



# Advancing Hawaii’s Farming Communities Through Applied Research, Education and Collaborative Partnerships

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Hawaii is the most geographically isolated population in the world. It is situated in the middle of the Pacific Ocean vulnerable to natural and economic disasters. Increased food self-sufficiency and security is a priority for an island state which relies on 85-90% of imports as its primary food source (Loke and Leung, 2008).

Based on the 2012 USDA Census of Hawaii Agriculture, there are currently 7,000 farms in the State of Hawaii. Sixty-three percent of farms in Hawaii are less than 10 acres in size with 88% of total farms operating on less than 50 acres (Fig. 1 and 2). Approximately 92% of Hawaii’s farms are considered small family farms (based on national category descriptions).

Agriculture in Hawaii that was once dominated by the sugar and pineapple industry has shifted towards a diversified agricultural system. Small acreage farms (less than 50 acres) now account for 88% of Hawaii’s agriculture producers. There has been an increase in new, beginning and/or immigrant farmers with little to no experience in sustainable crop production. Contrary to mainland cropping systems, Hawaii farmers have multiple and concurrent, year-round cropping systems. Majority of Hawaii’s (88%) farmers made less than \$50,000 in sales and contributed collectively less than 9% to the total statewide sales in 2012. The remaining 12% of producers contributed to 91% of total sales (Fig. 3, 4).

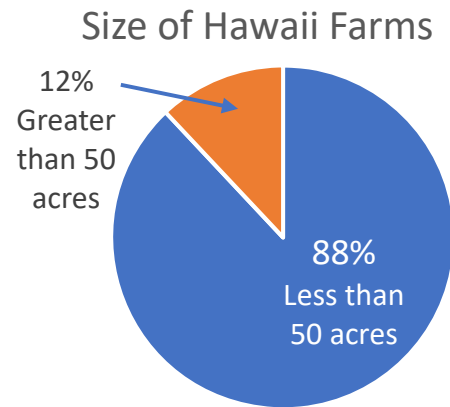


Fig. 1. Distribution on sizes of Hawaii farms (NASS, 2012 Census of Agriculture).

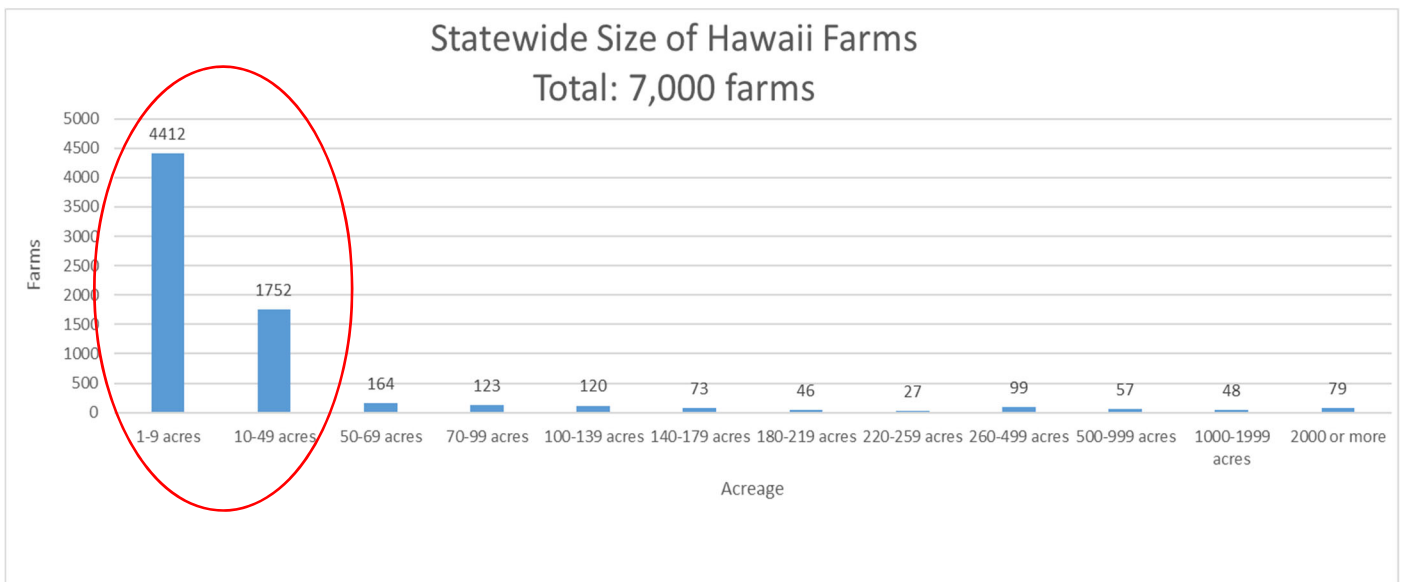


Fig. 2. Out of 7000 farms in Hawaii, 6164 farms are smaller than 50 acres (NASS, 2012 Census of Agriculture).

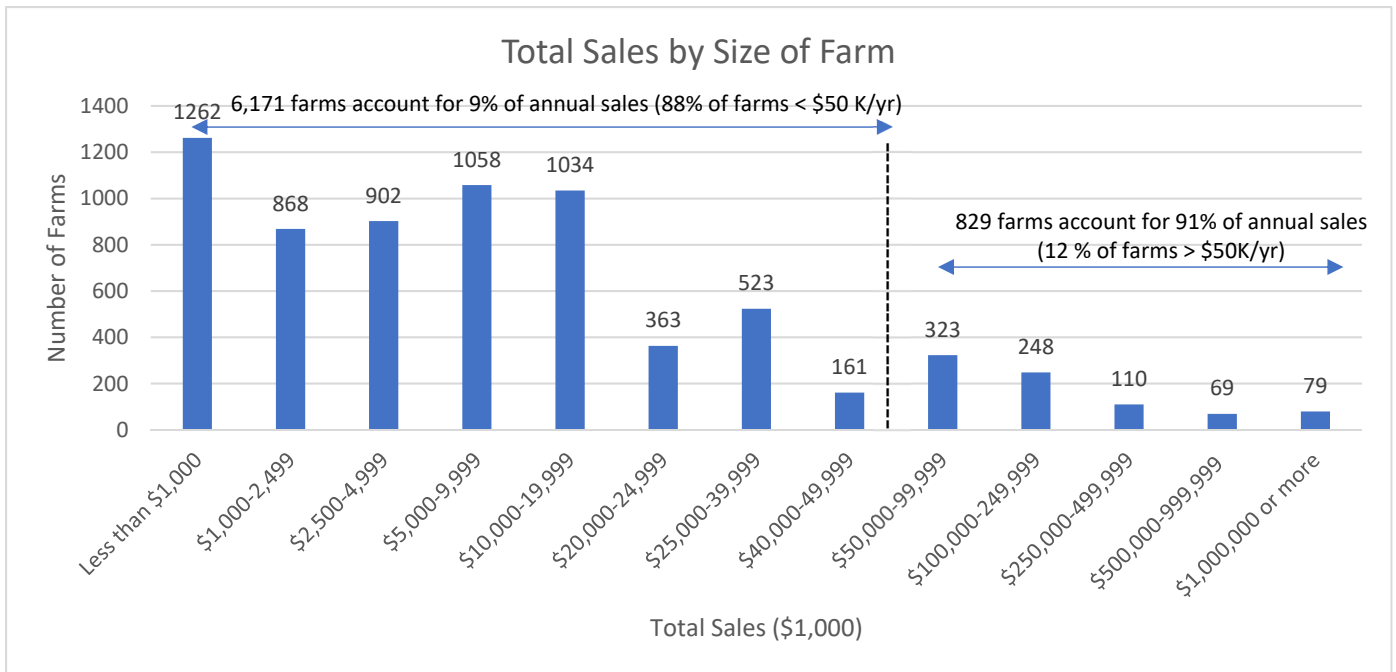


Fig. 3. Distribution of Hawaii farms by total sales (NASS, 2012 Census of Agriculture).

Fifty-two percent of Hawaii’s farmers farm as their primary occupation. Since 1978, the average age of farmers are on the rise. The average age of farmers is now 60.4 years of age. Thirty-six percent of Hawaii’s farm operators are women which is higher than the national average. While total farms in Hawaii are generally increasing, so is the cost of doing business in Hawaii. Fertilizer cost are decreasing but chemical expenses are generally on the rise. The number of farms which reported treating for insects, weeds, and diseases have also risen over time.

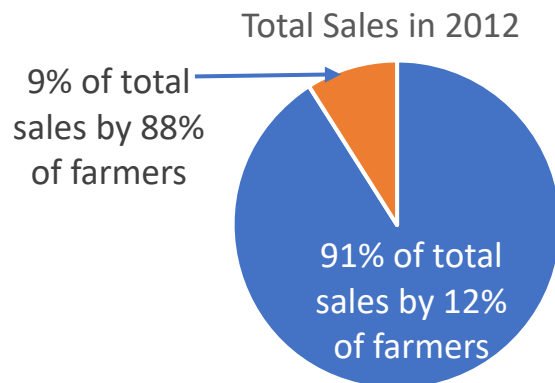


Fig. 4. Distribution of farms based on contribution to total farm sales of Hawaii (NASS, 2012 Census of Agriculture).

### New Trends of Farming in Hawaii

A change in Hawaii’s agriculture industry has prompted an ongoing need to increase awareness about the environmental and economic impacts of conventional farming systems. Farmers need to deal with multi-facets crop production challenges even just within managing different types of pests (Fig. 5). Interestingly, an increase in number of farms in Hawaii since 2002 is not accompanied by an increase in the number of farms practicing different chemical pest management (Fig. 5), indicating that many new farming businesses are into non-chemical based pest management strategies. There is an ongoing need to develop efficient and sustainable agricultural practices to prepare for the long-term sustainability of local agribusiness and diversified farm communities in Hawaii.

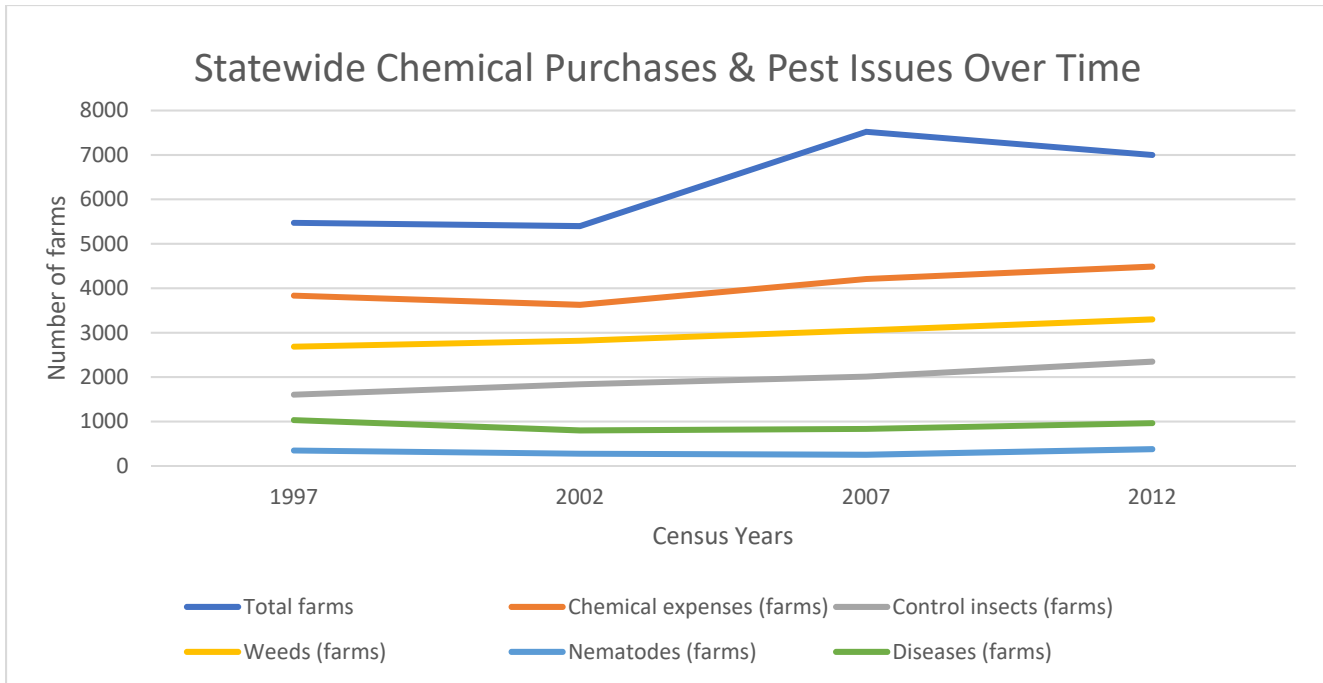


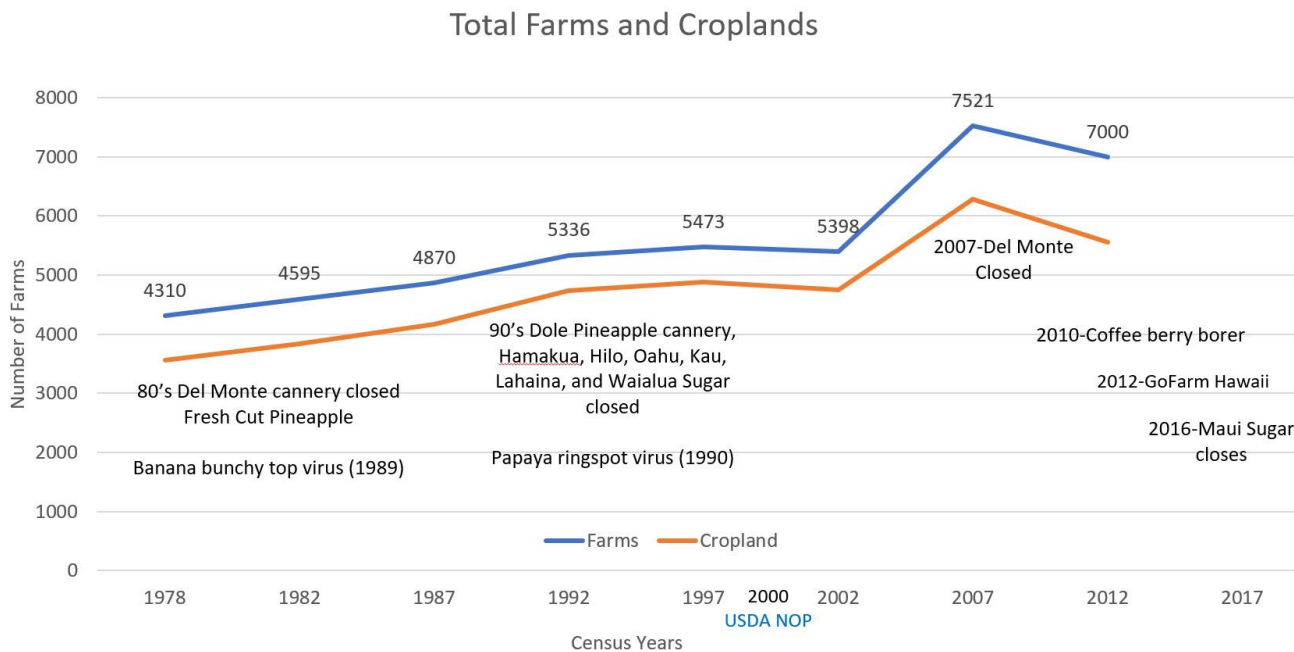
Fig. 5. Numbers of farms in Hawaii that practice different pest management (NASS, 2012 Census of Agriculture).

The Sustainable and Organic Agriculture Program (SOAP) at University of Hawaii College of Tropical Agriculture and Human Resources (UH CTAHR) is committed to fulfilling the Land Grant University’s purpose of provide instruction, scientific research, and outreach. SOAP utilizes the human resources of CTAHR Cooperative Extension agents, collaborative partnerships, and various forms of traditional and distance education technologies to transfer research and technology discoveries. We aim to better prepare farmers to deal with multi-facets crop production needs such that they can utilize modern technologies best suited to meet their farming needs. SOAP has established a solid reputation for delivering timely, useful, quality outreach and education to Hawaii’s producers. However, many growers in Hawaii remain underserved. There is a need to expand SOAP’s educational programs both within current targeted communities, and into remote and underserved areas.

### Sustainable Agriculture-Hawaiian Style

Sustainable agriculture is the production of food, fuel, fiber and floral crops utilizing agricultural practices that are ecologically based which focuses on the utilization of multi-disciplinary crop production practices and principles. Sustainable agriculture practices include practices such as conservation tillage, cover cropping, grazing, crop, livestock, and landscape diversity, community vitality, marketing, ecological based pest management, nutrient management, on farm energy conservation and production, whole farm management approach, etc. (WSARE, 2010). The primary goal of sustainable agriculture is to retain or enhance production yields without causing a negative impact to the environment. A common misconception in Hawaii is that conventional farmers which use synthetic chemicals or genetic modification technologies do not practice sustainable agriculture concept. When in fact, many producers who utilize synthetic inputs are strong advocates for

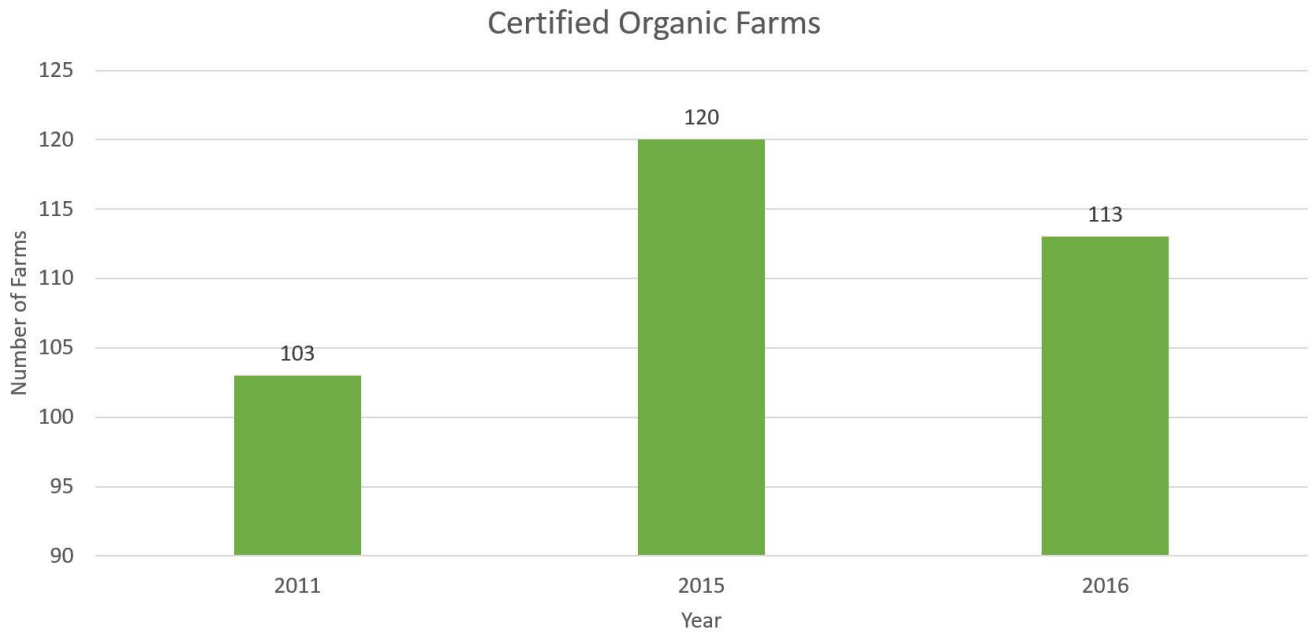
environmental stewardship on sizable acreage. Since the departure or closure of several plantation businesses, agriculture in Hawaii is experiencing a shift to a diversified but small-scale farming system especially after the inception of USDA National Organic Program in 2000 (Fig. 6). Number of farms in Hawaii peaked around 2007 but are slowly in decline (Fig. 6). However, with the closure of Maui sugar plantation in 2016 and the establishment of a statewide new farmers’ training program, GoFarm Hawaii, in 2012 we are anticipating an increase in the number of farms in the next census.



NASS, 2012 Census of Agriculture: -661 million dollar industry

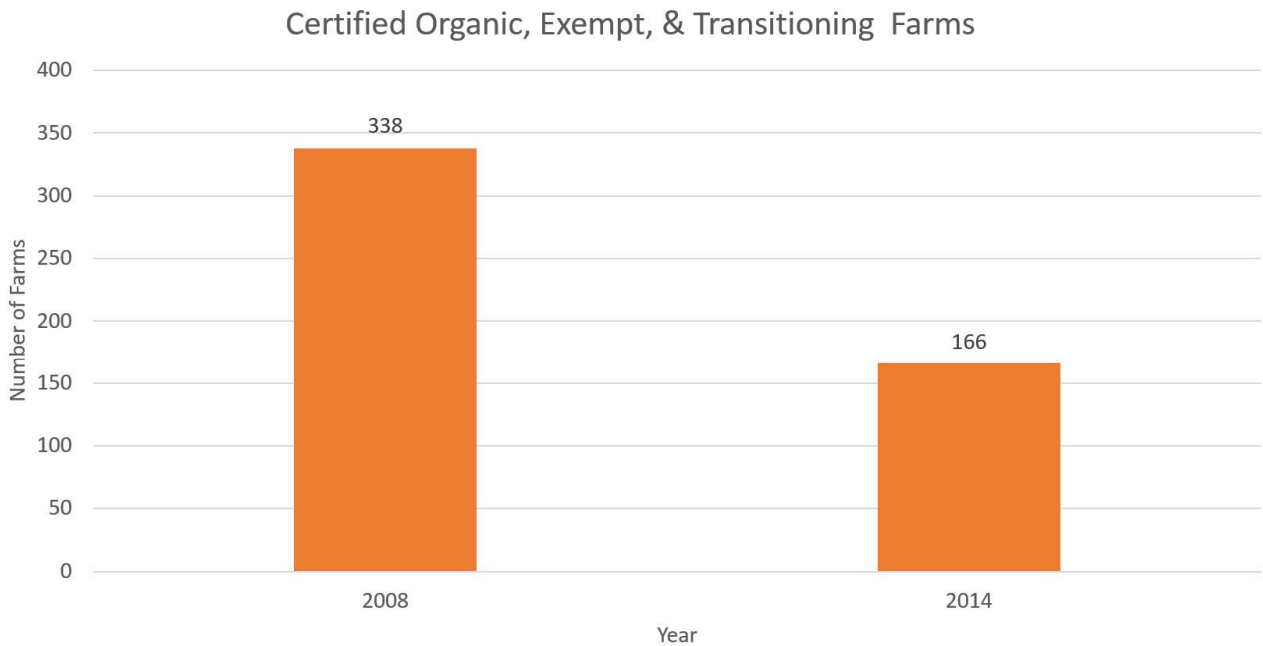
Fig. 6. Numbers of total farms in Hawaii over time (NASS, 2012 Census of Agriculture).

Across Hawaii, farmers are experimenting with diverse ethnic crops, innovative farming systems, and developing creative revenue streams to enhance or advance agricultural pathways that are sustainable, economically viable and beneficial to the social and environmental well-being of the rural communities of family farms they live in. The 2007 Census of Agriculture showed a sudden escalating increase in certified organic farms (536 farms), followed by a steep decline thereafter (Fig. 7). However, upon further investigation we found that the number of organic farms cited in 2007 was not comparable to the 2011, 2015, and 2016 Certified Organic Survey data as they were tabulated from a different series of questions. Small organic farms and businesses (gross agricultural income from organic sales less than \$5,000 per year) as well as farmers transitioning into organics are classified as “Certified Organic, Exempt and Transitioning” (Fig. 8). In either case, there is a decline in numbers of “Certified Organic” or Certified Organic, Exempt and Transitioning” after 2008 in Hawaii. Although certification is not required for these “exempt” or “excluded” operations, they may pursue voluntary organic certification. Exempt and excluded operations still need to comply with specific sections of the USDA organic regulations (USDA Agricultural Marketing Service, 2018). There is an ongoing need to help farmers in Hawaii that are interested in obtaining organic certification as there are new federal and state programs that support the adoption and use of organic practices in the US.



USDA NASS  
 Organic counts may not always be comparable as they may be from a different series of questions  
 Refer to the text (Census of Agriculture) for more information  
 USDA NOP established in 2000

**\*\* Fig. 7. Numbers of certified organic farms in Hawaii (NASS, Certified Organic Survey 2016).**



USDA NASS  
 Organic counts may not always be comparable as they may be from a different series of questions  
 Refer to the text (Census of Agriculture) for more information

**\*\* Figure 8. Number of certified and exempt organic farms in Hawaii (NASS, Certified Organic Survey 2014).**

CTAHR's Sustainable and Organic Agriculture Program provides statewide programs that will simultaneously address three important challenges for farms of all sizes: 1) achieving profitable farm income; 2) promoting environmental stewardship; and 3) enhancing resilient and prosperous family farms or communities.

### **Challenges of Sustainable and Organic Agriculture in Hawaii**

Many issues are affecting the expansion of Hawaii's diversified agriculture industry, for examples:

- Hawaii's tropical climate provides an ideal haven for insects and plant diseases. Despite strict quarantine, new pests enter into Hawaii every year causing significant economic losses statewide.
- New government regulations on environmental impacts, food safety, farm dwelling, worker protection, etc. are being enforced to minimize human and environmental risk associated with agricultural crop production.
- Limited land availability, repetitive mono-cropping system and the lack of organic matter replenishment have resulted in nutrient depletion in many Hawaii's soils. For an island state, fertilizer applications and soil health must be monitored on a regular basis to minimize erosion, nutrient leach, and ground water and ocean contamination.
- Large scale producers have higher cost associated with responding to existing and impending regulations such as food safety, worker protection, labor, housing, occupational safety, etc.
- Small acreage farms are vulnerable to low wholesale prices and saturated market niches. They are also at a higher economic risk due to the elevating costs of land, water, labor, mechanization, and farm inputs.
- Governor Ige's Sustainable Hawaii Initiative Goal to double our food supply lacks sufficient background information on our current food supply inventory and projections. The forecasted FY2019 Executive Supplemental Budget by the Department of Budget and Finance (S/H, 2017) shows that 0.4% of the statewide operating budget total will be allocated to the Department of Agriculture,
- USDA National Institute for Food and Agriculture (NIFA) provides funding to support the transition of farms toward organic production via the Organic Transition Program (OTP). Policy makers in Hawaii passed Act 258, (2017) which establishes an Organic Food Production Tax Credit for Hawaii's farmers, ranchers and producers. Qualified expenses for the production and expenses related to organic food production will be credited up to \$50,000. Tax credits for farming could be expanded to the greater population of food producers in Hawaii beyond the organic industry. Credits could serve as an incentive similar to the credits provided to the film industry to level the playing field (Yamaguchi, 2018) for businesses to operate in Hawaii and compete on the global market.
- Local producers are especially vulnerable to natural disasters and need site-specific, sustainable farming solutions to strengthen their agricultural resiliency. For example, the massive Kilauea Volcano eruption in May 2018 covered some important crop lands in southern Hawaii island. Much of Hawaii island's papaya industry was affected. Supports are needed to help these industries to rebound.
- Hawaii has become the first U.S. state to ban the use of pesticides containing chlorpyrifos, a widely-used chemical linked to severe developmental delays in children. Under the new law, pesticides containing chlorpyrifos will be prohibited across Hawaii starting on Jan. 1, 2019. The new law also prohibits the spraying of pesticides within 100 feet of schools during normal school

hours. This is especially challenging on Oahu where residential areas are often close to farm communities.

- Immigrant farmers bring along their farming techniques, experiences and ethnic foods from their countries to Hawaii. Special extension and outreach programs crafted for specific ethnic group are often needed to help immigrant farmers to thrive or accommodate to different environment, country and government regulations. Due to their remote locations, lack of trust in government programs, and need to stay close to their farming area, many of these under represented farmers would need more intense outreach and support from CTAHR.

## **Prospects of CTAHR SOAP Program to Advance Hawaii's Sustainable and Diversified Ag**

Agricultural research that applies to the continental United States is not always applicable to Hawaii's tropical agroecosystems. SOAP's strength lies in its ability to conduct localized, applied research and field demonstrations to supplement its outreach efforts in providing alternatives and science-based solutions to emerging and recurring issues. Expansion of diversified and sustainable agriculture in Hawaii requires educational support which SOAP can provide.

***“Food security*** exists when ***all people, at all times***, have physical and economical access to sufficient, safe and nutritious food to meet their dietary needs and food preferences for an active and healthy life” (Kent, 2008). There are approximately 1.4 million people in Hawaii with over half a million housing units (S/H DBED, 2017). Currently, approximately 17% of Hawaii residents live in poverty, higher than the national poverty average of 15.1% (U.S. Census Bureau, 2016). Increased food self-sufficiency and security with less reliance on imported inputs is a priority for Hawaii with 88% of its primary food source imported (Loke and Leung, 2008). Hawaii climate and rainfall pattern allows for year-round crop production. As a result, Hawaii has great agriculture production potential. Supporting the state's importation replacement program with increased sustainable agriculture adoption would result in increased economic, social and environmental advances and the development of resilient rural communities throughout Hawaii. Simply replacement of 10% of the current imports would result in \$188 million in sales, \$6 million in state tax revenues and 2,300 jobs (Leung and Loke, 2008).

However, funding to support the growth and adoption of sustainable agricultural practices across the state remains limited. It is critical for SOAP to seek support from extramural grants and other funding sources. Over the years, expanded partnerships across UH-CTAHR departments, linking CTAHR with community colleges, state and federal governments, non-governmental organizations, and local agricultural consultants had accelerated our efforts to enhance adoption of sustainable agriculture in tropical ecosystems and promote diversified agriculture in Hawaii. Stronger alliances with our partners at community colleges, public and private agencies also have increase adoption rates of Hawaii new and beginning farmer towards sustainable agriculture practices.

*After review of the current state of agriculture in Hawaii, SOAP educational initiatives are focused on:* 1) supporting and ensuring all producers are compliant with government regulations; 2) reduce the cost of farm inputs; 3) increase the adoption of reduced risk crop protection strategies; 4) scaling up the productivity and economic viability of new and small acreage producers through partnerships with new farmer training program and agribusiness (public and private) organizations, 5) replace imports by offering local crop production technologies, and revenue generating agribusinesses; 6) recruit young professionals into agriculture through internship and other work



opportunities; 7) promote local food systems with the “Buy Local, it Matters” campaign to heighten local food demands; and 8) advance backyard and urban food crop production.



Fig. 9. CTAHR Sustainable and Organic Agriculture Program initiated various farm demonstrations and outreach education initiatives ranging from protected agriculture, to promoting the planting of insectary plants, to recycling local organic fertilizers to advance Hawaiian food crop production.

For example, if we can help the 6,171 farmers increase their annual sales above \$50,000 a year through educational supports for farmers and their families, establish connections from farm to table, or building of shared infrastructure, etc., we could increase their economic contribution to Hawaii’s diversified agriculture industry by 25% (Table 1). Further, obtaining a better understanding of the social and economic impact of: backyard and urban garden food systems; food grown on public lands; or growing areas that are not covered by the Census of Agriculture would go a long way towards understanding the impact these unaccounted-for food systems have on advancing food security in our islands.

Table 1. Estimate of economic contribution if helping small-scale farmers to achieve annual sale of \$50K in Hawaii.

	Current	Estimate increase
Number of farms	6171	6171
Percent of farmers	88%	88%
Annual sales (\$1,000)	57,521	308,550
Percent of total sales	9%	34%
Average sales/ farm	9,321	50,000
**Assuming all other variables remain the same		
2012 Census of Agriculture, Value of Sales		
\$57,521,000 (sales from 6,171 farms under 50K) + \$603,825,000 (remaining farms) = \$661,346,000 = \$661 million-dollar industry		
Increased sales from the 6,171 farms with sales under 50K: \$308,550,000		
<u>(6,171*50K) + \$603,825,000 (remaining farms) = \$912,375,000</u>		

Overall goal of SOAP is to elevate the volume and improve the quality and consistency of Hawaiian grown commodities under sustainable agriculture practices in Hawaii. We hope our research and outreach efforts continues to provide cost savings to all agriculture producers via field research transfer, reduce importation and make strides in advancing food self-sufficiency as it could ultimately result in economic, social and environmental benefits to the State of Hawaii.



## Acknowledgements

Census data and collection methods can change over time. The census is conducted every 5 years. The authors would like to thank USDA NASS staff for their assistance with the census information.

### **\*\*Note on Organic Data from USDA NASS:**

“The 2008 and 2014 organic surveys published all organic data (certified, exempt, and transitioning), whereas, the 2011, 2015, and 2016 Certified Organic Surveys published only certified organic data. Each survey’s results reflect the industry as of the time the mail list was created and for the given production year. Data users should allow for differences when comparing the data between the surveys including reference periods, organic definitions, and weighting methodologies. There are multiple survey and statistical methodology differences between the two surveys: The 2016 Certified Organic Survey conducted by NASS is a complete census of all known certified organic producers in the United States. The data released from this survey are self-reported and includes only certified producers that had production in the 2016 calendar year. The methodology for counting the same farm or ranch with multiple locations may be different between NASS and AMS. While these may be counted as separate entities by AMS, NASS may account for them as one single entity with separate locations.”

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