

BREADFRUIT INSTITUTE

SPRING & SUMMER PROGRESS REPORT | 2018



The National Tropical Botanical Garden (NTBG) is dedicated to tropical plant research, conservation, and education. NTBG's Breadfruit Institute (www.breadfruit.org), established in 2003, is the global leader in efforts to use breadfruit diversity to support food security, regenerative agriculture, and income generation for smallholder farmers in the tropics. The Breadfruit Institute manages the world's largest collection of breadfruit, vital to research, conservation and education. More than 300 trees of 150 varieties make up a living germplasm repository.

Breadfruit Agroforestry Advancement



The Second Phase Planting in the Regenerative Organic Breadfruit Agroforestry Demonstration involved NTBG staff, volunteers, and 20 Waimea High School students helping with site preparation, mulching, planting, broadcasting crop cover seeds, and harvest data entry. Horticultural Technician, Noel Dickinson, and Dan Rudoy, regenerative agriculture specialist, gave a great lesson on intercropping with breadfruit trees and harvesting techniques.

Within the Second Phase, development began in the Heritage Pacific Island and Contemporary Tropical themes. The layout consists of multistory forest islands rather than rows as in the Shade-grown Understory demonstration that was installed in the project's First Phase.



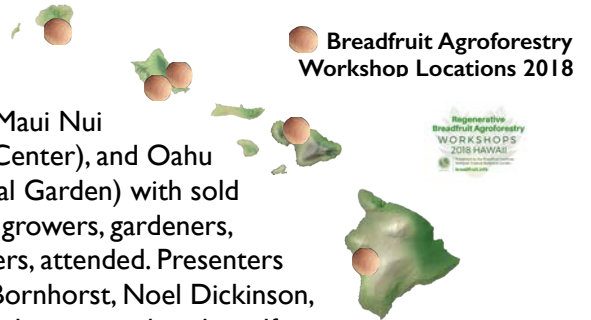
Breadfruit has long been an important staple crop and a primary component of traditional agroforestry systems in Oceania. In addition to providing food and goods, these breadfruit agroforestry systems provide broad ecosystem services such as soil and water conservation and maintenance of biodiversity essential to long-term island habitation.



Breadfruit Agroforestry State-wide Community Outreach



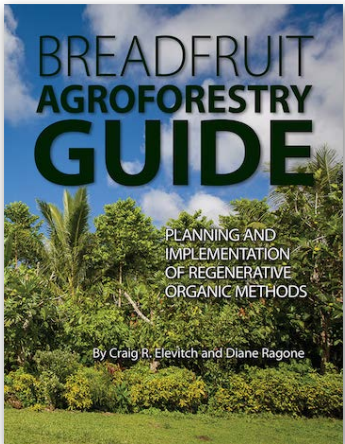
The Breadfruit Institute and Agroforestry Net completed the "Breadfruit Agroforestry: Regenerating abundant, resilient, and profitable landscapes" workshops on Kauai (NTBG), Maui (Maui Nui Botanical Garden), Big Island (Kealakekua Ranch Center), and Oahu (Waimanalo Research Station and Foster Botanical Garden) with sold out venues. More than 300 participants, including growers, gardeners, students, educators, food entrepreneurs, and others, attended. Presenters included Dr. Diane Ragone, Craig Elevitch, Heidi Bornhorst, Noel Dickinson, Dr. Failautusi Avegalio, Gerry Ross, and Dr. Ted Radovich who presented topics such as breadfruit varieties, tree care and pruning, Regenerative Organic Agroforestry, soil composition, making value-added products, agroforestry planning, and site management.



Breadfruit Agroforestry Guide Book Release

We are happy to announce that the *Breadfruit Agroforestry Guide: Planning and implementation of regenerative organic methods*, written by Craig Elevitch, Director of Agroforestry Net, and Dr. Diane Ragone, Director of NTBG's Breadfruit Institute is now available! The guide is being released as the prolific Pacific Island staple crop enjoys a resurgence in planting and growing interest across the Hawai'i and around the tropical world.

The guide presents techniques that can sustain productivity for long periods of time, while regenerating land degraded by erosion, compaction, overgrazing, and loss of organic matter. It covers subjects that include recognizing breadfruit varieties, agroforest planning, planting, and maintenance, selection of suitable accompanying crops, value-added products, and economic evaluation. The guide targets a range of growing scenarios from backyard gardens to large farms in the tropics.



The Regenerative Organic Breadfruit Agroforestry project is co-sponsored and funded by Patagonia Provisions and the State of Hawaii Department of Agriculture.



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Breadfruit Agroforestry Education and Producer Outreach

We hosted 32 North Lake College students from Texas in the Breadfruit Agroforestry Demonstration. The students planted many flats of spinach, ferns, taro, mamaki and Hawaiian chili peppers in the Heritage Pacific Island, Contemporary Tropical, and Regeneration agroforestry plots. They also harvested seeds from flowers to grow in the nursery for future plantings. The education group is focusing on sustainability practices and was able to learn about regenerative organic agroforestry through the demonstration.



Director of Global Initiatives



Roger Still, the institute's Director of Global Initiatives, has been working with partners in Hawai'i, Costa Rica, Jamaica, and Puerto Rico in developing breadfruit agroforestry and organic regenerative agriculture practices. He is coordinating between the institute, Patagonia Provisions, the Regenerative Organic Alliance, foundations, and others to support these efforts. The Breadfruit Agroforestry Demonstration in McBryde Garden and the *Breadfruit Agroforestry Guide* are models for sustainable and regenerative agricultural practices that can provide significant environmental, social and economic benefits.

Trees for Puerto Rico



Breadfruit trees received in Puerto Rico from Global Breadfruit.

Hurricane Maria seriously impacted residents, communities, and food production systems, and caused substantial damage to forests and other ecosystems. Planting more breadfruit trees will help mitigate these impacts and foster the development of more resilient communities and farms. The institute is working with a team of experts in regenerative agriculture/agroforestry and bird conservation, breadfruit farmers and product entrepreneurs, as well as state and federal agencies to develop plans for cultivating breadfruit as part of regenerative organic agroforestry production systems. The goal is to revitalize local agriculture and economies, while helping conserve biodiversity, especially the endangered Elfin-woods Warbler.

Breadfruit Exhibit at Garden Club of Honolulu Annual Flower Show



Breadfruit ('Ulu fiti) trees were grown for a "Challenge Class" and displayed at the Garden Club of Honolulu's Major Flower Show—Rooted in Paradise. The Breadfruit Institute's Global Hunger Initiative and breadfruit were featured in several educational exhibits. We're delighted to have

breadfruit and its many benefits and the Global Hunger Initiative introduced to thousands of visitors attending the show at the Honolulu Museum of Art.



KUPU Intern Blake



Blake Kristofferson, an intern in the Kupu Conservation Leadership Development program at Kahanu Garden mentored under Dan Rudoy to learn regenerative organic methods and worked closely with Dan and Kama Helekahi, Horticultural Technician, to

implement these practices and help with general collection care and maintenance. In the first four months of 2018, Blake devoted more than 400 hours to the breadfruit collection.

Arborists in the Breadfruit Research Orchard



Certified arborists pruned 23 breadfruit trees in the McBryde Garden Breadfruit Research Orchard prior to expansion of the Contemporary and Heritage Agroforestry themes. Pruning encourages new root and shoot growth and synergistically helps 'jump start' the growth of intercropped plants. Proper pruning also helps improve overall health and structure, allowing more sunlight to reach lower branches and underlying

landscape while improving air circulation throughout the tree.

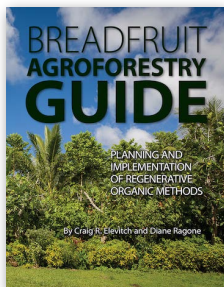
BFI Gets Noticed in Japan

A member of the EM Fellowship Association of Kanto, Japan, visited the Breadfruit Agroforestry Demonstration and featured Noel Dickinson in an article in the organization's publication which specializes in EM (Effective Microorganisms). EM is used as an organic fertilizer and acts like a probiotic tea enriching the soil's overall health. Noel discussed her EM-I brew process and the application methods used throughout the Agroforestry demonstration.



Publications & Media

- Breadfruit [*Artocarpus altilis* (Parkinson) Fosberg]. *Exotic Fruits Reference Guide*.
- A transcriptome screen for positive selection in domesticated breadfruit and its wild relatives (*Artocarpus* spp.). *American Journal of Botany*.
- *Breadfruit Agroforestry Guide: Planning and Implementation of Regenerative Organic Methods*.
- Radio interviews with Dr. Diane Ragone on KKCR, HPR's *Bytemarks Cafe*, and NPR's *All Things Considered*.



Go to Amazon if you'd like to purchase a hard copy of the *Breadfruit Agroforestry Guide: Planning and implementation of regenerative organic methods*. Download a free printable PDF version at <https://ntbg.org/breadfruit/resources>.

Please help support the Work of the Breadfruit Institute and the Global Hunger Initiative by making a donation at:

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SUMMER & FALL PROGRESS REPORT | 2018



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Global Hunger Initiative Update



Breadfruit trees were shipped to Hawaii, Yap, Federated States of Micronesia, Palau, Dominica, Kenya, Uganda, and Ghana from Cultivaris (Global Breadfruit) facilities in the USA and/or Germany. It is rewarding to receive reports from throughout the world of hundreds of trees going into the ground and to receive photographs of the first fruit from proud farmers. This initiative, now underway for a decade, involves a diverse network of organizations and individuals working in more than 40 countries towards a common goal of planting more breadfruit trees.

Photo: Nursery in Cape Coast Ghana with trees ready to be distributed to farmers.

Research Collaborators



Congratulations to Dr. Marin Lysak from the University of Copenhagen for receiving her PhD for her dissertation research on "Improving food and nutrition security through exploration of market potentials by revitalizing breadfruit as a strategy for adapting to climate change." She has spent the last 3 to 4 years studying breadfruit products and use in Hawaii and worked extensively with the Breadfruit Institute by conducting surveys of 1,200 people who received breadfruit trees through of our Plant a Tree of Life project.

Major Grants



In October, the Ceres Trust awarded a \$275,000 grant to support "Strengthening Conservation, Research, and Regenerative Breadfruit Agroforestry Capacities Related to NTBG's Breadfruit Institute." The grant funds essential work related to breadfruit collection conservation and research as well as international projects. The trust's support is essential to advancing BFI's mission in breadfruit conservation, food security, regenerative agriculture, and income generation for smallholder farmers in the tropics.



Breadfruit Conservation Collection - Kahanu Garden



The main breadfruit collection continues to display very good improvements, especially with tree health, disease resistance, soil cycling, drainage capabilities and fertility distribution. Ground covers and border plants continue to spread at a good rate and will provide future support to the orchard system as a whole.

Breadfruit Agroforestry Advancement



Photo by Dan Rudoy

The Breadfruit Institute is helping implement sustainable and regenerative organic breadfruit agroforestry in Puerto Rico to help promote food security and economic development. In December a workshop was held as part of a pilot project to expand forest onto private farms to conserve wildlife and provide farmers with a very productive and resilient system. The planting took place on MikoNokus, a five-acre farm, in the Mayaguez mountains.

KUPU AmeriCorp Member Joins BFI!



We are excited to have Lucy Caine join the Breadfruit Institute team as a KUPU/AmeriCorp Program member. She is helping with our Regenerative Organic Breadfruit Agroforest (ROBA) and breadfruit research projects as part of the program's hands-on educational and personal growth experience. She is from San Francisco and went to University of Oregon majoring in Environmental Science with a focus in geology. She started BFI's new Instagram account (breadfruit_institute) featuring the breadfruit agroforest and "Foodie Fridays." She is working on data synthesis for the Taumako Breadfruit Project. Lucy is also starting her own research project with Bokashi in composting and soil regeneration. This internship is funded by a grant from Patagonia Provisions.

Record Breaking Harvest



Breadfruit, and short- and medium-term crops and flowers planted during the agroforestry project, are harvested weekly and weighed/counted. Over 1,900 pounds of breadfruit and a ton of produce and flowers were harvested in 2018. More than 600 pounds of breadfruit was donated to the Kauai Independent Food Bank to help feed hungry families throughout the island.

Education Outreach



The Breadfruit Institute's community outreach and education promotes the conservation and use of breadfruit, reforestation, agroforestry and regenerative organic agriculture. Various education groups are able to have experiential learning by working and discussing regenerative organic methods while in the Regenerative Organic Breadfruit Agroforestry (ROBA) in McBryde Garden. The project is funded by a grant from Patagonia Provisions.

A few groups hosted by the institute: (continued on next page)



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NTBG Horticultural Interns

The interns attended Dr. Diane Ragone’s lecture on breadfruit and the institute. They also helped maintain the ROBA demonstration for a week by planting, irrigating, EM spraying, composting, and harvesting produce. The institute also mentored three interns who focused on independent projects: “Soil and temperature microclimate study” by Britt Webster, “Insect biodiversity” by Andrew Jansen, and “Back to the roots: how to malama the agroforest” by Yesi Olivera.



Science Teachers Enrichment Program

Participants in the Science Teachers Enrichment Program (STEP) had an interactive learning session in the ROBA demonstration. The group also harvested produce for breadfruit nachos and salad for lunch. NTBG, in partnership with Kaua’i Community College, conducts an annual STEP program on Kaua’i. Science teachers participating in the course may be awarded up to three academic credits through the University of Hawai’i Mānoa Outreach College.



Keiki o ka `Āina

Through NTBG’s Keiki o ka `Āina program and the Breadfruit Institute, children learn about natural resources and Polynesian culture through outdoor recreation that includes nature activities, environmental games, and garden exploration. The youth group spent the morning in the demonstration and learned about using cover crop seeds. Seeds from marigolds and zinnias were separated by hand to add to a diverse cover crop seed mixture.

Waimea High School, KUPU Members, and Kanuikapono Charter School

KUPU members and Waimea High School students helped plant and weed the Contemporary section of the ROBA. This section demonstrates a “modern” agroforest with commercial, environmental, and cultural values. The educational outreach day was very productive in planting more than 200 plants/starts. Pulled weeds were re-used for significant weed and grass suppression. Hawaiian plants such as ferns, mamaki, and taro were planted. They also enjoyed lunch in the breadfruit agroforest, helped in the nursery, and had a tour of “Food for Thought.” The school is a K-12 education program rooted in Hawaiian culture, based on Kauai.

Community Outreach



La ‘Ulu Festival

Noel Dickinson and Juliana Prater joined Kahanu Garden staff at a breadfruit booth and display at the annual La ‘Ulu Festival on Maui in August. The institute participated in the community outreach event by educating attendees about breadfruit varieties, origins, uses, tree care, methods of cooking, and current projects. Other booths provided breadfruit food products, tree give-aways, tapa and poi making demos, and a breadfruit cooking presentation.

NTBG Annual Holiday Craft Fair

The info booth at NTBG’s Annual Holiday Craft Fair was a hit! KUPU Member, Lucy Caine, provided great 101 basics on breadfruit preparation and cooking. The booth also provided information about the institute’s efforts in supporting breadfruit diversity, conservation, food security, and regenerative organic agroforestry.



Get to Know an Expert

Patagonia Provisions documented the *Get to Know an Expert* event that featured Heidi Bornhorst, Pruning for Productivity, and Dr. Diane Ragone at the ROBA demonstration. The Horticulture Interns and local community members such as chefs and food product entrepreneurs attended. The day involved an introduction to breadfruit varieties, a breadfruit agroforest lunch, a breadfruit pruning demonstration, and regenerative cultivation techniques.



Media Coverage

The Documentary Channel of Shanghai Media Group is working on a documentary “Legend of Fruits” (Season 2) about people who are passionate about fruit. It will be broadcast on China Central TV, Shanghai TV, and Tencent video--a Chinese equivalent of YouTube in eight weekly episodes beginning in mid-late February 2019. Breadfruit is part of the last episode, featuring fruit of cultural importance. On December 22, a five-person production crew spent the day with Dr. Ragone and Noel Dickinson in the ROBA, joined by Juliana Prater for a breadfruit variety and cooking demonstration at “Food for Thought.”



Ragone Making Waves

Dr. Diane Ragone was featured in the Making Waves section of the October 2018 *Honolulu Magazine*. The section featured six women in STEM (Science, Technology, Engineering, Math) who are making a difference in Hawaii.

Modern Farmer

Modern Farmer is a resource for progressive food producers and consumers promoting the latest food trends, traditional cooking methods, and crops from around the world. Dr. Ragone’s incredible work with breadfruit and global impact is discussed in the article *The Last Tree Standing*.

Scientific Publications

- “Agroforestry standards for regenerative agriculture” by Craig Elevitch, Niki Mazaroli, and Diane Ragone was published as a blueprint in regenerative organic agroforestry practices and standards in *Sustainability*.
- Dr. Diane Ragone’s breadfruit section was published in *Trees for Life in Oceania: Conservation and utilization of genetic diversity* supported by the Australian Centre for International Agricultural Research. The mission of the publication is to achieve more productive and sustainable agricultural systems for developing countries and Australia.
- First report of *Pratylenchus coffeae* on breadfruit (*Artocarpus altilis*) in the United States. *Plant Disease*.
- Jin-Wah Lau, S.P. Marahatta, D. Ragone, K. H. Wang, and B.S. Sipes. Plant-parasitic nematodes associated with breadfruit, *Artocarpus altilis*, in Hawai’i. *Nematropica*.



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