Hawai‘i Island Agriculture and Food System Study

Final Report

July 2021

Prepared by Hāmākua Institute

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Acknowledgements

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Acronyms Used

CoronaVirus Disease - 19 (COVID-19)
County of Hawaiʻi (COH)
Community Supported Agriculture (CSA)
College of Agriculture, Forestry, and Natural Resource Management (CAFNRM)
College of Tropical Agriculture and Human Resources (CTAHR)
Department of Business, Economic Development and Transportation (DBEDT)
Department of Education (DOE)
Department of Health (DOH)
Department of Land and Natural Resources (DLNR)
General Excise Tax (GET)
Good Agricultural Practices (GAP)
Hawaiʻi Administrative Rules (HAR)
Hawaiʻi Community College (HCC)
Hawaiʻi Department of Agriculture (HDOA)
Hawaiʻi Farmers Union United (HFUU)
Hawaiʻi Foodservice Alliance (HFA)
Hawaiʻi Institute of Pacific (HIP)
Hawaiʻi Island Agriculture Partnership (HIAP)
Hawaiʻi Island Food Alliance (HIFA)
Hawaiʻi Public Health Institute (HIPHI)
Hawaiʻi Island Meat Cooperative (HIMC)
Hawaiʻi Master Food Preservers (HMFP)
Hawaiʻi Tropical Fruit Growers (HTFG)
Hawaiʻi Revised Statutes (HRS)
United States Department of Agriculture (USDA)
National Agricultural Statistical Service (NASS)
Hawaiʻi Small Business Development Center (SBDC)
United States Department of Agriculture- Farm Service Agency (USDA-FSA)
University of Hawaiʻi West Oʻahu (UHWO)
University of Hawaiʻi at Hilo (UHH)
University of Hawaiʻi at Mānoa (UHM)
Women Organizing for Change in Agriculture and Natural Resource Management (WOCAN)

Citations

2. "What is the Food System?", Oxford Martin Programme on the Future of Food, University of Oxford, accessed June 30, 2021, https://www.futureoffood.ox.ac.uk/what-food-system.
3. Bower, Jim, Ron Doetch, Michael Fields, and Steve Stevenson, "Tiers of the Food System: A New Way of Thinking About Local and Regional Food," (Madison: UW-Madison Center for Integrated Agricultural Systems, Sept 1, 2010), https://cias.wisc.edu/wp-content/uploads/sites/194/2010/09/tiers082610lowres1.pdf.
5. Melrose, Jeffrey, Ryan Perroy and Sylvana Cares, "State Agricultural Land Use Baseline 2015," (Hilo: Hawaiʻi Department of Agriculture, 2016), https://hdoa.hawaii.gov/wp-content/uploads/2016/02/StateAgLandUseBaseline2015.pdf.
6. Perroy, Ryan and Eszter Collier, "2020 Update to the Hawaii Statewide Agricultural Land Use Baseline: Oʻahu, Hawaiʻi, and Kauaʻi," (Hilo: Hawaiʻi Department of Agriculture, 2020), https://hdoa.hawaii.gov/wp-content/uploads/2021/04/2020_Update_Ag_Baseline_Oahu_Hawaii_Kauai_v3.pdf.
10. *cf.* Kent Fleming, "Value-Added Strategies" (2003); and Craig Elevitch and Ken Love, "Adding Value to Locally Grown Crops in Hawaiʻi" (2013).

Executive Summary

Purpose

The Hawai‘i Island Agriculture and Food System Study began as a way of understanding and improving Hawai’i Island’s agricultural market system and local food supply to enhance the health and wellbeing of the island’s community. To this end, the Hāmākua Institute partnered with the Hawai‘i Island Agriculture Partnership (HIAP) and the Hawai‘i Island Food Alliance (HIFA) to co-conduct this study for determining pathways to achieve positive, system-wide change.

This study is meant to provide a map of focus areas for collective action by HIAP, HIFA, and their partners. It is meant to be more about understanding the breadth of the system than the details of individual components. From this starting point, HIAP will drive recommended actions forward, focusing first on actions that hold the potential to spark system-wide change. It will also initiate more detailed analyses of individual system components and strategic product value chains, continuously building a repository of agriculture and food data for use by all stakeholders to collectively facilitate changes that make sustainable improvements to the island’s agriculture and food system.

Methods

For the purposes of this study, Hawai‘i Island’s agriculture and food system is defined as the set of people, businesses, and organizations working together as parts of an interconnected and interdependent network for generating agricultural livelihoods on Hawai‘i Island and ensuring an adequate and equitable supply of food to its population.

From a systems perspective, key assumptions for this study included:

- The agriculture and food spaces and activities on Hawai‘i Island can be characterized and viewed as one system;
- This system, like all systems, has nested subsystems within it; and
- There are useful lenses available through which we can view and understand these systems.

The study employed *systems thinking* to facilitate a holistic understanding of the Agriculture and Food system in Hawai‘i and its components’ functions and associations, in order to uncover underlying, root-level constraints to growth. It applied a *collective impact* approach, which requires active collaborative participation by stakeholders through multiple study phases, from planning through to recommended actions. To this end, government agents and administrators, businesses, farmers, ranchers, planners, academics, agricultural specialists, non-profits, educators, and others working in the island’s agriculture and food space informed the study process, supported data collection efforts, and proposed and evaluated recommendations.

The collaborative process and transparency throughout the study process built cohesion and trust among participants. Collaborative analysis and recommendation-building allowed participants to think with others around issues plaguing Hawai‘i’s agriculture and food system. In the shared responsibility to identify issues in the system and prioritize solutions, HIAP and HIFA members, along with other key stakeholders, built shared ownership of the study’s conclusions and recommended actions.

Major Findings

Small farms have been a fixture in Hawai‘i and constitute the majority of Hawai’i Island farms, providing much of the diverse produce sold at local markets. Yet data indicates most small farms make very little income, and larger farms and operations dominate the agricultural market space.

This study indicates barriers to small farm success exist along the entire agricultural value chain, from production through to market. They include:

- Limited accessibility of inputs--especially land, labor, and capital;
- Inadequate middle value chain operations geared toward small farms, such as aggregation, storage, and distribution;
- A lack of food processing infrastructure;
- Sparse data on markets and market opportunities for small farms; and
- A lack of connection between producer and consumer.

There is also a wider eco-system of information, infrastructure, policies, laws, and norms that affect the island’s agricultural market system and underpin strong system performance. By looking broadly at this eco-system and how it functions, the study’s participants determined actions that could not only solve for individual barriers, but serve as leverage to tip the agriculture and food system toward larger-scale improvements. The resulting recommended actions are summarized below.

Recommended Actions

With evaluation of the system and its nested subsystems, participants identified key findings that could drive recommended actions moving forward, some of which are highlighted below. A comprehensive list of recommendations and action partners can be found in the report.

- Study team members gave a high priority to building capacity and opportunity in the “messy middle” of the island’s agricultural value chain functions of processing, transportation, aggregation, storage, and distribution. They recognized that shared public-private efforts to increase cooperation and coordination within these value chain functions represents impactful means of increasing small farm viability and stimulating increased production on-island.

- Conducting this study during the COVID-19 pandemic brought a strong focus to the importance of food banks and the efficiency of food relief efforts in times of crisis. Increasing food storage and distribution capacity, maintaining funding, and identifying infrastructure for these efforts are considered key actions toward regular food relief programs and emergency preparedness.

- A key takeaway from the study process is that the demand for cooperation across the island’s agriculture and food system clearly exceeds the supply of available mechanisms. Many efforts to develop the sector are siloed, lacking coordination, and synergy. HIAP seeks to establish multi-stakeholder teams and committees to help existing cooperatives, organizations, and networks to work together towards shared goals for improving the system in ways that avoid duplication and increase synergies. Moreover, HIAP is set to serve as a platform where individuals and organizations can coordinate with others toward shared goals.

- The study revealed there are already considerable efforts underway to increase food system education at the primary and secondary level on the island. This is a critical effort and deserves the shared support of all stakeholders as it affects the future food landscape for the entire island. Study team members indicated collaboration between schools and non-profit partners can explore mutually beneficial supports that build school capacity to educate students on nutrition and food systems, encourage and make space for student-led projects in the schools and communities, and increase community support for school gardens.

- The study findings validated HIAP's initial focus on branding and marketing, revealing a strong shared interest in a social marketing campaign promoting agricultural products made on Hawaiʻi Island and identifying the comparative advantages they offer local consumers. Study team members highlighted the growing market demand for agritourism, alongside concerns that tourism needs to be responsible and respectful to local values.

- There is also a recognition that increased marketing efforts are best guided by greater analysis of market demand, which is also needed by farmers to plan production. Stakeholders expressed frustration over the lack of available data on market demand and called for increased market research and value chain analysis.

- Concerns over state and county policies and legislation were discussed in several of the study team meetings. There was broad recognition of the need to change policies by ensuring policymakers are better informed of the full implications of existing or proposed laws on the agriculture and food system.

Conclusions

This study focused on highlighting weaknesses and gaps in the system to better understand underlying barriers to small farm success, and the long-term health and viability of the agriculture and food system on Hawaiʻi Island. However, it does not do justice to the many efforts currently underway to improve the system, many of which provide valuable assistance for existing small scale farmers on the island. These efforts are inspiring and provide useful examples of the energy that currently exists for organizations to work together.

To encourage transformational impact, these efforts must move forward systematically and coherently, in ways that harness the power of coordinated effort towards shared goals of economic success and food resiliency. Introducing mechanisms that lower the barriers to collaboration and coordination within the system can broaden and deepen the impact of each of these partners while sharing effort and responsibility across more parties.

Through its action teams and committees, HIAP is developing some of these new mechanisms, seeking to help more partners work together and build synergies for transformative change. To fulfill this potential of local food resilience and small farm success will take the shared effort of many stakeholders described in this report. Given the cooperation and dedication we have observed among so many people throughout this study, that kind of collaboration not only appears feasible, it feels inevitable.

1. Introduction

The Hawai‘i Island Agriculture and Food System Study started as a response to the need for improving the viability, sustainability, and resilience of Hawai‘i Island‘s agricultural market system, its local food supply, and, ultimately, to enhance the health and wellbeing of the Hawai‘i Island community. To this end, the Hāmākua Institute partnered with the Hawai‘i Island Agriculture Partnership (HIAP) and the Hawai‘i Island Food Alliance (HIFA) to co-conduct the study for determining pathways to increase positive, system-wide change.

The study applied two primary approaches: *systems thinking* and *collective impact*. Systems thinking allows for a deeper, more holistic understanding of social and economic problems by facilitating the understanding of the system as a whole, its components‘ functions and associations, and the uncovering of underlying, root-level constraints to growth. Once problems are identified and understood, collective impact provides a framework for solving those problems through multi-stakeholder, cross-sector coordination and collaboration, a critical practice that allows system-level change to occur. Combining these approaches allowed for critical discussions on existing conditions of the agri-food system and achievable, resourceful solutions to generate consistent and long-term change.

The study consisted of multiple participatory phases including planning, data collection, analysis, and review. Government agents and administrators, businesses, farmers, ranchers, planners, academics, agricultural specialists, non-profits, educators, and others informed the study process and supported data collection efforts. Data collection included:

- **collation and organization of Hawai‘i Island-specific and statewide quantitative data** related to agricultural production, processing, and consumption;
- **collation of maps** generated from stakeholder perspectives of agricultural market and food systems;
- **a review of literatures**, including previous Hawai‘i Island-wide agricultural and food studies; and
- **interview and survey data** with stakeholders related to major aspects of agricultural market systems and food security.

Collaborative analysis with study participants occurred during a series of interconnected discussions, focusing first on mapping the island’s agri-food system, then diving into agricultural value chains and food resiliency topics, and concluding with a final analysis meeting. where conclusions and recommendations were jointly developed by meeting participants.[1] Conclusions and recommended actions were formulated with stakeholders throughout the final analysis workshop and subsequent review.

Collaborative analysis and recommendation-building allowed participants to think with others around issues plaguing Hawai‘i‘s agriculture and food system. By sharing the responsibility to identify issues in the system and prioritize solutions, HIAP and HIFA members built shared ownership of the study’s conclusions and recommended actions.

[1]Decades of available quantitative data and over 120 studies, articles, and plans were utilized to build a framework of the contemporary conditions of the agricultural system in Hawai‘i. 254 total surveys and 50 in-depth interviews added a more intimate portrayal of the experience and effects of the current agrifood system on Hawai‘i agrifood stakeholders and residents. 118 total participants participated in various planning and analysis meetings, from July 2020 through February 2021.

Overall, this study is meant to provide a map of focus areas for collective action by HIAP, HIFA, and their partners. It is meant to be more about understanding the breadth of the system than the details of individual components. From this starting point, HIAP will initiate more detailed analyses of individual system components and strategic product value chains, continuously building a repository of agriculture and food data for use by all stakeholders to collectively facilitate changes that make sustainable improvements to the island's agriculture and food system.

Below is a summary of study findings, conclusions, and recommendations. As was the original intention, the study identifies keystone issues and recommended actions that will inform the strategies of both HIAP and HIFA, helping them to align their plans to improve the viability of Hawai‘i Island's agriculture, the resilience of its food local supply, and the health and wellbeing of the Hawai‘i Island community.

2. Defining and Describing the System

For the purposes of this study, Hawai‘i Island's Agriculture and Food System is defined as the set of people, businesses, and organizations working together as parts of an interconnected and interdependent network for generating agricultural livelihoods on Hawai‘i Island and ensuring an adequate and equitable supply of food to its population.

The study applied systems thinking to better understand the inter-dynamics and interdependencies in the island's agriculture and food system. Applying a systems thinking lens helped identify and explore the underlying forces shaping agricultural markets, supplier relationships, and food resiliency on the island. In this section of the report, these underlying forces are defined and described to help provide a framework of reference for the data, findings, and recommended actions contained throughout this report.

Key assumptions made by the study include:

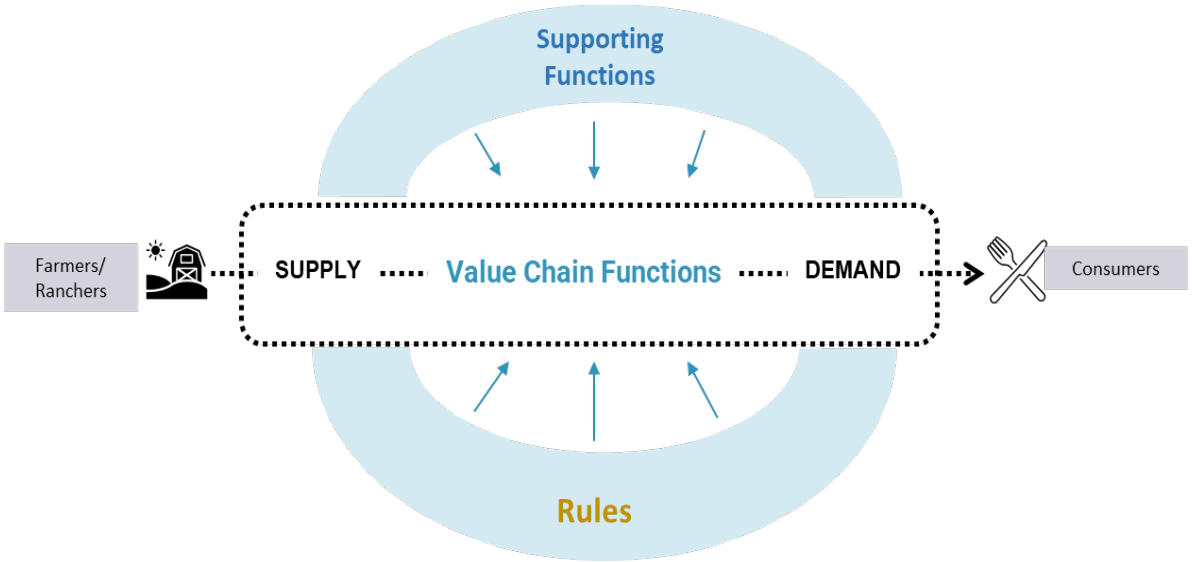
- The agriculture and food sector on Hawai‘i Island can be characterized and viewed as one system;
- This system, like all systems, has nested subsystems within it; and
- There are useful lenses available through which we can view and understand these systems.

Agricultural Market Systems

An agricultural market system is defined as the network of buyers, sellers, and other actors that come together to trade in a given agricultural product or service. The participants in a market system include direct market actors such as producers, buyers, and consumers who drive economic activity in the market as well as indirect market actors such as service providers and policymakers who support and influence market performance. An agricultural market system can be specific to a product (such as coffee, papayas, or dairy) or a cross-cutting sector (finance, labor, or transportation).

The following diagram displays the key components and functions of an agricultural market system. It not only follows the value chain from farmer to consumer, but recognizes the wider eco-system of supporting functions, rules, and stakeholder interests that shape system performance. Each object in the diagram represents a set of data points gathered for the study. The system map forms the framework against which HIAP can organize baseline data, key system performance indicators, and more detailed analysis.

Agricultural Market System Map



Food Systems

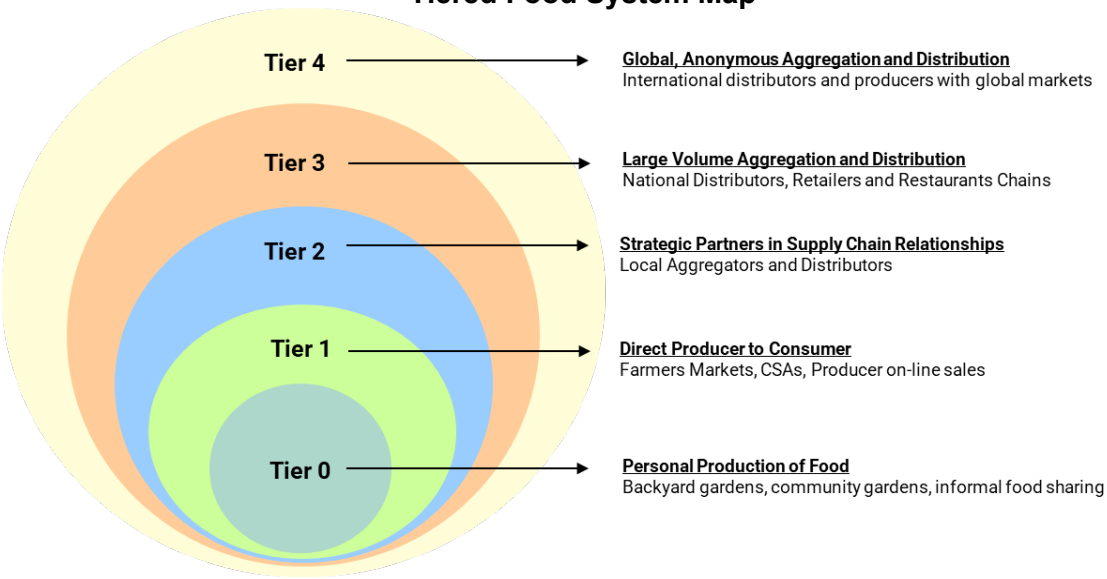
A food system is defined as the, "complex web of activities involving the production, processing, transport, and consumption of food. Issues concerning the food system include the governance and economics of food production, its sustainability, the degree to which we waste food, how food production affects the natural environment, and the impact of food on individual and population health."[2]

The following tiered food system map[3] is used to build a shared understanding of food systems through the lens of consumption relationships across the food system, identifying five different levels of relationships between food producers and consumers.

[2] University of Oxford, "What is the Food System?", Oxford Martin Programme on the Future of Food, Oxford Martin School, accessed June 30, 2021, https://www.futureoffood.ox.ac.uk/what-food-system.

[3] The Tiers of the Food System framework was developed by Jim Bower, Blue Planet Partners; Ron Doetch, Michael Fields Agricultural Institute; and Steve Stevenson, UW-Madison Center for Integrated Agricultural Systems. Published by UW-Madison Center for Integrated Agricultural Systems, Aug 2010.

Tiered Food System Map



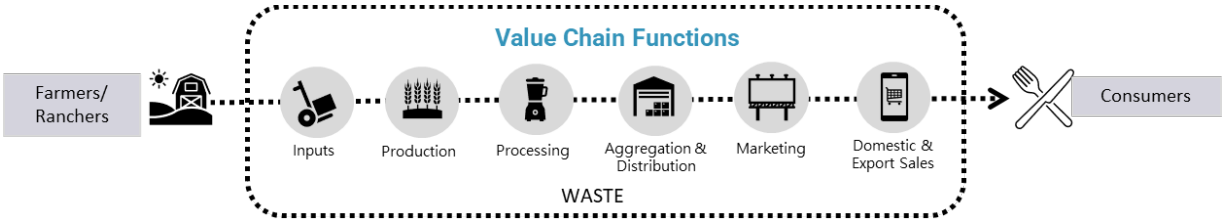
The above definitions and diagrams will be referenced throughout the following report sections to build a stronger understanding of Hawai‘i Island’s agriculture and food system and where there is a shared interest in improving it.

3. Understanding the Agriculture and Food System on Hawai‘i Island

The study sought to help stakeholders in the island’s agriculture and food system better understand the scale and components of the system, where they fit, and what needs and opportunities exist to improve system performance that benefit all. Provided below is an overview of quantitative and qualitative data gathered during the study and collectively analyzed by a diverse group of stakeholders in the study’s team meetings.

A. Agricultural Value Chains

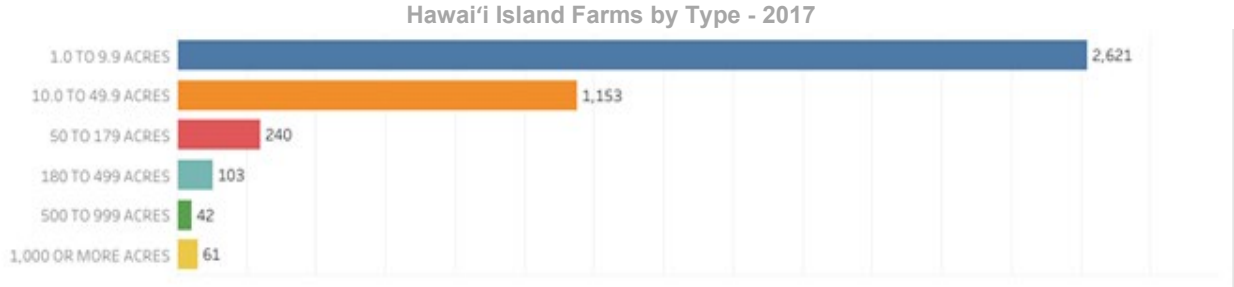
An exploration of the underlying agricultural market system of Hawai‘i island starts by following products from production to consumption, along a value chain of functions that enable products to reach their various markets.



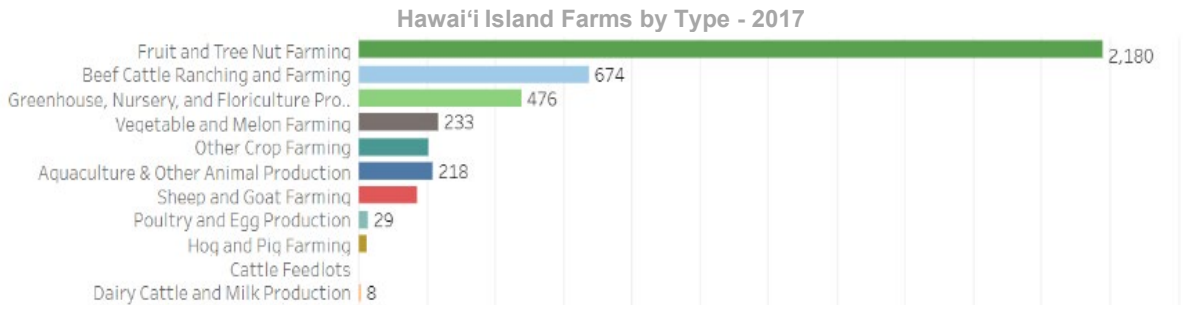
To follow this product journey, we start with the farms and ranches responsible for the island’s agricultural production and the inputs they need to operate.

Farms & Ranches

Through the 2017 Agricultural Census, we know small farms constitute the majority of the island’s farms. Records indicate 89% of all farms in the state as well as on Hawai‘i Island are between one and ten acres.

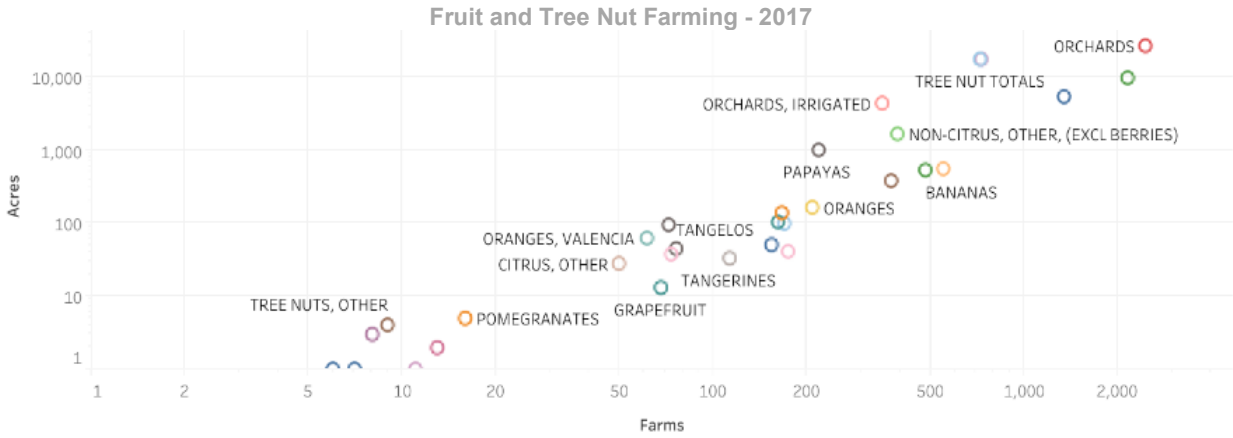


The majority of acreage on-island is dedicated to fruit and tree nuts, much of which is earmarked for export.



Data[4] indicates larger farms and operations dominate the agricultural market space, with many small farms making very little income. Much of the current utilized agricultural acreage on-island supports export production, with industry around macadamia nuts, coffee, banana, and papaya, as well as seed, flower, and beef. Small-scale farmers are often suppliers of the diverse produce sold at local markets, typically purchased directly by consumers.[5]

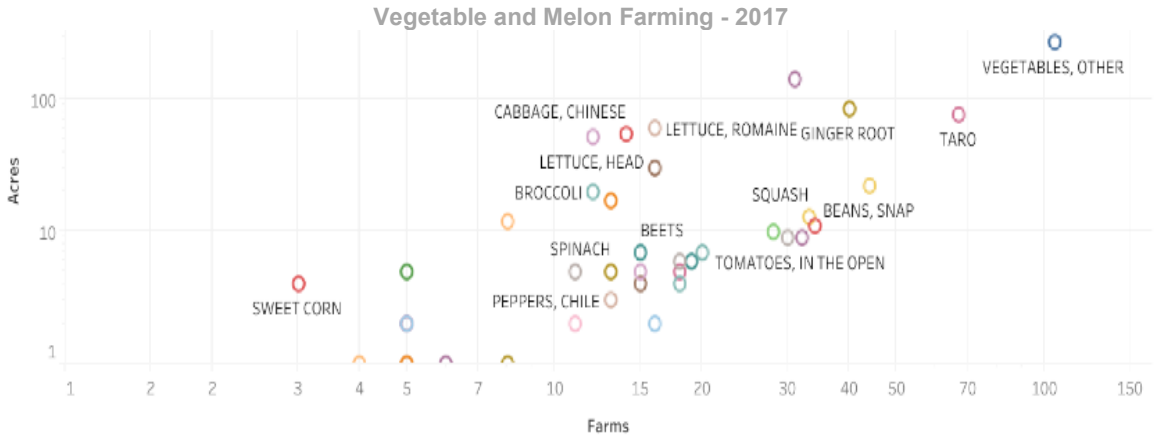
Fruit and Tree Nut farms represent more than half of the island's farms and a broad range of the island's crops. This category of farms is broken down further in the following plot showing the distribution of crops by acreage and number of farms.



Similarly, the distribution of vegetable farming demonstrates the island's capability to produce a diverse range of food crops.

[4] Data is census *survey* data, and therefore offers a general read of the space, rather than an exacting calculation of it. Some data is also purposely redacted by NASS in order to maintain anonymity of census data providers, inhibiting direct identification of farms to profit. Data remains useful, however, as the study goals are to catalyze system change rather than to build an exact map or comprehensive documentation of the space.

[5] Melrose, Jeffrey, Ryan Perroy and Sylvana Cares, "State Agricultural Land Use Baseline Report," (Hilo: Hawai'i Department of Agriculture, 2016), https://hdoa.hawaii.gov/wp-content/uploads/2016/02/StateAgLandUseBaseline2015.pdf.



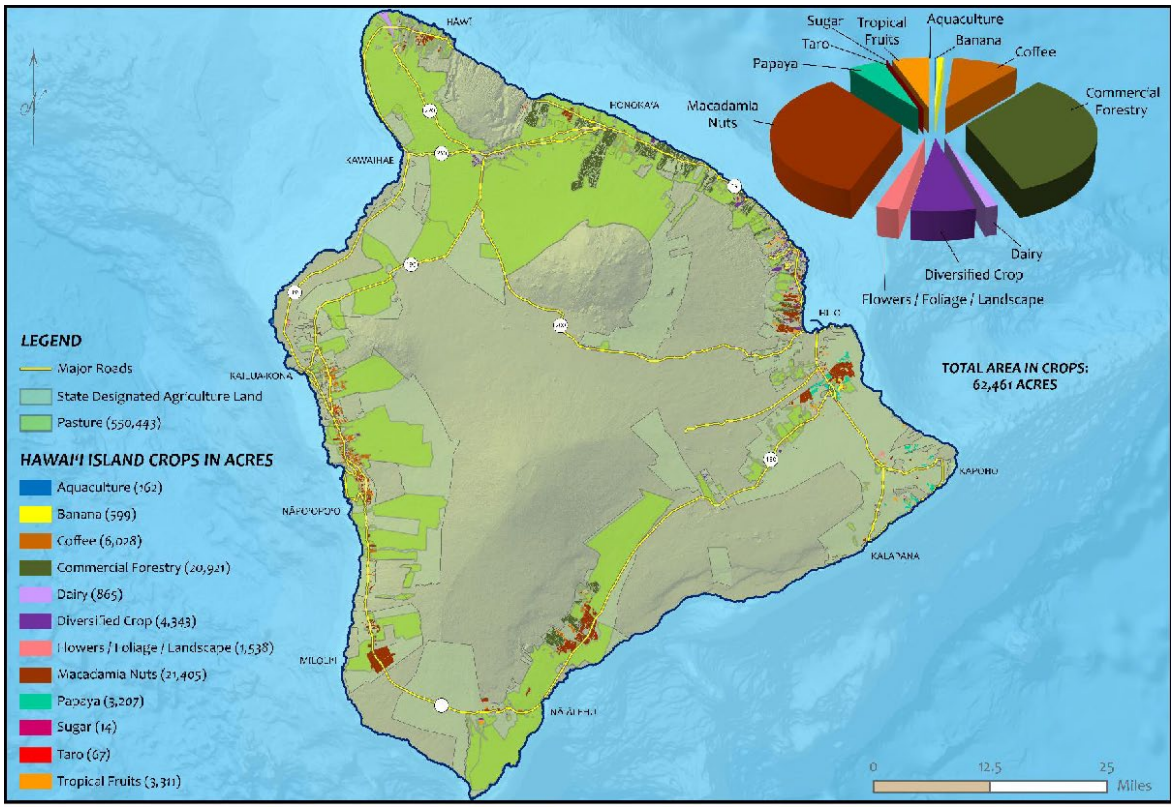
Inputs

Next we explore some of the key inputs for agricultural production on the island: land, capital, and labor.

Land

The cost and availability of suitable farmland on Hawai‘i Island represent significant barriers to most farmers. Yet small farms continue to proliferate on the island. As noted by the recent update to the state's Agricultural Land Use Baseline by the Hawai‘i Department of Agriculture (HDOA), the "2018 eruption at Kīlauea Volcano's East Rift Zone covered about 1,000 acres of productive agricultural lands in Puna, which included diversified crops, horticulture, macadamia nut, papaya, and tropical fruit farms. Despite those losses, most of these crops increased in acreage during the survey period with diversified crops gaining 1,076 acres (+33 percent), papaya gaining 640 acres (+25 percent) and tropical fruits gaining 167 acres (+5 percent). Acreage in dairy production dropped about 1,000 acres due to the closure of Big Island Dairy in 2019. The survey did note the first return of sugar cultivation to the island with 14 acres in Hāwī as part of a distillery operation."[6] The updated land use map from that recent study (below) highlights how nearly 90% of the island's agricultural land is dedicated to pasture.

[6] Perroy, Ryan and Eszter Collier, "2020 Update to the Hawaii Statewide Agricultural Land Use Baseline: O‘ahu, Hawai‘i, and Kaua‘i," (Hilo: Hawai‘i Department of Agriculture, 2020), https://hdoa.hawaii.gov/wp-content/uploads/2021/04/2020_Update_Ag_Baseline_Oahu_Hawaii_Kauai_v3.pdf.



Source: 2020 Hawaii State Agricultural Land Use Baseline

Capital

Capital is considered one of the most prominent barriers to small farm success across the islands. Limited capital precludes or limits farmer access to land, equipment, and infrastructure. Research[7] shows that capital supports in the form of grants and loans are not always accessed by Hawai'i's farmers for a number of reasons, including:

- mismatch of grant stipulations based on needs;
- the often obscure and difficult process of applying for and comply with grant funds;
- Lacking business and grant literacy needed to procure a loan or grant and meet the terms of the funds;
- an inability of farmers to prove credit worthiness in instances where they have never before assumed large loans, and
- Historical and continued racial, social, and economic inequities created by larger systems of inequality, which exacerbate the above.

Studies also cite the difficulty traditional lenders have in determining loan risk for farms because of the often high-risk, low-return, and non-liquid aspects of agricultural loaning.

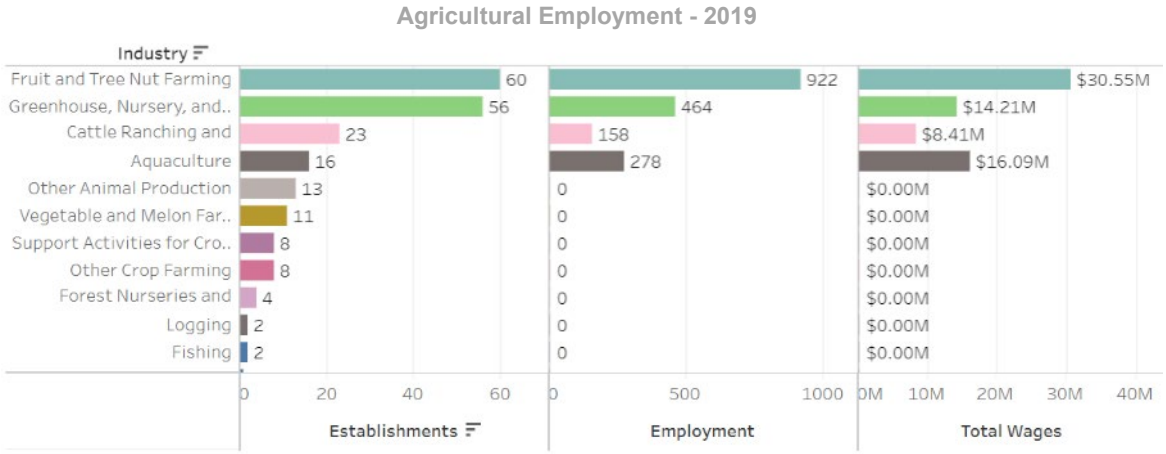
[7]See Island of Hawai'i Whole Systems Project (RMI, 2007); Hawai'i's Food System: Food for All (Ulupono, 2017); CFDI-Farmer of Color Capital Access National Project (Cochiarelli et al., 2015); Access to Capital for Entrepreneurs: Removing Barriers (Kauffman, 2019).

The above factors affect the true availability of capital for Hawai‘i’s farmers. In other words, even when money is allotted for farmers and ranchers through federal, state, county, and private investments, those who meet the qualifications, have the capacity to apply, and actually receive funding are a small minority. Kohala Center’s Rural and Cooperative Business Program on Hawai‘i Island works to mitigate some of these gaps.

Alongside grant and loan opportunities, proposals to show capital support to Hawai‘i’s farmers have included increasing institutional purchases of local product,[8] introducing farmer subsidies, along with GET exemptions, to enable competitive pricing of local produce,[9] and strengthening county infrastructure to increase value-added processing potentials. Each of these increases the viability of farming on-island, and the potential for local food resilience.

Labor

Fruit and tree nut farms represent the largest agricultural employers, followed by ornamental crops and ranching. Fruit and tree nut employment has increased over the past 5 years, with the number of employees increasing by 6 percent, the number of establishments increasing by 14 percent, and the total wages increasing by 43 percent.



Source: Bureau of Labor Statistics, 2019

A 2018 survey of farmers assessed barriers and needs of farmers related to increasing food production in Hawai‘i. On Hawai‘i Island, farmers from different districts prioritized different barriers, but most commonly identified farm labor as their biggest barriers to increased production. The table below identifies their prioritized barriers by district:

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[8] Beyond Green Partners helped to establish farm-to-institution programs at Kona Community Hospital and Kohala Elementary School. The ‘Aina Pono program, run through the HDOE School Food Services Branch, also implemented pilot programs in DOE schools across the state, awarding school lunch procurement contracts to O‘ahu, Kaua‘i, and Maui sources of vegetable and fruit, and Hawai‘i Island, Maui, Moloka‘i, O‘ahu sources of beef through 2018.

[9] See Kahn et al. (2018) and Arita et al. (2012) for economic analyses of local food production.

2018 Farmer Needs Assessment

District	#1 Barrier	#2 Barrier	#3 Barrier
Kau	Capital	Pests & Diseases	Farm Labor
Puna	Farm Labor	Capital	Land
Hamakua	Business or Marketing	Pests & Diseases	Farm Labor
North Kohala	Housing	Farm Labor	Land
South Kohala	Capital	Farm Labor	Pests & Diseases
North Kona	Farm Labor	Pests & Diseases	Capital
South Kona	Farm Labor	Business or Marketing	Water

Source: Heaivilin, H., & Miles, A. (2018). Hawaii Farmer Needs Assessment Survey

The long depression of the agricultural industry in Hawaiʻi and the difficulty of starting, maintaining, and making a living from farming has meant that food production is hardly imagined as a sustainable career or life pathway. The average age of the current local farmer population is over 61. During the study, stakeholders indicated that even with access to land, equipment, and knowledge, inheriting or starting a farm is unappealing, as the labor is hard, the market is absent, prices are low, costs are high, climate changes and pests create uncertainty around production, and regulation is tightening even as certifications/permits become increasingly difficult to obtain. It is well understood that if Hawaiʻi is to innovate and invest in new systems around the small farmer and local values, Hawaiʻiʻs farmers must also be a sustained resource.

Research shows that a variety of programs currently are at work investing in the next generation of farmers. EA Ecoversity (Waipiʻo), Ulu Mau Puanui (Puanui), and Hui Mālama i ke Ala ʻŪlili (Koholalele) are several examples of ʻāina-based Hawaiian cultural programs that center Hawaiian values, which include right relationship with land, resources, and food. These groups offer training and supports for youth and families interested in the production and sharing/distribution of food, teaching the practice of growing food in relationship to human and nonhuman community and also to market. Hawaiʻi Institute of Pacific (HIP) Agriculture is another organization that offers education in agriculture, with a focus on regenerative agriculture and youth.

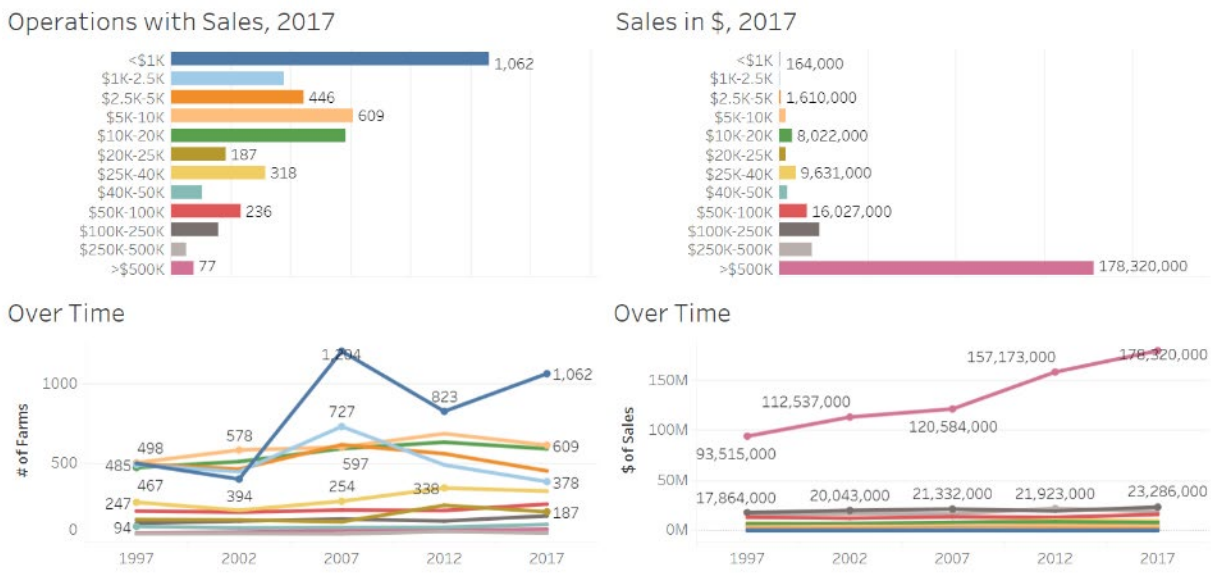
Also of importance are DOE networks and Charter schools that offer space for students to grow and taste foods through school programs, and connect food to math and science curricula as well as the health and well-being of students, families, and communities, and Hawaiʻi Community College (HCC), which offers degrees and certificates in agriculture that prepare students for work in government, agribusiness, horticulture, livestock, floriculture, landscape, and industry.

Analysis teams indicated that continuing to shift the narrative of vocational education and agriculture could help cultivate desire to enter the trades. And, there is hope that if and as the system shifts and farming becomes a more viable vocation, that more individuals will be interested in entering into the agricultural space. As emphasized throughout the study itself,

system inter-relationships will allow momentum and impact to ripple through the agriculture and food space, and new opportunities for flourishing in farming will continue to open. Efforts that pay attention to and value agriculture as a trade, and farming and food production as a practice of intimate relationship to place, will and can continue to move the culture of farming and food production in Hawai‘i toward sustainability and resilience.

Production

Given the diverse range of agricultural commodities and products on the island, production is more easily compared in terms of revenues. From the 2017 Agricultural Census, we see that less than 2% of the island’s farms produce approximately two-thirds of the island’s agricultural revenues, and their share of revenues is steadily increasing.



With over half of the island’s farms earning less than $20,000 per annum and less than 7% earning more than $100,000 per annum, it is easy to recognize the significant gaps between the many small farms and the few large agricultural operations on the island. Study team members recognized that agricultural exemptions on property taxes on the island may exaggerate the numbers of farms at the low end of the scale, with concerns expressed that there are an increasing number of “gentleman farms” with little genuine intent to carry out any commercial agricultural production. But the study also identifies the significant barriers to successful farming, particularly for small farms, offering little incentive to those with suitable farmland to invest in commercial production, even if they have the capital to do so.

Developing better connections between small scale, part-time producers and large scale supply chains are seen as important opportunities for agricultural development on the island. Better aggregation and distribution of fresh produce from small farms can stimulate more production

and increased food security, but many stakeholders recognize small farms need to undertake more value-added processing to increase their market opportunities and profit margins beyond fresh produce.

Adding Value to Production

Literature[10] considers value-addition an important route for farmer/grower market sustainability in Hawaiʻi, because of the ways that high input costs make few items profitable to the local producer at farm-gate prices. Value-addition offers producers distinct opportunities to increase value on a product, setting up the conditions for increased profit, reduced waste, and increased product sales without increased farm labor or expansion of production. Farmers and producers are able to therefore create a living from farming/producing. Their opportunities for profitability expand with their recognition of the broad value of a product and its component parts, as well as producer-consumer valuation of care around how a product is produced, valuation of connection between producer and consumer, and recognition of the power of producer, consumer, and the producer-consumer relationship in the shaping of the emergent agri-food system.

Value-addition encompasses a wide range of actions or processing measures that increases the value and market of a product. According to the USDA, value-addition can stem from:

1) A change in the physical state or form of the product;
2) The production of a product in a manner that enhances its value; or
3) The physical segregation of an agricultural commodity or product in a manner that results in the enhancement of the value of that commodity or product.

Value-addition thus includes the way a product is grown (i.e., organics, hydroponics, etc.), how a product is processed (i.e., triple-washed, ready-to-eat, etc.), how a product is marketed (i.e., Kaʻū Coffee, "Hawaiʻi Island Made," etc.), or any combination of these.

Processing

During interviews and analysis meetings, stakeholders made clear that establishing and outfitting processing facilities is critical to moving the agri-food system toward market sustainability and longevity. Study team members recognized processing as a way for Hawaiʻi to become more self-reliant, to utilize excess fruit during peaks of season, and to produce exports in the forms of highly prized oils, medicines, foods, and drinks. Successful medium-sized business owners indicated that, with existing processing infrastructure, they were hitting a growth ceiling and expending resources shipping product out, only to have the product shipped back to Hawaiʻi in its final form.

[10] *cf.* Kent Fleming, "Value-Added Strategies" (2003); and Craig Elevitch and Ken Love, "Adding Value to Locally Grown Crops in Hawaiʻi" (2013).

Longtime large-scale distributors made clear that washing, grading, and packing product could vastly increase the possibility of broad market distribution, as the process would assist in the aggregation of goods and also better ensure regulatory health standards. Full-time and part-time farmers, as well as public-facing non-profit staff whose organizations serve farmer needs, indicated increased processing infrastructure could greatly improve small farmer viability; however, individual establishment of on-farm facilities is costly and permitting prohibitive, and cooperative efforts at shared facilities have often not succeeded.

2017 NASS Census data shows on-farm packing facilities do exist, though the number reported on the island reduced from 325 in 2012 to 258 in 2017.Little detail is available on where they exist and how they are managed--including if they are linked to larger operations and whether or not they are shared facilities. Eighteen processing facilities on Hawaiʻi Island are publicly listed. Most are privately-owned and primarily created for the processing of brand goods produced by a particular company.

Ranchers indicate that the existing processing capacity of meats is not adequate, and many ranchers ship their cattle to the continent to be finished and slaughtered, reducing their earnings per head, increasing the environmental impacts of beef production, and maintaining reliance on continent-based parties for “local” beef production.

Facilities that can process large volumes of food and can process, pack, and bottle large quantities of food and drink could meet the immediate needs of the medium-size producer and support their growth; these facilities could also aggregate product from numerous small farms, and contribute to county institutional and broad market needs. The centrality of these facilities to allow for maximum value and use, and ease of distribution, and the linking of large-scale processing facilities with coordinated services including food distribution, composting/waste management, research and education, and food storage will only strengthen the possibility that the facility finds good use, and ultimately supports local agri-food resilience on Hawaiʻi Island.

Like cooperation, value-addition continues to come up as a pivotal for shifting the agri-food system towards sustainability and resilience. Investing in infrastructural support could expand the potential of the agricultural market space on Hawaiʻi Island, as well as the potential for a more equitable shift in the system.

Despite the recognized need for value-added processing facilities on- island, studies and stakeholder input highlighted that processing sites close to agricultural production are lacking and unevenly distributed. Processing sites with adequate equipment and storage for the beginning producer are extremely limited, while sites offering ancillary services including education in permitting, packaging, and marketing are in high demand.

The study team identified the need for increasing value-added processing capacity at two levels:

- A need to increase localized, shared facilities for food processing, packaging, and storage that small farms can access, with at least one in each district; and

- A need to establish a larger centralized facility for aggregated storage and high-end processing that can meet both local and export demand.

Processing equipment and facilities suggested during the study included:

Localized Small-Scale Processing	Centralized Large-Scale Processing
Preparing	Dehydrating
Cooking & Preserving	High Pressure Processing
Juicing	Freezing
Pickling	Cold Storage
Milling	Bottling
Cold Storage	Co-Packing
Packaging	Warehousing

Aggregation & Distribution

Stakeholders observed trends in study data indicating agricultural market issues on Hawai'i Island are less about barriers to production (i.e., limited land availability), and more about "the messy middle"--components of aggregation, processing, storage, and distribution not sufficiently in place currently to enable small farm growth. The disconnect between these parts of the system has meant that food produced by small farmers cannot ultimately reach the market.[11]

> *"Food system issues are not resource availability issues. Our issues are with logistics. We have everything we need, we're just not connecting the dots."*
>
> Farmer

Study team members focused on these functions of agricultural value chains as key opportunities for improving the system, noting the following findings:

Aggregation

- Aggregation services are an underdeveloped component of the system that could have a major impact on ways producers connect to distributors and to markets.
- Increased aggregation would enable larger quantities of local produce to be collected from a variety of small farmers to support larger retail and institutional markets.
- Aggregation services that could grade and pack food would vastly increase the appeal of small farm produce to larger buyers and distributors.
- Aggregation sites and services close to production could assist small farmers in accessing direct-to-consumer markets without having to devote so much time to market sales.
- District-based, local aggregators maintain the potential to not only collect and distribute food, but also assist farmers and regulatory agencies with implementing food safe practices

[11] No data on current locally-produced food sales/local consumption is available. Baseline data, and regular collection of data, could help trace how much food is being produced on island and sold on island to the local population.

and achieving the necessary certifications that allow for broad distribution and safe public consumption. These secondary services would enable small farmers to connect to large local distributors, and therefore larger markets.
- Emergency COVID-19 food relief services illustrated the value of local and district-centered aggregation-distribution sites to farmers and those in need.
- Emergency COVID-19 food relief services illustrated the way community could band together to grow resilience through crisis.

Storage
- Food storage on Hawaiʻi Island needs development, especially since food is shipped to Oʻahu facilities first, which are clustered on a low-lying strip of land and increasingly vulnerable to climate-related disaster.
- Food storage that is connected to existing and equitable distribution networks have proven beneficial through COVID-19.
- Storage at all levels of production is needed, from shelf and refrigerator storage for small producers to warehouse facilities for food emergency relief organizations.

Distribution
- District-centered distribution sites can increase food security and health and well-being in communities who lack access to markets with fresh local food or reliable transportation to county centers.
- Broad distribution of small farm goods by existing distributors hinges on food safety practice. Facilitating education, training, application, and certification practices and subsidizing costs for small farmer certification can support small farmer compliance with food safety standards.
- Broad distribution of small-farmer goods by existing large distributors hinges on aggregation of small farmer produce. Identifying aggregators and aggregation models that can process and grade produce and guarantee consistency of provision will widen routes to market.

System-wide analysis of the agri-food system opened space for discussions on the connection between components, and the existing logistical barriers to getting the abundance of produced food to market. Thus, instead of getting caught responding to a perceived lack of production (driven by the unavailability of local produce in commercial markets), participants were able to recognize how “connecting the dots” of aggregation, processing, storage and distribution operations could strengthen the “messy middle” of the value chain, and increase the flow of already produced food to market.

Marketing

Stakeholder feedback and analysis highlighted the need to better monitor, understand, and respond to emerging consumer tastes and interests. Local producers recognize they are not competing with imports on price and need to fully understand where their comparative market advantages lie to build market demand on that basis. There’s emerging drivers that give local production a comparative advantage over imports. These include:

- Social networks, where local farmers have strong networks and linkages with communities.

- Government policy and procurement rules related to food donations, school meals and other public procurement that prioritize buying local.
- Impact of the COVID-19 pandemic and the recognition that “just-in-time” needs to be re-balanced with “just-in-case” procurement and storage.
- Environmental concerns over carbon footprint where locally grown and locally consumed models are increasingly being reflected in the price consumers are willing to pay.
- Seasonality, with Hawaiʻi Island benefiting from different climatic zones.

Branding and marketing campaigns such as the HDOA Market Development Branchʻs “Buy Local, It Matters” program, the “Hawaiʻi Seal of Quality” program, and the “Made in Hawaiʻi, With Aloha” branding help to build comparative advantage for local products. There is also the stateʻs (DBEDT) *Buy Hawaiʻi, Give Aloha* program, a central portal for Hawaiʻi businesses to market and sell their products. Since the inception of HIAP in 2019, stakeholders on the island have collectively expressed a shared interest in building a brand image for Hawaiʻi Island Made products. The study meetings elevated this shared interest and provided useful input for HIAP’s Market Opportunities Action Team to continue building the branding and marketing strategy for the island.

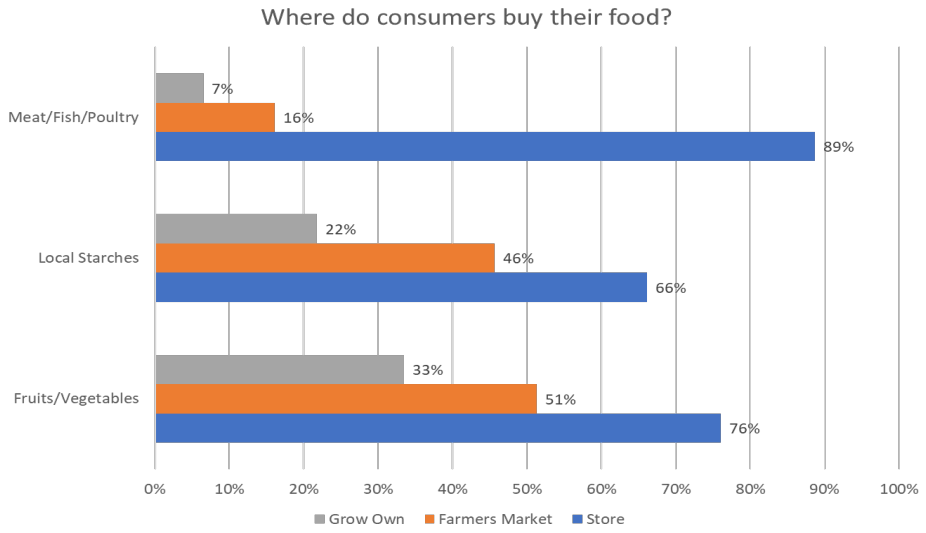
Hawaii Farm Trails website is increasing awareness of agritourism experiences throughout the State

Study team members also noted the importance of agritourism as a key opportunity for the island’s small farms. With state revenue heavily dependent on tourism, many want to find a way to more effectively market local farming together with this flow of revenue to the state. Because the landscape of tourism on the island has changed so dramatically during the COVID-19 pandemic, there are now new opportunities for local farm tours to gain market share as local tourism rebounds. This not only provides local farms with additional tour revenue, it also increases opportunities for direct product sales during tours and from a growing community of followers.

Domestic & Export Sales

While consumption data on the island is limited, estimates indicate between 85% and 90% of the food consumed in the state is imported from the mainland or foreign suppliers. In surveys

conducted for this study, students from three schools on Hawai‘i Island asked local consumers where they buy their food. The vast majority of respondents indicated they purchase most food items from local stores, with higher percentages of meat, fish, and poultry purchased at stores than for local starches, fruits, and vegetables.



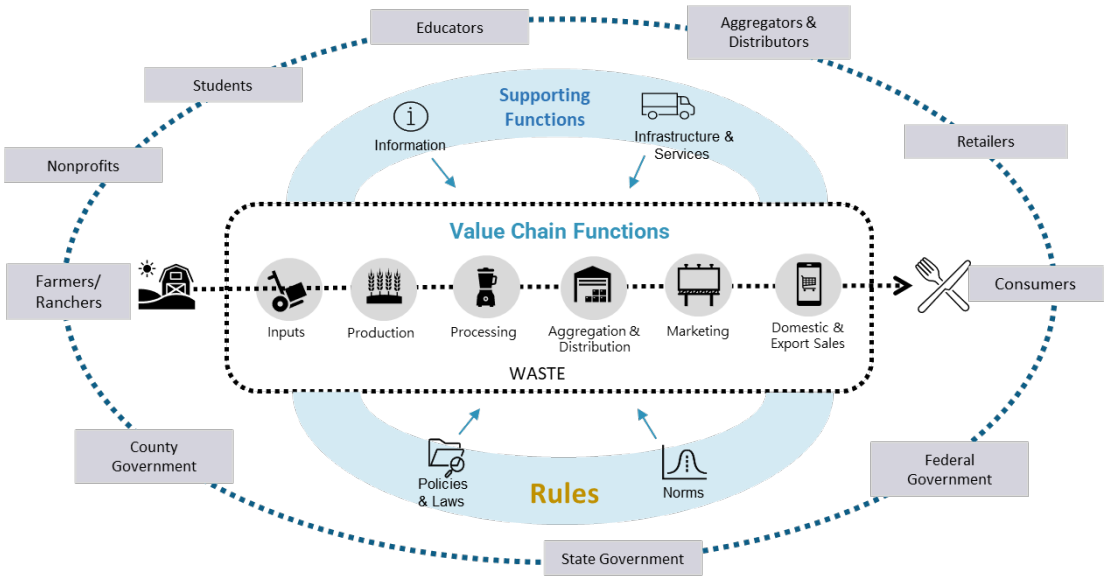
Strengthening Awareness of local Products

Preference for local foods is being cultivated through educational programs such as farm-to-school and school garden programs that teach keiki about food through growing, preparing, and eating garden and farm-fresh foods. Educators offer and witness how keiki preferences are shaped by experience, and how knowledge of foods and health, social implications of consumption, impacts to self, community, environment can exist as curricula that build critical consciousness into the next generation of farmers, food-related professionals, and consumers. These early investments in the connection of younger generations to their food has the greatest potential to shape and sustain future markets, as well as the values underlying and embodied in food production and consumption.

Study participants indicate that having local retailers not only sell their products, but promote them to consumers could also be key for increasing demand. Participants also indicate there is a need for further investment in DOE and other farm and garden programs for keiki, as these programs cultivate students’ palates around local food and build students’ and parents’ familiarity with locally-grown products. Ensuring that social components of the food system are addressed could strengthen the potential of agriculture and local food system planning.

B. The Agricultural Market Eco-System

Agricultural value chains do not function in isolation of the wider eco-system of information, infrastructure, policies, laws, and norms that exist on-island. The island’s agricultural market system cannot be understood without the supporting functions, rules, and stakeholder connections that underpin strong system performance. The market system diagram below highlights the key components of the island’s agricultural market eco-system, and the following sections describe key findings from the study associated with its supporting functions and rules.



Hawaii Island's Agricultural Market System

Supporting Functions

Market Information

There is currently a lack of data being collected and produced by the state and counties around food. Small farmers suffer from a lack of market signals--available data on supply, demand, and price--which inhibits them from being able to plan their production cycles and businesses. There is also very little available existing consumer data on food consumption, the relationship between local food production and consumption, and consumer demand. Moreover, it's been historically difficult to disaggregate statistical data by county, making the information less useful for understanding Hawai'i Island markets, which differ significantly from O'ahu. Some of these differences come in the form of the presence and prevalence of commercial grocery outlets, the culture of farmer's markets and food exchange, the ability to grow, fish, and hunt for food, and the financial means of consumers.

Available studies have tracked state consumption trends according to USDA food pyramid categories and county consumption and crop data. The Keaau School Food Security Survey, Kamehameha School Food Security Survey, and Hawaii Community College Students Food Survey attempt to help understand Hawai'i Island food procurement and food security patterns.

Analyzing existing consumption data with stakeholders fostered several distinct discussions: one, on the need for increased data collection on food consumption that is Hawai'i Island-specific or can be disaggregated by island; two, on the need to develop better understandings of the informal food sector in order to more clearly understand the food preferences of consumers; and three, on the desire to ensure that agricultural production and food resilience on Hawai'i Island are appreciated as parts of a single, integrated system, whereby production and market success are not separate from increased resilience and food security.

There are different connections of local agricultural products to different parts of the food system. HIAP seeks to help stakeholders manage the complexity of the agricultural market

system, but this means breaking down the system into specific components with a focus on products, channels, transactions and end markets. The market system framework described in this report provides a useful lens through which to analyze agricultural product and service value chains. HIAP will be using that framework to organize system data, monitor system performance, and carry out more detailed analysis of individual system components.

Infrastructure and Services

Stakeholder interviews identified concerns over the lack of infrastructure and services available to small farms, particularly associated with value-added processing, aggregation, transportation, storage, and distribution. The most current list of existing open certified kitchens (2020) is available through The Kohala Center website. While about 1,500 kitchens are certified on Hawaiʻi Island, some of these kitchens are fast food and chain restaurant kitchens, which are not available for public use. Of the 1,500 total certified kitchens on island about 100 are potentially usable by entrepreneur- producers, and of the 100, only nine remained open and available to the public through COVID-19. Of these nine, only two--Hilo Food Hub and Hilo Farmerʻs Market Kitchen--are set up as incubator kitchens specifically for entrepreneurs processing their own goods, and Hilo Food Hub alone has started to offer auxiliary services that assist people through permitting, packaging, label design, and food business education. Other

Commercial Kitchens, 2020
Source: The Kohala Center

Food Hubs & Aggregators, 2019
Source: Heaivilin

facilities are community service facilities or restaurant kitchens that open their spaces to the public but may restrict hours, equipment, and storage services. Notable is the non-existence of listed commercial kitchens in North Hilo, Hāmākua, North Kohala, South Kohala, and Kaʻū. In contrast, six of nine are located in (South) Hilo, and two in Kona--one each in North and South Kona; the remaining is in Volcano. Larger processing facilities for bottling, co-packing, and large-scale dehydration are not available on-island.

Establishing conditions for equity in the market across the wide geographic and social range that constitutes Hawaiʻi Island requires establishing facilities proximate to each district community--to allow for the economic development, community networking, and resource

sharing integral to resilience. These include coordinated services such as business, capital, permitting, and design supports that increase potential for producer success and sustainability; and that create modes and routes of communication that allow for identification and meeting of distinct community needs as well as networked island food needs. Identifying existing defunct facilities that can be refurbished for use by current farmers and producers in the area could cut down on waste and also accelerate the availability of incubator kitchen spaces for community use.

CTAHR and the Cooperative Extension Service grew out of federally funded agricultural research work and outreach programs established in 1901, as the U.S. Agricultural Experiment Station on Oʻahu and its extensions in Hilo and Glenwood on Hawaiʻi Island. Today, the UH-Cooperative Extension provides science-based, non-formal education in support of farmers, consumers, and families in Hawaiʻi. GoFarm Hawaiʻi was formed in 2003 by the CTAHR program to support the business needs of Hawaiʻi's agricultural producers. It continues as a beginning farmer development program and offers formal certifications (at cost), one-on-one agribusiness services, and a compilation of resources on agribusiness. Their website also serves to connect farmers and consumers to farmer-graduates from their programs on each island. During the study, farmers frequently mentioned concerns over a decline in the availability and support for extension services on-island.

The Kohala Center also offers a variety of support for existing, new, and next generation farmers, ranchers, and small business owners. These include Rural and Cooperative Business Development Services, which provides a variety of programs, resources, and one-on-one services to farmers, ranchers, value-added producers, and small business owners.

Rules

Policies and Laws

Stakeholder input across the agriculture and food system reflected concerns that current policies around land and land use, labor, imports and exports, as well as food safety often erode the possibility of small farmer success without necessarily increasing the potential for efficient government regulation.

Land Legislation

Market prices for available arable land are driven by residential and resort property values, impeding purchase by farmers at affordable rates. Producers in areas zoned for agriculture are incentivized to utilize arable land for the production of food through reduced property taxes. Commercial agricultural dedication and non-dedicated agricultural use tax breaks are available. While this legislation is intended to preserve parcels for agricultural use, it has also been used for lowering property taxes on non-productive parcels in agricultural districts on what are known as "gentleman farms"--zoned agricultural parcels owned by individuals that contribute little to the

sector but enjoy agricultural use tax breaks by meeting minimum county requirements. Alongside designation and tax incentives, state HDOA and private agricultural parks encourage leasing and use of arable lands for farming.

To protect farmlands from development, lawmakers passed legislation to identify and protect Important Agricultural Lands from development (effective 2008), and proceeded to map and designate these lands across the state. Acquisition of Resource Value Lands (HRS 173) dedicates 2% of annual property taxes in the state to the purchase of Legacy Lands, as a degree of protection from lands set for reclassification and rezoning for development and other uses. There have also been recent legislative pushes to identify and utilize existing native Hawaiian infrastructure to achieve food security by revitalizing Hawaiian agricultural and aquacultural culture and practice.

Labor Legislation

Labor is a key issue affecting the viability of small farms in Hawaiʻi, as well as the state's food security, long-term sustainability, and possibility for food resilience. Wages for farm laborers in the islands are high compared to other U.S. states and foreign agricultural ventures. Additionally, many farmers have difficulty finding sufficiently skilled and ready labor pools. The high cost of labor increases food production costs, and in turn the cost of locally grown food. However, fair labor wages also contribute to the health and resilience of the local food and agriculture system, providing community members the means to purchase food and access shelter, transportation, and other basic human needs. Since the start of the COVID-19 pandemic, USDA NASS statistics show that weekly hours of laborers dropped, as did the rate of pay for laborers with the initial outbreak of the pandemic.

Farm dwelling legislation is also an important concern, since labor shortages are at least partly resulting from high housing costs across the island, and/or distance of housing from farm site and reliability and expense of transportation. Previous recommendations have included revising County zoning laws related to housing on agricultural lands, allowing farmers to more easily house and care for workers.

Import and Export Legislation

The Jones Act is a major piece of 1920s legislation that continues to affect the movement of goods to and from the islands. Different comparative economic and social analyses come to different conclusions about whether and how the Jones Act affects local prices for the island consumer, as well as how it affects the viability of Hawaiʻi-based producers. Suggestions to entertain Jones Act waivers, attempt trial periods for unrestricted or modified cabotage, and push for long-term amendments to the Act offer alternatives to stolid arguments to keep or repeal the Act in existing form.

Food Safety Legislation

Food safety regulations are governed by HAR Chapter 11-50, and enforced by the Department of Health Food Safety Branch. Training and permitting as of January 2021 can be completed online. In different reports, farmers have expressed difficulty in meeting regulatory requirements

of the state, attaining permits for food sales, and assuming full costs of safety qualifications (GAP) as a small scale farmer.

Permitting Certified Kitchens and other Processing Facilities
Farmers shared frustrations about the time and process involved in obtaining County permits for certified kitchen facilities and receiving conflicting instructions from different officials on how to meet all permit requirements. They raised concerns the lengthy process discourages investment in building the island's value-added processing capacity.

Concerns were also raised about State Department of Health (DOH) requirements that do not allow certified kitchens and food processing facilities on rain catchment water systems, making it difficult for many to invest in on-farm kitchen facilities for adding value. Some farmers feel appropriate filtration and treatment systems should be allowed for kitchens using rain catchment.

While the issues concerning stakeholders most varied between groups, their shared interest in greater cooperation around dialogue and improving agricultural policies and laws were quite consistent. HIAP has added a Policy & Advocacy Committee to build upon this shared interest.

Norms: Cooperation

The study team's analysis of the agricultural market system's norms primarily focused on how stakeholders cooperate and work together within the system. Recommendations coming out of local studies and extension literature suggest producer cooperatives as ideal solutions for scaling and sustaining the small farms of Hawaiʻi's agricultural sector. This type of collaboration offers opportunities to maximize cost-sharing, increase options for marketing and education, establish shared facilities for value-added food production, and facilitate coordination with government agencies., This formal method of collaboration continues to help individual operations overcome economic, scale, and capacity-based barriers to entry, maintenance, and growth.

Many small farmers and businesses have encountered challenges to forming and maintaining cooperatives, however. This is not atypical; national literature on cooperatives shows in general, negotiations made around cooperative investment, structure, and operations ask individuals to share power, risk, information, and workload, and to continually negotiate relationship with each other. As in many instances, Hawaiʻi's cooperative struggles have included experiences of uneven sharing of power, risk, information, and workload, and too often along the lines of race and class histories. Successful cooperatives certainly can and do exist. The study indicates some of the more successful cooperatives in Hawaiʻi sometimes find themselves reaching a ceiling of growth, and needing increased infrastructure to grow to a profitable, sustainable scale.

Technical and capital supports and political will can certainly feed increased cooperative growth and success. Supports, such as The Kohala Center‘s Rural and Cooperative Business Development Services, have evolved to help Hawai‘i Island farmers obtain capital, build businesses, and form mechanisms for cooperative market development.

As cooperative efforts remain key to shifting the conditions of small farms toward increased resilience and viability, new working mechanisms for cooperation need to be introduced. These should look beyond traditional producer cooperatives and explore cooperation throughout the value chain functions, such as supply chain partnerships focused on meeting large supply contracts for processed goods.

Collective bodies such as HIFA, HIAP, and Vibrant Hawaii represent broader networks for cooperation and multi-stakeholder partnership that offer relatively new mechanisms for system-wide cooperation beyond traditional producer cooperatives and industry associations. HIAP was established to activate public-private partnership in collectively developing the agricultural sector on Hawai‘i Island, placing farmers and other agribusinesses at the center of the partnership and ensuring government agencies, universities, and non-profits are aligned in their efforts to support and engage them. HIAP is now using this study and its recommended actions to guide and develop the efforts of its action teams.

Consumers

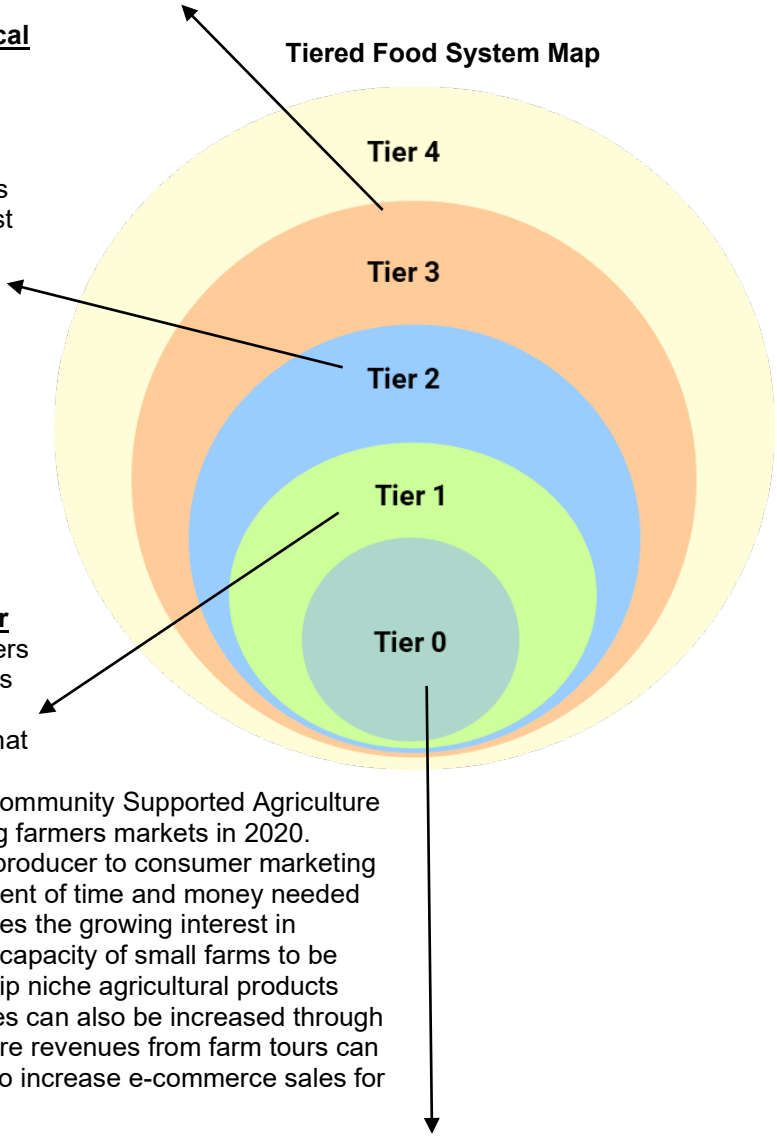
The final component of Hawai‘i Island’s agricultural market system are the island’s consumers themselves. While there are many agricultural products purchased on the island that do not end up on someone’s plate, this study focused primarily on the consumption of food products on-island, how that relates to supply chains, and the need to mitigate vulnerabilities within the island’s food system.

C. The Food System

The island’s agri-food system is situated within a complex integration of local, national, and global supply chain relationships that shape local agricultural market conditions and the resiliency of the island’s food supply during times of crisis. The study used the tiered food system map on the following page to better understand these relationships and guide the identification of needs and opportunities to explore system improvements.

Tiers 3 and 4 – National and Global Aggregation and Distribution
Most stakeholders see the national and global industrial food system as competitive obstacles to local farm competitiveness, but a few see the opportunities associated with building a stronger brand image for local products in the US and abroad. They highlight that the key to lowering prices of locally produced agricultural products for the island's consumers is by pursuing bigger markets offering economies of scale for local producers.

Tier 2 – Strategic Partnerships in Local Supply Chain Relationships
Study team members recognized the pivotal role that local aggregators and distributors play in consolidating and marketing locally grown food from farms to consumers. There is a shared interest in establishing more supply chain partnerships including producers, aggregators, distributors, and retailers. Study team meetings explored how innovative new models of aggregation, transportation, and distribution can be established using new technologies to build networks and support for existing operations in ways that stimulate increased food production from small local farms.



Tier 1 – Direct Producer to Consumer
Direct sales from producers to consumers most often happens in the many farmers markets on the island, though several producers indicated during interviews that they had increased e-commerce sales on-line and increased membership in Community Supported Agriculture (CSA) after the pandemic began closing farmers markets in 2020. Farmers would like to see these direct producer to consumer marketing channels expand to reduce the investment of time and money needed to market their products. This encourages the growing interest in increasing the value-added processing capacity of small farms to be able to grow, process, package, and ship niche agricultural products directly to consumers. These direct sales can also be increased through the growing interest in agritourism, where revenues from farm tours can not only supplement farm sales, but also increase e-commerce sales for those farms.

Tier 0 – Personal Production of Food
As indicated in the survey results above, there are people on the island who produce their own food through gardening, farming, hunting, gathering, fishing, and using various forms of home preservation to store this food. This is a critical element of food security for the island's population, yet little data is available to measure the full extent of food production at this level, how much informal food sharing is taking place within the island's communities, and how personal production of food can be sustainably and appropriately increased to improve the resiliency of the island's food supply. The study team recognized the need for more data and analysis at this tier of the island's food system.

Mitigating Vulnerability

While not always included in evaluations of consumer need and market influence, food insecure communities must be considered as meaningful consumers, and the systemic constraints that guide food "choice" in these communities must contextualize the social and economic conditions in which these choices are made. Literature indicates that in these conditions, cost and proximity to grocery outlets are primary factors guiding purchasing decisions for individuals and families that experience food insecurity. Ensuring locally produced, affordable food is accessible in all communities, and that some portion of foods are available at reduced or no cost to food insecure consumers near their residences, can initiate trends toward a more equitable food system.

Through the study and analysis period, participants asked questions about the values underlying current action in the agri-food system on Hawai'i Island. To value the small farmer; to value food, food sustainability, and resilience; to value systems and systems thinking, collective process and action; to value local--to define more clearly what that means; and to value each other--were some key conversation points. Continuing to evaluate how agricultural market and food resilience spaces overlap and can mutually support each other is a step toward determining how food insecurity can help guide production, processing, and distribution plans into the future.

Given that the fundamental assumption of food system resilience for any community is food security, mitigations of vulnerability that emerge synchronously with market establishment become integral components of any agri-food system plan seeking to be resilient. Innovating for a future where people are fed, regardless of income, is establishing a market system that expands to hold those who endure and are not always seen. These innovations will define and shape community, and build a food culture better prepared for crisis.

> *"[During COVID], the first things that disappeared were rice, flour, and yeast. So understanding that, our legislators, or the powers that be, should be taking notes. They must be taking notes about the first things that disappeared and in which communities. For weeks we couldn't find flour and yeast; we had to order our yeast off of Amazon, just so we could provide bread. Providing healthy, fresh starches for our communities was the first objective in our family.*
>
> *So we knew that in order to sustain our family and those around us, we needed to provide a source of protein and a source of starch. We have 'ulu, we have mai'a, we have kalo, but we had to wean our people onto the COVID-19 diet; we simplified our food. That way we don't have to spend a lot of energy or resources in producing the food."*
>
> Kūʻike Kamakea-Ohelo

As Kūʻike Kamakea-Ohelo illustrates in his statement above, there is abundance--*and* there is need to shape consumer preference to match that abundance. Thus current consumer preference does not need to *define* production so much as give a sense of where change is needed, and how it might be encouraged. Strengthening awareness and mitigating vulnerability are some strategies that emerge from the study's collective analysis. Basing and shaping trends towards foods that will fill bellies, honor the lands upon which food is grown, honor the farmer and their labor, and honor the body that lives off the food underlie these suggestions, and become formative of a social space that carries these values forward.

4. Recommended Actions for Improving the System

Building a shared understanding of the island's agriculture and food system is of little value if it is not used as a basis for guiding shared efforts to catalyze change in how the system functions. The study process channeled stakeholder analysis of system components towards identifying where there is a shared interest in collective action to improve the system. Following are the recommended actions the study team felt were the highest priorities for the collective efforts of HIAP and HIFA. For the sake of brevity, this report does not list the entire set of stakeholder recommendations that emerged in the study analysis. More detailed documents of stakeholder findings and recommendations however, can be accessed from the study's page on the HIAP website.

A. Value Chain Development

Study team members gave a high priority to building capacity and opportunity in the "messy middle" of the island's agricultural value chain functions of processing, transportation, aggregation, storage, and distribution. There was a recognition that shared public-private efforts to increase cooperation and coordination within these value chain functions represent the most immediate and impactful means of increasing small farm viability and stimulating increased production on the island.

The following collective actions were prioritized by the study team to improve the island's agricultural value chains.

	Collective Action	**Who should be involved?**
1	Implement Value Added Growth Strategy: • Maximize the use of current facilities, increasing funding and initiatives to support upgrades for existing kitchens, food hubs, and other processing facilities to meet community needs and food safety requirements.	Hawaii Tropical Fruit Growers; Hawaii Master Food Preservers; Hawai'i Farmers Union United teahawaii.com; The Kohala Center; ' Ulu Coop; Puna Chicks; Hilo Products; CTAHR Extension; **Convener**: HIAP
	• Develop a sustainable business model for establishing a centralized aggregation and processing facility. Install equipment to process a diverse range of agricultural products.	
	• Develop policy and funding structures that enable increased processing. Strategically build affordable public certified kitchens and subsidize cooperatives located where the need is, based on the number of farmers in the region.	

	Collective Action	Who should be involved?
	• Increase slaughterhouse capacity on-island by re-opening closed slaughterhouses or bringing in additional mobile slaughterhouses. Install anaerobic biodigesters to deal with waste and energy issues.	Akamai Working Group; Hawai‘i Dept of Agriculture; The Kohala Center; County of Hawai‘i - R&D; Hawai‘i Island Meat Cooperative; UH Manoa – CTAHR; Value added smoked processors; HIMC **Convener:** HIAP
2	Explore new models of aggregation, processing, and distribution, particularly from small farms: • Build upon shifting marketing channels arising during COVID-19. • Support those models through regular releases of online information about crops offered and sold. • Establish partnership around food standards, involving aggregators, distributors, large retailers, and farming groups, who can collectively confirm processes and standards.	CTAHR; Food Hubs/Aggregators; Food Processors; Kōkua Harvest **Convener**: HIAP

B. Food Distribution

Conducting this study during the COVID-19 pandemic brought a strong focus to the importance of food banks and the efficiency of food relief efforts in times of crisis. Study team members noted that food relief efforts during the 2018 Kilauea eruption and after Hurricane Lane provided important lessons learned that guided the enormous challenges of food distribution during the COVID-19 pandemic. Building on those lessons learned, study team members recommended the following actions for improving food distribution.

	Collective Action	Who should be involved?
3	Increase support and efficiency of food relief efforts: • Establish programs to enable agricultural operations, food relief, and distributors to purchase or lease equipment for loading and transportation. • Increase the capacity of FSA to promote, administer, and streamline the Transportation Reimbursement Program.	Food Hubs; The Food Basket; The Kohala Center HFA; ‘ Ulu Coop; Adaptations; USDA-FSA; UH Manoa – CTAHR **Convener: HIFA**
	• Identify long term funding opportunities to allow non-profits to continue their work at food relief centers without having to devote so many resources towards fundraising. • Identify strategic opportunities for shared for-profit and non-profit use. For-profit food hubs can pivot to emergency food distribution centers in times of crisis if designed that way at the outset.	Private Donors; CTAHR; County of Hawai‘i – R&D **Convener: HIFA**

C. Cooperation

A key takeaway from the study process is that the demand for cooperative mechanisms in the island's agriculture and food system clearly exceeds the supply of available mechanisms. A plethora of farmer associations, producer cooperatives, industry bodies, and networks of shared agricultural and food interests already exist, but for a variety of reasons there is still demand for more. The diversity of farms, crops, and interests represented in the island's agricultural market eco-system make it difficult for any entity to represent a wide swath of perspectives or unite farmers around a common objective. Thus, many efforts to develop the sector are siloed, lacking coordination and synergy.

For this reason, HIAP seeks to position itself as a neutral platform for shared public-private dialogue and collective action in the agricultural market ecosystem, establishing multi-stakeholder teams and committees to help existing cooperatives, organizations, and networks to work together towards shared goals for improving the system in ways that avoid duplication and increase synergies. HIAP seeks to offer existing groups a convenient space to coordinate with others and a special purpose vehicle for shared efforts wherever one does not already exist.

Both HIAP and HIFA will serve as conveners and coordinators for the recommended actions.

	Collective Action	**Who should be involved?**
4	Lower costs and increase opportunities for small farms through increased cooperation: • Establish incentive programs that encourage small farm participation in cooperative mechanisms. Work with small farms to establish and/or join cooperative mechanisms and increase support for those mechanisms. Advocate for bills/legislation that seek to expand the types of cooperative models allowed in Hawai'i. • Develop tighter vertical integration and partnerships. Look at opportunities for building supply chain partnerships - based on specific commodities / products - to be able to engage, assess, and invest jointly and be more coordinated moving forward.	Ulupono; Hawaii Tropical Fruit Growers Hawai'i Farmers Union United; The Kohala Center; Food Hubs; 'Ulu Coop; UH Manoa – CTAHR; **Convener**: HIAP
5	Increase collaboration throughout the system: • Utilize HIAP and HIFA platforms to enable existing networks and teams within the system to talk to each other more easily and increase connections through multiple layers and channels. • Build and support HIAP to strengthen coordination and advocacy, joining up thinking, planning and action for collective agricultural development.	County of Hawai'i – R&D; HIPHI; UH Manoa – CTAHR; Food Hubs; Hawai'i Farmers Union United; County Ag Commission; **Convener:** HIFA/HIAP

D. Education & Awareness

The study revealed there are already considerable efforts underway to increase food system education at the primary and secondary level on the island. This is a critical effort and deserves the shared support of all stakeholders as it affects the future food landscape for the entire island. Student involvement in the data collection process of this study is a strong indicator of student interest and enthusiasm around food sustainability and resiliency. Schools can work with non-profit partners to explore grants and other supports to not only build their capacity to educate students on nutrition and food systems, but to support student-led projects and increase community support for school gardens.

Student interest can be leveraged even further to generate more interest in farming as a career, introducing to students the more exciting and technologically advanced opportunities available to overcome mental models of farming simply being about hard labor for little return.

	Collective Action	**Who should be involved?**
6	Support increased education on the values of food resiliency and sustainability**:** • Support the integration of sustainable food systems education into K-12 curriculum. This includes creating a curriculum database for K-12 educators, supporting teacher training and youth led activities promoting food resiliency. • Explore opportunities to work with retailers to increase education and awareness of how money spent on local food impacts our community. • Increase vocational training opportunities supporting new technologies and machinery for food production, processing and other value additions.	Hawai‘i Island School Garden Network; Hawai‘i Farm to School Hui; DOE ‘Aina Pono program; UHWO - Sustainable Community Food Systems program; County of Hawai‘i – R&D and County Council; Complex area superintendents, Principals; Hawaii Master Food Preservers; UH Manoa – CTAHR; The Kohala Center; **Convener:** HIFA
7	Build consumer familiarity with locally produced food products through students and their parents: • Scale up work of groups like Food Corps that works with schools to teach nutrition and use of local crops/plants. • Integrate more local foods into school feeding programs. • Increase funding and build community support for garden programs in all schools.	Hawai‘i Farm to School hui; Hawai‘i School Garden Network; HIPHI; DOE, DOH; County of Hawai‘i – R&D; HCC Cohort program Farm to Table (Culinary); HMFP; UH Manoa – CTAHR; FoodCorps; ‘Ulu Cooperative; Kū-A-Kanaka; Kamehameha Schools; **HIFA**

E. Marketing & Market Information

The study findings validated HIAP's initial focus on branding and marketing, revealing a strong shared interest in a social marketing campaign promoting agricultural products made on Hawai'i Island and identifying the comparative advantages they offer local consumers. There is also a recognition that increased marketing efforts are best guided by greater analysis of market demand, which is also needed by farmers to plan production. Stakeholders collectively lamented the lack of available data on market demand and called for increased market research and value chain analysis.

Some farmers also highlighted the growing market demand for agritourism and recognized the opportunity to promote local farm tours and farm products together. But there is also a shared concern of the threats posed by tourism that is not responsible and respectful to local values. A coordinated effort to support agritourism represents a key opportunity for HIAP's Market Opportunities action team.

	Collective Action	Who should be involved?
8	Build a stronger brand preference for local products: • Launch a social marketing campaign promoting Hawai'i Island made products, coordinated across multiple industries and sectors of the agri-food system. • Increased marketing and education on fresh, value added products emphasizing quality over quantity.	'Ulu Coop; COH Ag Specialist; Hawai'i Farm to School Hui; Farmers' Markets; UH/Hawai'i Sector Partnerships; HTFG members on all islands; HFUU; CTAHR; **Convener:** HIAP
9	Increase marketing of local farms and products to tourists, emphasizing local values of food resiliency, sustainability, care and honor of land and water.	County of Hawai'i – R&D; 'āina aloha economic futures; Produce/value added vendors from Farmers Markets; UH Manoa – CTAHR; **Convener:** HIAP
10	Make more market information available to farmers: • Prioritize the gathering and reporting of better information on pricing, supply, and demand to support both existing and potential operations. Conduct participatory value chain assessments for key products / commodities. • Create an accessible dashboard/data repository that provides raw and interpreted and constantly updated data to producers and other stakeholders in the food system.	Big businesses involved in Hawaii; CTAHR; UHWO; Food Industry Associations; CSAs; Farm Bureau; Food Hubs and Local Aggregators; The Kohala Center; HDOA; **Convener:** HIAP

F. Small Farm Support

Stakeholders working in agriculture and food systems feel strongly about the value of the island's small farms in the quest for agricultural development and food resilience. This value is widely recognized by consumers, government institutions, and policymakers, but more often in word than in deed. The study team identified some of the deeds needed to increase support for small farms and lower some of their many barriers to profitable growth.

A critical part of this support relates to farm labor. Study team suggestions to support small farms included developing an on-line system for farm labor recruitment and introducing new labor-saving solutions to reduce farmers' dependency on hired personnel. They also recommended orienting and aligning policies, research and capital investments towards small farm operating costs.

	Collective Action	**Who should be involved?**
11	Identify solutions for labor substitution/ reduction through: • Exploring increased mechanization, working directly with mid-sized or larger producers to assess impact. • The creation of opportunities for farmer-to-farmer learning to aid in adoption of labor-saving solutions.	UH Manoa – CTAHR **Convener:** HIAP
12	Develop an on-line system to enable farms to easily recruit good quality labor: • Develop an application and establish a digital farm labor bulletin board. Establish an online application for both the farm and the worker, connecting interests. • Explore non-digital ways to share information for those laborers with limited access to digital communications.	Hawai'i Community College Cohort Project (labor) Angela Dean UH Manoa - CTAHR **Convener:** HIAP
13	Increase support for small farms to lower costs and increase access to productive land. • Conduct deeper assessments on the economic challenges of small farms and use this to engage with policy makers and others on potential interventions to reduce costs and increase productive opportunities. • Introduce new policies at the County and State level. Introduce tax credits, change permitting procedures and remove limitations on farm housing. • Offer more incentives for private sector agricultural development and make more land available for small holder farmers, but with requirements to follow sustainable agricultural practices.	The Kohala Center SBDC UH Manoa - CTAHR Kamehameha Schools DOA, DLNR County of Hawai'i - Planning & R&D Other large landholders County Council members **Convener:** HIAP

G. Policies, Laws & Norms

Concerns over state and county policies and legislation were discussed in several of the study team meetings. There was broad recognition of the need to change policies that constrain system performance by ensuring policymakers are better informed of the full implications of existing or proposed laws on the agriculture and food system. Stakeholders wanted to ensure there is appropriate multi-stakeholder analysis and consultation involved before changes are proposed to legislation and public policy.

Stakeholder discussions also highlighted a shared interest in showcasing Hawaiʻi Island as a model for tropical island sustainability, embracing technical innovations for environmentally-conscious and regenerative agricultural practices which can be emulated in other Pacific Island settings.

	Collective Action	**Who should be involved?**
14	Ensure government policies and regulations are better informed by system information and stakeholder feedback • Understand what information is used to guide current policy making processes and work with policymakers (and those that inform them) to improve the quality of that information. • Conduct cross-sector work with academic, non-profit organizations and government to clarify government aims and establish shared definitions of food self-sufficiency, built on long-term resilience goals. • Facilitate increased coordination between government and higher education to develop and support new and existing industries in Hawaii.	New County Ag Commission Think Big Hawaii County of Hawaiʻi – R&D UH Manoa - CTAHR HI State Legislators **Convener:** HIFA/ HIAP
15	Build Hawaiʻi island's potential as a model for tropical island sustainability, researching and piloting innovations that will improve our ecological footprint. • Identify potential new technologies to be introduced on island based on linkages with other institutions in similar locations. • Reframe our thinking and how we define the inputs and outputs of production and explore new value propositions around waste. Support increased analysis, collaboration and collective action to improve waste management on the island.	WOCAN UH Manoa - CTAHR UHH – CAFNRM **Convener:** HIAP

How we shape the production and movement of food and other agricultural products on the island going forward will be dependent on our capacity to collectively reimagine how these spaces can be reshaped toward equity, by honoring space, place, land, and resources. Shifts in society will come as groups align toward mutually beneficial outcomes, and put energy into projects that keep shared values as the foundation and center of activity.

5. Conclusion

This study focused on highlighting weaknesses and gaps in the system to better understand underlying barriers to small farm success, and the long-term health and viability of the agriculture and food system on Hawaiʻi Island. However, it does not do justice to the many efforts currently underway to improve the system, many of which provide valuable assistance for existing small scale farmers on the island. These efforts are inspiring and provide useful examples of the energy that currently exists for organizations to work together.

To encourage transformational impact, these efforts must move forward systematically and coherently, in ways that harness the power of coordinated effort towards shared goals of economic success and food resiliency. Introducing mechanisms that lower the barriers to collaboration and coordination within the system can broaden and deepen the impact of each of these partners while sharing effort and responsibility across more parties.

Through its action teams and committees, HIAP is developing some of these new mechanisms, seeking to help more partners work together and build synergies for transformative change. To fulfill this potential of local food resilience and small farm success will take the shared effort of many stakeholders described in this report. Given the cooperation and dedication we have observed among so many people throughout this study, that kind of collaboration not only appears feasible, it feels inevitable.