research, instruction, and outreach, plays a vital role in the success of Hawaii's agricultural industries.

Action: Support.

2. Relating to Agriculture (Department of Agriculture; Operating Costs; Omnibus Bill)

Purpose: To allow the agricultural commodities inspection, certification, weighing, grading, and licensing activities of the Department of Agriculture (DOA) to be funded exclusively through fees, penalties, and other moneys collected by DOA.

Justification: The Department of Agriculture has been severely impacted by significant budget cuts in recent years. These have reduced the department's ability to help to grow agricultural industries and respond to threats. These shortcomings, in turn, threaten food security, and overall sustainability of our island State. Agriculture serves to satisfy one of the most basic needs of human and societal function. As such, support for the department is requisite. This measure serves to insulate the department from negative effects of fluctuations in the general fund.

Action: Support. (SB 2527 SD2; HD2)

3. Relating to Irrigation Systems

Purpose: To disburse funding allocated for capital improvement projects to various irrigation systems statewide.

Justification:

- A. Ka'u Irrigation System, Hawaii
Disbursement of \$1.5MM CIP funding
- B. Molokai Irrigation System, Molokai
Disbursement of appropriated CIP funding

Action: Support

4. Relating to Agriculture Commodity Inspectors

Purpose: To restore funding to HDOA for Agricultural Inspector positions.

Justification: Recent HDOA budget cuts, have left the department unable to properly support and service the needs of the agricultural industry. The HDOA Ag Inspectors are Hawaii's first line of defense against invasive species. They help curtail invasive species that enter the state through imported cargo. Invasive species have become one of the most devastating problems impacting Hawaii's agricultural industry. Invasive species and the havoc they cause to Hawaii's environment and economy are evident in the demise of the native wili wili trees, the recent infestation of imported Christmas trees, the introduction of coqui frog, coffee berry borer, little fire ant, and others pests and diseases that chronically devastate our agricultural crops.

Action: Support.

5. Relating to Invasive Species

Purpose: To appropriate funding to eradicate and control the little fire ant.

Justification: The little fire ant has become a serious pest that infests yards and agricultural fields, and they will move into houses and other structures. The bites from these very tiny ants initially hurt and burn, and then may cause welts followed by intense itching that can last for two weeks or more. They climb onto plants of all sizes, including trees, but they easily fall off when the plants are disturbed. Activities such as pruning branches, harvesting fruit, or picking flowers in infested areas can cause little fire ants to rain down in large numbers. Some orchard workers in East Hawaii have quit their jobs as a result. Pets, livestock and wild animals are also at risk for little fire ant stings. Multiple stings in the eyes can result in blindness by secondary infection or even the death of newly born or small animals.

Action: Support.

6. Relating to Coffee Berry Borer

Purpose: To encourage the Legislature to allocate funding for the research, control, and eradication of the Coffee Berry Borer.

Justification: The confirmed discovery of the Coffee Berry Borer on Hawaii Island represents a significant threat to an agricultural commodity important to the State of Hawaii. It also serves to highlight the need for comprehensive invasive species controls, education, research and cooperative assistance.

Action: Support \$1.18MM budget request advanced by the Coffee Berry Borer Task Force; an ad-hoc, multi-agency industry organization.

7. Relating to Aquaculture.

Purpose: To appropriate funding for aquaculture development programs.

Justification: Hawaii is an ideal location for aquaculture, the farming of plants and animals in water. Shrimp, abalone, seaweed, microalgae, tilapia and various organisms for food, fuel and the aquarium trade are among the many investment opportunities.

Action: Support.

8. Relating to Biosecurity

Purpose: To address the invasive species issue that directly affects Hawaii's agricultural industry.

Justification: Invasive species has become one of the most devastating problems impacting Hawaii's agricultural industries. The Hawaii Department of Agriculture continues to develop and implement their biosecurity plan to protect the industry from unwanted pests and disease entering into the State. Additional resources are needed to carry out the duties and responsibilities of the Department of Agriculture.

Action: Support.

9. Relating to Agriculture

Purpose: To restore funding to reinstate the Commodity Market News

Justification: Commodity Market News was previously published by HDOA and contained wholesale prices for a variety of agricultural products including eggs, flowers, vegetables and fruit being paid by major wholesalers statewide. This is valuable information for farmers who sell directly to hotels, restaurants, grocery stores, farmers markets, etc. to help them be more competitive.

Action: Support.

A Unified Statement from Agriculture in Hawaii

January, 2011

A renewed interest in agriculture is a welcome shift for all those engaged in the vocation. Comments in the media that seek to assign blame for mistakes of the past have dominated the discourse. Our reliance upon imports is not the fault of individuals nor institutions but the result of economic forces. We would do well to seek solutions rather than assign blame.

Agriculture is a diverse industry, and this diversity is a strength. Farmers, ranchers, and aquaculturists are free to choose the methods and crops that best fit their vision, values, the land, water, and markets available to them. Organic, biodynamic, aquaponic, natural, or conventional, large or small, traditional or technology-driven: farmers, ranchers and nurserymen share much in assuming the challenging task of feeding people and stewarding the land.

Farmers and ranchers are conservationists. We get up every morning and get to work; dirt under our fingernails, sun on our backs, mud beneath our boots. But also logistical, engineering, mechanical, accounting, and marketing work. We do what's necessary to produce the food, flowers, and foliage that we all enjoy. Our livelihoods depend upon a working knowledge of hydrological and nutrient cycles. We construct and maintain drainage systems that enhance watersheds, reduce run-off and preserve soil. We preserve the pastoral vistas that are a treasured part of our island landscape.

We, too, need to eat. We need to feed our families, educate our *keiki*, care for our *kupuna*, maintain our homes and equipment, and invest in our communities. We must earn a living. If we can't survive, we won't.

Our needs are straightforward. We require land, water, labor, transportation and markets. We require science and technology to manage today's problems and pests. We need these elements at rates that allow us to be profitable. Without these things, there is no agriculture.

All the arguments for food security have been made. The warning signs are evident. We must move toward sustainability by producing safe and healthy food, flowers, foliage, fiber and fuel for our fellow citizens. We have a duty to do this. The economics of the food supply have favored imports, causing our local food system to atrophy. The solution is up to you. If you eat, you have a stake in agriculture.

If you value food security, you must create the demand. You must buy local, demand local of your grocer, and dine in restaurants that do. Our future hangs in the balance.

Hawaii's agriculture is subject to all the pressures of the private sector; yet we are much more. Ours is a public service. We can revitalize Hawaii's agriculture, but you, as a customer and a citizen, must support Hawaii's farmers and our products. Keeping your dollars local represents an investment in our economy. Support the values that are important to you. Buy local.

The revolution has already begun. Our growing network of farmers markets has never been stronger. Interest in local food production has never been higher. We are strengthening education and careers in agriculture. The new agricultural leaders have arrived and they are growing.

Government plays a critical role in supporting an environment in which agriculture can flourish. Our elected and appointed officials must consider unintended consequences made by imperfect policy decisions. You must urge your political representatives to support the agricultural sector. Government is an important partner in the advancement of our common goal of a sustainable Hawaii. You have the power, and a duty, to hold them accountable.

Occasionally, opinions will differ within our industry. While we engage in respectful debate, we must not allow our differences to dominate the conversation. Rather, we should focus on the overarching commonalities that bind us. Only then can we move forward.

It's a big canoe. There is room for all. Climb aboard. And paddle.

Hawaii Farm Bureau Federation
Agricultural Leadership Foundation of Hawaii
Aquaculture & Aquaponics Association
Hawaii Agriculture Research Center
Hawaii Beekeepers Association
Hawaii Biofuels Foundation
Hawaii Cattlemen's Council
Hawaii Coffee Association
Hawaii Coffee Growers Association
Hawaii Crop Improvement Association
Hawaii Egg Producers Association
Hawaii Floriculture & Nursery Association
Hawaii Florists & Shippers Association
Hawaii Tropical Fruit Growers
Hawaii Restaurant Association
Landscape Industry Council of Hawaii
University of Hawaii- College of Tropical Agriculture and Human Resources

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Hawaii Food Manufacturers Association Delegate Biographies

Maria Langscheid, President of the Hawaii Food Manufacturers Association. Maria received an MBA from HPU 8 years ago and has worked at the local food manufacturer, Oils of Aloha since then as Sales and Marketing Director. Oils of Aloha has 21 employees. It uses only Hawaii grown macadamia and kukui nuts for its cooking oils and skin care products. Since Maria speaks several European languages, she is in charge of the company's sales to the European market.

James Chan, President of Hawaiian Chip Company. Raised in Hilo, James earned a Liberal Arts degree from the University of Hawaii. He started Hawaiian Chip Company 11 years ago. It has now grown to 18 employees. James uses only Hawaii grown sweet potato and dry land taro for the very popular chips. The chips are sold in local stores and restaurants as well as on Hawaiian Airlines. James has recently started expanding sales on the US mainland and in Japan.

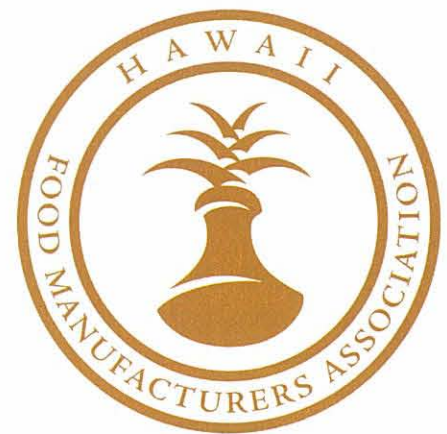
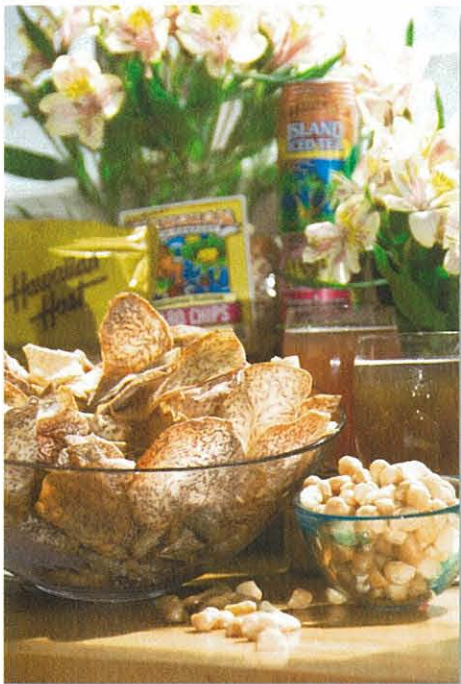
Nina Tanabe, owner of Pacific Food Technology, a manufacturing and food processing consulting firm. Nina has worked with the Hawaii Food Manufacturers association for many years as an advisor on packaging, labeling, food safety, and manufacturing efficiency. Her company is based in Hilo where she has many food processing clients.

Katie Anderson, Executive Director, Hawaii Food Manufacturers Association. Formerly a Vice President at First Hawaiian Bank in commercial lending, Anderson is now an independent contractor and runs the operations of the HFMA. She has an MBA specializing in Finance and a BA in Asian Studies from the University of Hawaii.

Hawaii Food Manufacturers Association



HAWAII FOOD MANUFACTURERS ASSOCIATION



WWW.FOODSOFHAWAII.COM
HFMA@FOODSOFHAWAII.COM

Promoting “Buy Local” to support our economy and keep entrepreneurs and prospering businesses in Hawaii

Hawaii’s food manufacturing industry includes sugar and candy processing, fruit and vegetable preserving and canning, dairy product manufacturing, meat processing, seafood packaging, bakeries, and snack, sauce, seasonings, and beverage production. These companies create innovative products based on Hawaii’s unique blend of cultures and local food traditions.

This industry is also a major market for Hawaii grown farm products. The manufacturing process preserves farm produce, enabling farm products to not only have a much longer shelf life than fresh produce for local buyers, but to be shipped around the globe. Branding and marketing raises the value of Hawaii’s processed foods considerably over farm commodity products.

Hawaii’s food products are one of the most important ambassadors of Hawaii’s rich traditions. Sold worldwide, these products enhance Hawaii’s image. Hawaii’s food production industry employs community leaders, managers, accountants, machinery technicians, chemists, marketers, graphic designers, sales teams, production personnel, and drivers.

The Hawaii Food Manufacturers Association (HFMA) includes companies which manufacture within the state of Hawaii. The HFMA seeks to raise the level of food production and marketing capability of its members, it sponsors local Hawaii food events, and participates in national and international food shows.

Hawaii Food Manufacturing Statistics

- Hawaii’s largest manufacturing industry, 40% of Hawaii’s industrial employment.
- Major purchaser of Hawaii farm products, with annual purchases of \$170 million, nearly 25% of total Hawaii Agriculture sales.
- Annual product value produced: over \$1.3 Billion
- Employees: Approximately 8,400
- Number of Companies: 260
- Annual Payroll: \$2.34 million
- Annual Capital Expenditures: \$35 million

(statistics from DBEDT Economic Reports and Manufacturers News Survey)



Industry Challenges

1. Difficulty competing with imports into Hawaii
 - a. Costs are higher in Hawaii, making local products more expensive. These include product containers and bottles, which often are shipped in, as well as general business costs.
 - b. Getting products from the neighbor islands to Oahu is expensive, driving neighbor island products out of the market on Oahu.
 - c. Mainstream supermarkets refuse to carry smaller manufacturers (most Hawaii manufacturers) because they do not make enough money off them. Or they may demand marketing or shelf space subsidies which effectively bar small local food producers from most retailers.
2. Exporting barriers and obstacles
 - a. Buyers are often very interested in Hawaii products at trade shows, but Hawaii products are often priced out of the market because of shipping and distribution costs.
 - b. Most Hawaii companies do not have the resources to keep up with food trends, packaging technology, market research and, most importantly, a frequent or permanent presence on the mainland to sustain a mainland sales program.
 - c. Very unique products can be successful. But some Hawaii products are in the "me too" category such as salad dressing or tomato sauce based products. Brokers and distributors that HFMA has dealt with state they are less likely to pick Hawaii products for which competition will make success too difficult. Being "Made in Hawaii" is not enough if a product is priced higher than similar products, unless it is very unique.

Work of the Hawaii Food Manufacturers Association

With the help of funding from the Hawaii State Dept. of Agriculture, HFMA has been able to provide many benefits to Hawaii's food manufacturers.

1. Educate Manufacturers
 - a. Branding – how to stand out from the competition
 - b. Marketing – latest strategies in promoting your product
 - c. Distribution – creating and maintaining a distribution infrastructure
 - d. Food Safety / Labeling requirements
 - e. Pricing strategies
2. Promoting "Buy Local"
 - a. Advertising assistance to local food producers
 - b. Organize in-store promotions to highlight locally produced products
 - c. Discounts for local retail and trade shows
 - d. Arranging one-on-one meetings with local retail buyers
 - e. Educating Hawaii consumers through website and advertising
3. Mainland and International Sales - give opportunity for small manufacturers to get to the mainland and Asia through:
 - a. Consolidated shipping programs.
 - b. Soliciting distributors and brokers to take on collections of small Hawaii companies
 - c. Assistance in translation, customs, packaging adjustments for the Japan market.





Hawaii GLCI Promotes:

- Understanding the ecosystem benefits of managed grazing
- Partnerships
- Technical development
- Outreach and education

Hawaii Grazing Lands

Conservation Initiative

Foraging for Healthy

Ecosystems

Hawaii GLCI is a grassroots partnership dedicated to providing guidance and leadership in the pursuit of grazing land conservation.

Conserving Hawaii's Grazing Lands

Healthy grazing lands provide many watershed-scale benefits and opportunities:

- Carbon Sequestration.
- Open, scenic space.
- Water catchment and filtration - the recharge of aquifers.
- Soil health and improved nutrient systems.
- Erosion and sedimentation control.
- Habitat and wildlife conservation.
- Invasive species control.
- Reduction of the risk of wildfires.
- Food safety and security.
- Flavorful, healthful food.
- Community participation.
- Agritourism and ecotourism providing a Hawai'i experience.
- Preservation of historical and cultural heritage values.
- Economic, educational and cultural resources for future generations.
- Scientific Research.

Legislative Assistance Sought

We need legislative help to maintain and improve the health of our grazing lands. Some things we can work on together include:

- Transportation/shipping issues.
- Conservation easements.
- Lease rates.
- Improving processing capacity with permanent and mobile slaughterhouse facilities.
- Water cost and availability.
- Navigate through regulations and issues such as the Endangered Species Act; Critical Habitat Designations; property taxation.
- Assistance in valuation of specific ecosystem services obtained through proper grazing management.
- Development of economic opportunities to sell/trade the values associated with ecosystem services.

Importance of Grazing Industry in Hawaii

Grasslands in Hawaii comprise about one million acres, or about 25% of the land area.

Annual revenues from the sale of livestock (cattle, sheep, goats, and other grazing animals) in Hawaii approximates over \$25 million.

Beef production is the 4th-ranked agricultural revenue source in Hawaii.

Although the number of jobs on ranches varies, employment in the livestock production and ranching sectors are valuable to our economic picture.

Hawaii grasslands are some of the most productive in the world.

Effective control of invasive species is being accomplished through intensively-managed livestock on several ranches throughout the islands. Using livestock to control invasive species reduces the need for chemical controls and may have a positive impact on native species habitat.

Contact us for more information or to collaborate on specific issues. 808-885-5599, Hawaii Cattlemen's Council, Inc. and Hawaii Grazing Lands Conservation Initiative (HI-GLCI).



Natural Farming with Master Cho

“Spreading the new seeds in Hawai‘i’s agriculture.”



Cho Global Natural Farming:

- Promotes the protection of the environment we live in and the quality of human health.
- Utilizes local natural farm resources and indigenous microorganisms that are made by farmers.
- Has been demonstrated worldwide in 32 countries as a viable method of agricultural production without the use of conventional and imported pesticides and fertilizer and without the use of conventional tillage technology.
- Has trained over 18,000 people in introductory and advanced courses.
- Improves crop and livestock yields and quality while decreasing production costs.
- Natural Farming farms in Korea has realized 20% higher yields, 30% higher sale prices and 60% decrease in production costs as compared to conventional farming.
- Is a harmonious methodology, which balances and improves plant and animal production systems in an environment, which avoids harmful disease conditions.
- Is a highly technical system that instills producers to be conscious of applying nutritional inputs at critical growth stages.
- Helps to eliminate waste products created from conventional food production systems
- Is a highly sustainable system, which has been demonstrated to be successful in both temperate and tropical climates and in a variety of crop-soil environments.
- Has lead the way to establish the International Standard Organization (ISO) 9001/14001 Natural Farming certification since 2003.
- Has been demonstrated to exhibit great potential in both crop and livestock production in Hawaii.
- Helps to teach community resilience and community building and can help economically as well as socially disadvantaged individuals become self-sufficient.
- Can revitalize Hawaii’s agricultural sustainability and help position Hawai‘i as a new farm model for future generations as well as a technological hub for eastern and western institutions with inherent sustainable missions.

Honors and Achievements for Master Cho and Cho Global Natural Farming:

- Received the “International Environmental Award” from Japan in 2004
- Received the “Stone Tower Order of Merit in Industrial Service” by the President of Korea in 2004.
- Received the “Friendship Award” by the People’s Republic of China in 2008.
- Received the “Lifetime Achievement Award” by Sri Venkateswara University in Tirupati, India in 2010.



Information & photos courtesy of Cho Global Natural Farming, CGNF Hawai‘i, Hawai‘i FFA Foundation, UH CTAHR, D. Fuertes, D. Wong, Dr. Park, K. Chang & Y. Kim.

**“Journey with North
Kohala’s Food
Resilience Program”**

“Journey with North Kohala’s Food Resilience Program”

Through our program we teach our students, a simple (4) component process that applies to our daily lives or when we encounter problems or opportunities. This process helps us know who we are, where we came from, what we value and how we can use that information to make decisions to get where we want to be.

The (4) components are:

Origin > Values > Purpose > Destiny.

“Journey with North Kohala’s Food Resilience Program”

ORIGIN:

- In the year 1778, North Kohala fed a population of approximately 30,000 people. Kohala sustained its people on agriculture, by cultivation of the land and sea. Today, the year 2010, our entire State only produces 18% of its population consumption. A need for facilities such as ARCH (Agricultural Resource Center of Ho‘ea) was determined through numerous community forums and meetings, North Kohala’s master community development plan (CDP), reiterated the concept of becoming food sustainable by 50% (food this community consumes.)

VALUES:

- To promote self-development and family unity
- To achieve the CDP goal of being food resilient by 50%
- To reduce health disparity

PURPOSE:

- To build healthy families with strong family unity
- Sustain a healthy community = healthy food production = healthier people
- Meeting the CDP goal of 50% food sustainability
- Produce and meet the needs of the Kohala community and beyond

DESTINY:

- A healthier Kohala community through education, production, and processing of beneficial food products.

“ How will we get there?”

- In determining “How will we get there?” Four purposes were identified and are reflected on the leaves of the attached illustration: 1. Education, 2. Promotion & Marketing, 3. Infrastructure and 4. Economic development. Below is a list of activities or projects in their respective areas that are helping us reach our goals.

PURPOSE:

1. Education

2. Promotion & Marketing

3. Infrastructure

4. Economic Development

DESTINY:

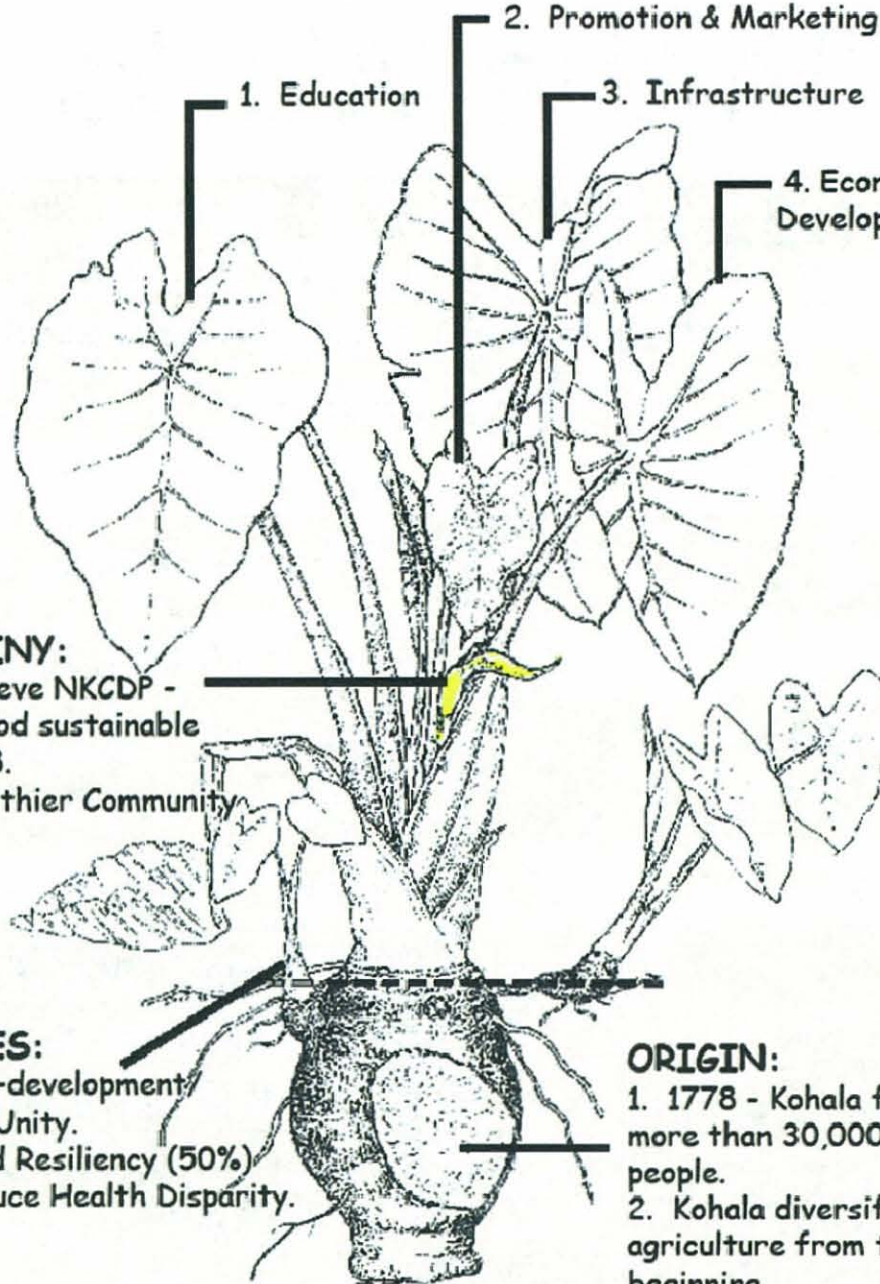
1. Achieve NKCDP - 50% food sustainable by 2018.
2. Healthier Community

VALUES:

1. Self-development/
Family Unity.
2. Food Resiliency (50%)
3. Reduce Health Disparity.

ORIGIN:

1. 1778 - Kohala fed more than 30,000 people.
2. Kohala diversified agriculture from the beginning.
3. Presently the State produces only 18% of



“In the Works”

Education

Goal: Provide people with knowledge, skills, and self- development; needed to become tomorrow’s leaders.

What

Who

1. Ka Hana No`eau (KHN)

Partners in Development Foundation (PIDF)

2. Restart of FFA program

Hawaii FFA foundation, DOE, County of Hawaii

3. Elementary & Middle school’s

USDOE 21st. century, The Kohala Center, North Gardening program- Kohala Resource Center.

4. Hawaii Youth Ag. Program

Uluwehi farms, Kohala Center, StarSeed ranch.

6. Natural Farming Classes

PIDF, CTHAR, HFFA foundation, KSBE, Ulupono, Island Harvest, Hoesa Ag. Park, Cho Global Natural Farming USA, KIC

6. Hawaii Homegrown Food Network

County R & D

7. Hawaii NPAC

USDA, State Dept. of Health

8. 2010 Summer Youth Employment Program

DLIR

“In the Works”

Promotion and Marketing

Goal: Increase awareness to the public on a healthier Kohala community campaign.

What	Who
1. North Kohala Food Forum	County of Hawaii - Department of Research & Development, Ulupono Initiative, Hoesa Agricultural Park, Starseed Ranch, and Local Contributors
2. North Kohala Eat Locally Grown Campaign	Kaiser Permanente, County of Hawaii - Department of Research & Development, USDA- FSA
3. Chicken Wok Challenge	KHN, HFFA foundation, HTA, Census Bureau
4. Community Harvest Hawaii	North Kohala Eat Locally Grown, Ka Hana No'eau, Ho'ea Ag Park
5. 2010 Summer Youth Employment Program: Student's "Kohala's Past, Present, Future" Mural	DLIR, KHN, KIC

“ In the Works”

Ag. Infrastructures

Goal: Strengthen out Kohala’s community agricultural infrastructure in reaching goal set in our CDP’s 50% sustainable program and beyond.

What	Who
1. Ag. Processing Facility planning grant	US EDA, OHA, CBED, HFFA Foundation
2. Kohala Ditch Restoration	NKCRC, State of Hawaii Civil Defense, USDA-Rural Development, KSBE, U.S. Senate, State DLNR, Community Donors.
3. Kohala Water Shed management	COH dept. of Water, DLNR, DHHL, The Nature Conservancy, Kohala Center, Individual Ranchers
4. 500 acre Agricultural Park	Hoea Ag. Park
5. Lease lands	Surety, KSBE, State DLNR, and Individuals
6. Existing Wells	USGS
7. Future Solar Energy	Hoea Ag. Park

“ In the Works”

Ag. Economic Development

Goal: Develop and offer agricultural business opportunities for the Kohala community.

What	Who
1. Dairy	Clover leaf Dairy
2. Exist Veg. and orchard farms	Individual businesses
3. Cattle	Individual businesses
4. Hog farms	Individual businesses
5. Wind Farms	SCI Richard Horn
6. Hydro farms	Hawaii Ag. Energy, Hoesa Ag. Park
7. Taro Dreams	Pam Day and Pii Kalama
8. Kohala Cultural Learning Project 10 x 10 x 10,000 Kalo project	HFFA Foundation, HTA
9. Hoesa Ag. Park	Hoesa Ag. Park

A.R.C.H.

Agriculture Resource Center of Ho'ea

Values:

1. Self-development/Family unity
2. Food Resiliency (50%)
3. Reduce Health Disparity

Purpose:

1. Build healthier families and community.
2. Produce healthy food to sustain Kohala and beyond.
3. Assist Kohala community in becoming 50% food sustainable.

Origin:

1. 1778 - Kohala fed 30,000+ people.
2. Kohala has always been a diversified agricultural community.
3. Today the State of Hawai'i only produces 18% of consumption.

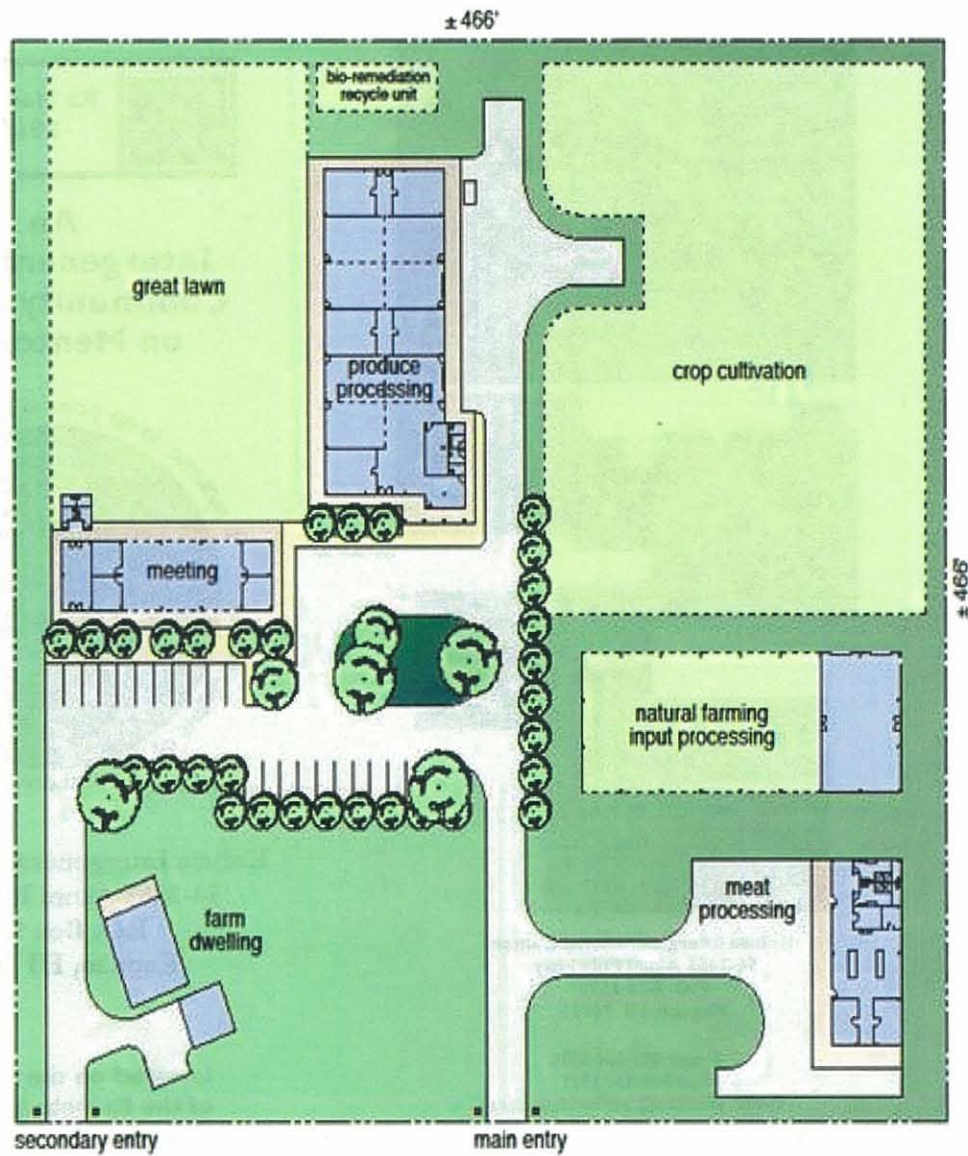
Destiny:

A Healthier Kohala Community.

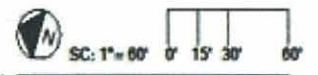
SITE PLAN

PROJECT INFORMATION

TAX MAP KEY TMK (3) 5-5-7: 39
 SITE AREA 5.00 ACRES



Richm Owensby
 PLANNERS
 ARCHITECTS



Ka Hana No`eau

How will it work?

- Students will apply to program of interest.
- 9 mentorship groups will be formed with 5-7 students in each group that attend Kohala Middle and High schools.
- Mentors will meet with students between 2-5 hours per week to develop student proficiency in skill area.
- Students will work with a business mentor to develop sustainable business plan in respective area.
- Students will develop an appreciation for the traditions associated with Hawaiian culture.
- A positive, intergenerational bond will be fostered through regular meetings.
- Participation in a positive extra-curricular experience that is aligned with student interest will have a positive impact on academics and career planning.



Kohala Intergenerational Center
54-3853 Akoni Pule Hwy.
P.O. Box 1596
Kapaau, HI 96755

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The Partners in Development Foundation
www.pidfoundation.org



An
**Intergenerational
Community Project
on Mentorship**



Kohala Intergenerational Center
54-3853 Akoni Pule Hwy.
P.O. Box 1596
Kapaau, HI 96755

Located on the makai side
of the Kamehameha Gym
Complex

Telephone: (808)884-5838
Fax: (808)884-5531

About the Community-based Project



"The root stock of all life is embodied in the taro plant." (Kelly, 2005)

Ka Hana No`eau...

(To work diligently to attain valuable knowledge)

In a rural community, there is always a need for activities that reinforce positive experiences for our youth. Our children are the community's treasures and represent our future leaders.

Kahana No`eau seeks

to nurture the potential within our youth and to help broaden their perspectives on positive and sustainable choices. It is also recognized that traditional values and culture of Hawaii are vital qualities that must be present in the manner that instruction is presented.

The bond that will be developed between students and mentor will give our youth networking opportunities that will extend well beyond the scope of this project.



Mentorship Descriptions

Small Animal Husbandry

Dave Fuertes

The Animal husbandry program is targeted at students who enjoy working with animals. Learners in this mentorship will have the opportunity to learn about animal care, reproduction, and sale. This mentorship is a gateway to many careers in science and agriculture. Come join us!

Culinary Arts

Billie Brown

Hawaiian cuisine consists of a wide range of foods using staples traditional to the culture. In Hawaii, influences from other cultures make food preparation exciting and continuously evolving. Students will learn to prepare and market traditional Hawaiian foods as well as other ethnic dishes. This mentorship experience provides an excellent means for students to experiment and be creative.

Hawaiian Saddle-making

Bronson Fuertes

The Mexican vaqueros brought saddles with them when they arrived on the islands as ranch hands and to help teach the principles of cattle ranching. This led to the adaptations of the saddle by na paniolo. Hawaiian saddle making have been an important part of the cattle industry on the Big Island for many years. Students in this mentoring project will construct an authentic saddle in the *Noho Uof Awe`Awe* style.

Sustainable Gardening

Lehua Matsuda

Traditional Hawaiian methods of plant propagation are only now becoming fully understood by today's modern plant producers. Students will learn to combine traditional planting techniques with current plant technology to create sustainable, marketable products. The techniques that students will learn include propagation by cultures, air-layering, grafting, and seedlings.

Traditional Taro Farming

Bert Kanoa

In Ancient times in North Kohala, wet, dryland, and forest taro was intensively cultivated. Taro holds an important role in our culture through its mythological origin as well as a belief that taro is superior to any other starch. Students in this program will re-cultivate taro in idle areas that were once farmed over a 100 years ago and will produce food products associated with taro.

Tradition of Hula

Kaui Nakamura

The language of hula tells a special story through dance and chant. More than learn to dance hula, students of this mentor group will explore the rich traditions and history associated with hula. Students will explore the use of instruments and study the different forms of hula-both traditional and ancient.

Aquatic Resources

Dennis Matsuda

In ancient times fisherman of the Ahupua'a provided fish, shellfish, seaweed and other aquatic foods for their villages. In doing this, they had the ability to reasonably predict the weather patterns and ocean currents while being connected to mother nature. Students will learn ancient practices as well as modern technology in aquatic resource management.

Machinery:

Michael Salvador

Performing Preventive Maintenance on your machine increases it's durability. Students learn hands on results-driven task in understanding basic systems in mechanical, electrical, and hydraulics. Students service small engines including lawnmowers, string trimmers, chainsaws, and ATV's.

Journalism:

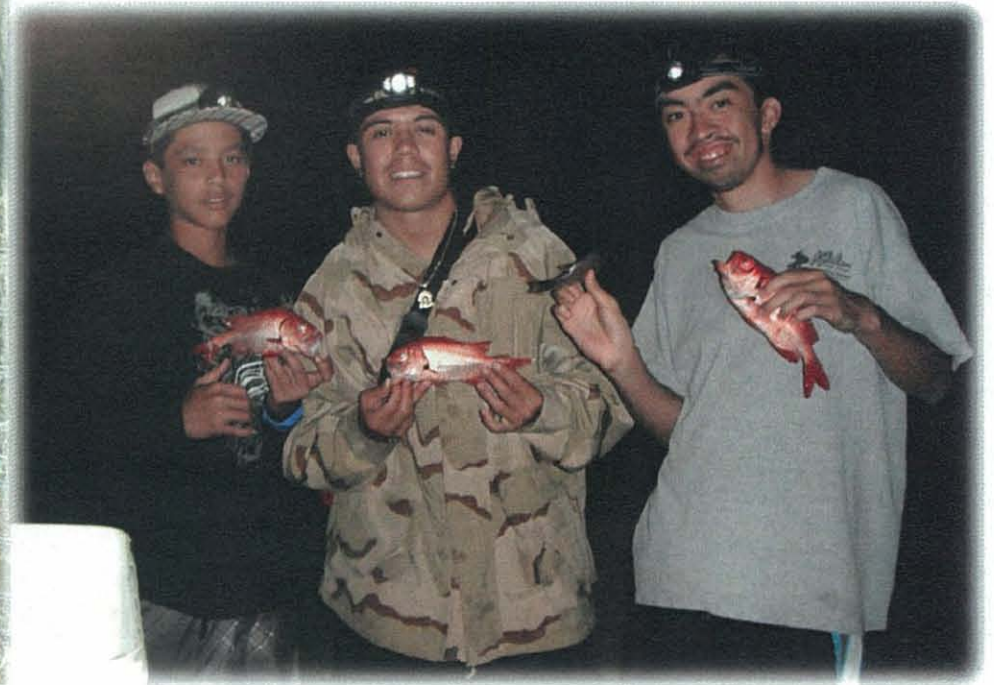
Jessica Brown

Journalism mentorship consists of Kohala High School's AVID (Advancement Via Individual Determination) class as well as a few other students. AVID is a program brought to Kohala through Ka Hana No`eau that helps to prepare students for college through rigorous writing, inquiry, collaboration, and reading strategies and activities. Ka Hana No`eau's journalism mentorship looks to incorporate AVID strategies and report on all the happenings within Ka Hana No`eau. Students will participate with the other mentorship groups and give first hand accounts of all the activities and projects of each group. They will tell the story of each mentorship group, as well as Ka Hana No`eau as a whole, through interviews, pictures, videos, and experiences. The journalism mentees will update the website weekly with articles, pictures, and slideshows as well as upcoming events.

Animal Husbandry



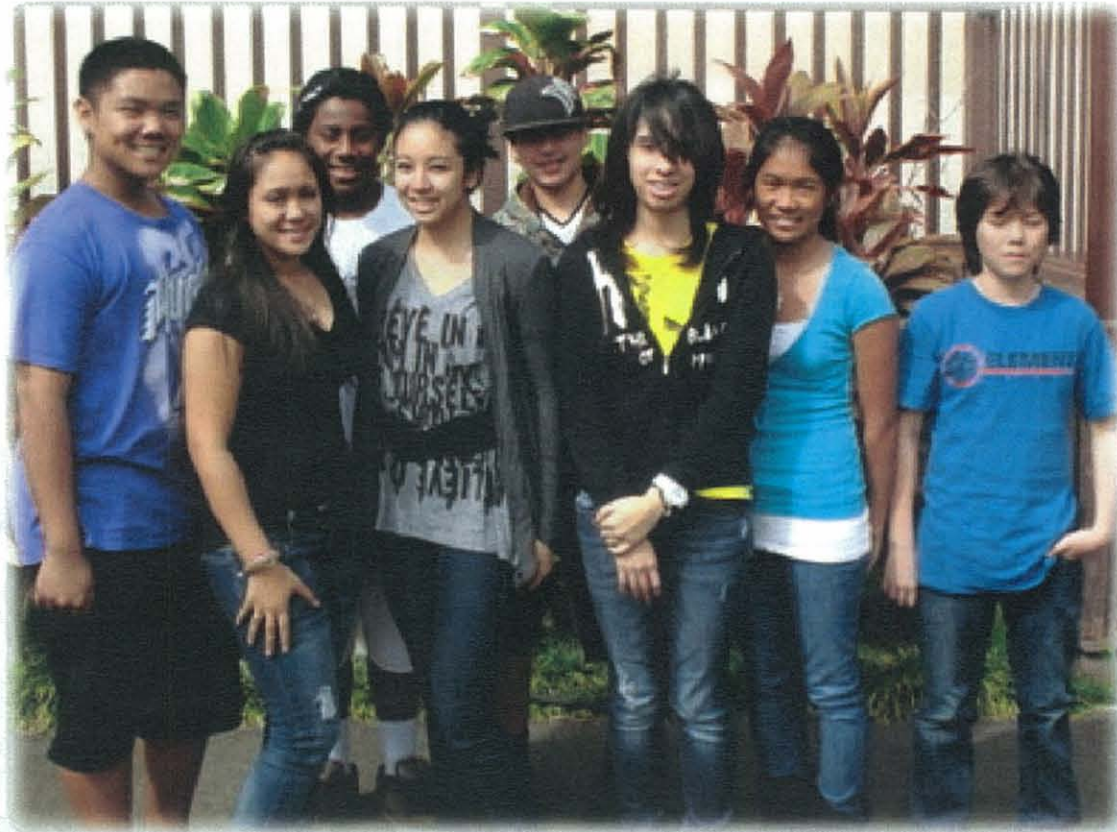
Aquatic Resources



Culinary Arts



Journalism



Small Engines Preventive Maintenance



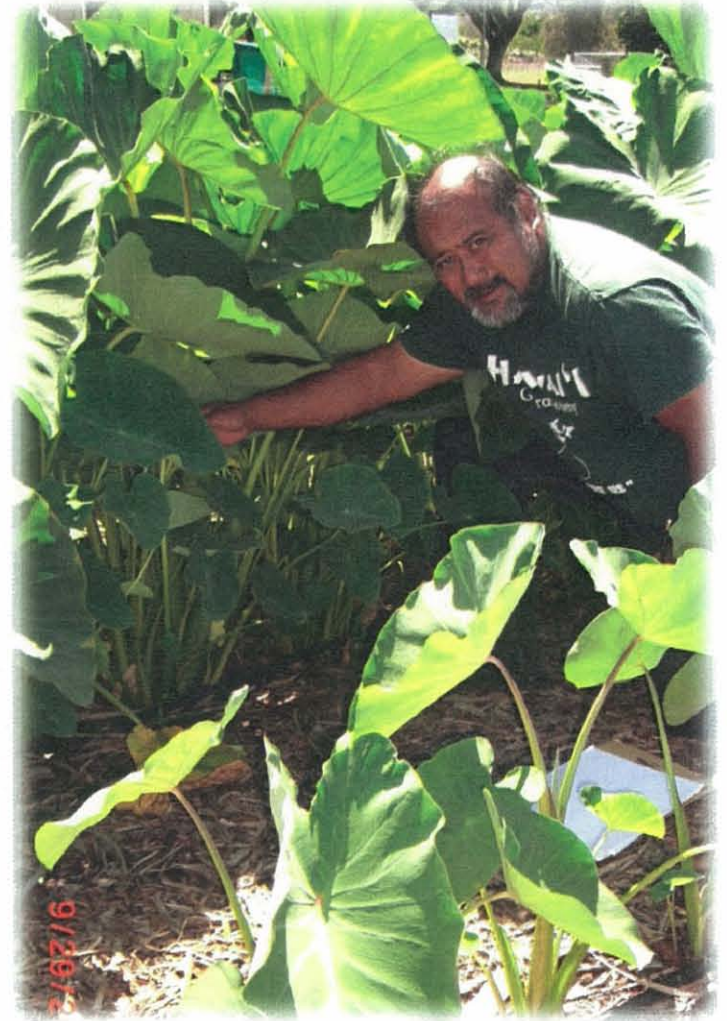
Saddle-making



Sustainable Gardening



Taro Farming



Please join us.

We are dedicated to identifying, publicizing, and advocating for environmental preservation and restoration issues critical to the world at national, state, and local levels.

How can you help?

Subscribe to our website's blog.

Join our mailing list.

Share our posts and action alerts with your online and offline network of friends.

Commit to contacting your representatives whenever important legislation is in process.

Donate all you can. We have a lot of work ahead of us, and the Caucus has administrative, publicity, educational, and advocacy costs. We could really use your help.

Please send a donation check to Environmental Caucus of the DPH
c/o Democratic State Headquarters
1050 Ala Moana Blvd, D26
Honolulu, HI 96814

(808) 596-2980

• *****

• Mahalo

• For info on the Food Sustainability and Farm Security committee contact: Juanita Kawamoto
Sub committee Chair @ 330-6224

**Place
Stamp
Here**

**Environmental Caucus of the DPH
Democratic State Headquarters
1050 Ala Moana Blvd, D26
Honolulu, HI 96814**

To:



Aloha
from the
**Environmental
Caucus of the
Democratic
Party of Hawai'i**



The Environmental Caucus's 2011 Platform*



1. Improve and fund Hawaii's quarantine inspection systems, in order to protect Hawai'i from the dangers of invasive species. It is better to turn our enemies back at the gate than to fight them once they are here.

2. Establish a 2000-foot shoreline setback on all Big Island state land from Ulupo Point to Volcanoes National Park. This setback will protect the historic Ala Kahakai Trail and preserve public access to the coast.



3. Banning/Managing plastic bags and Styrofoam containers throughout the State of Hawai'i, while not weakening the current neighbor Island plastic bag bans on Maui and Kaua'i.

4. Support legislation that creates a smart power distribution grid, designed to enhance and facilitate the delivery of clean and renewable energy resources throughout Hawai'i.

5. Reduce automobile use by making pedestrian and bicycle travel integral transportation modes within public rights of way, in accordance with HRS 264-20.5; Act 54 of Legislative Session 2009.

6. Ensure full funding of Clean Energy Investments from Barrel Tax (HB 2421).



7. Support the creation of School Gardens/Farms and Garden Educators who will instruct in the Agricultural Sciences/STEM and nutritional education to improve the health of our children and insure future food sustainability for Hawai'i.



8. Support legislation requiring the DLNR and DOA to improve and expand the availability of long term agricultural leases favorable to small farms and local agricultural enterprises, in order to improve local small farm investments in long-term food sustainability.

9. Resolve to study and fund an Agribusiness Cooperative Program, designed to empower local farmer distribution to large retail establishments, and develop local feed mills in order to lower farm costs and minimize the carbon footprint of current feed imports.

*In addition to this platform, the Environmental Caucus of the Democratic Party of Hawai'i supports all Environmental Resolutions passed at the 2010 Hawai'i State Democratic Convention. To read all 2010 Democratic Convention Environmental Resolutions, please visit the Convention 2010 Environmental Resolutions Link on our website.