

## Exhibit A. Association Production, Harvesting and Post Harvest Standards

All fruit marketed by the Association must meet the following standards outlining proper care of trees and handling of fruit in order to increase quality and shelf life, reduce losses, and help maintain and enhance product value and desirability. These standards are based on the *Breadfruit Production Guide* by Elevitch, Ragone and Cole (2013)<sup>1</sup>. They are good general guidelines for the industry, but we expect the Association will build upon and refine them over time. Additional food safety standards may be required for fruit entering certain markets (such as public schools, which require Good Agricultural Practices (GAPs) certification or adherence to Hawai'i Department of Health standards). The Association will work with members to help meet these standards and provide ongoing technical assistance to support improved production, harvesting and post harvest practices.

### Production

Optimal tree health is the basis for high productivity, pest and disease resistance, and large, good quality fruit. While there are general production recommendations for breadfruit, management practices must ultimately be site specific. The Association therefore requires an initial site visit to assess producers' tree and soil health, and will then work with members to develop management guidelines suited for their operation. The following are examples of recommended production practices to support basic tree nutrition and healthy soil biology.

- **Fertilizer:** adding fertilizer or other forms of nutrient amendments annually is generally recommended, preferably before the fruiting season and immediately after any major pruning events. It is advised to begin with soil and/or tissue testing (provided by the University of Hawai'i) to learn what nutrients are present in your soil and plants. *The Association can help with soil and tissue testing costs and logistics.*
- **Encourage beneficial soil microorganisms:** healthy and diverse soil biota can be encouraged through techniques such as compost tea, biochar, fermented plant juices, and the application of greensand, oyster shells, rock phosphate, and crushed limestone.
- **High quality mulch and compost:** mulch is especially important for large mature groves with more limited nutrient resources; it is recommended that both mulch and compost be applied once or twice a year at a thickness of 6-8 in under the tree canopy out to and beyond the drip line.
- **Cover crops and intercropping:** cover crops can suppress weeds, help build healthy soil structure and biology, provide nutrients and mulch materials, and reduce nutrient leaching. Throughout the Pacific, breadfruit was traditionally grown in diversified agroforests with many other crops; it does well interplanted with a wide array of plants and such diverse systems can bring multiple benefits to the crops, the ecosystem and the grower.
- **Sanitation:** in certain locations, removing fallen fruit and branches may decrease problems caused by naturally occurring pathogenic microorganisms in the soil, especially on farms with regular rainfall.

### Harvesting

Harvesting and field handling techniques that minimize blemishes to the fruit also minimize field losses and extend shelf life.

- **Fruit maturity:** although breadfruit is edible at all stages of development, the largest market is currently believed to be for starchy, mature fruit. Therefore, members are requested to harvest **only fully mature fruit** unless otherwise requested by the Association manager. For more information on breadfruit maturity stages, see pages 12-18 of Breadfruit Production Guide.
- **Field practices:** allowing fruit to fall on the ground should be avoided, as this may bruise the fruit internally and externally, reduce shelf life, and increase disease exposure.
- **Temperature:** fruit should be kept in the shade as much as possible to avoid adding to the field heat.
- **Sap:** allow the sap to drain from fruit immediately after harvest; a recommended method is to cut the stem close to the base and set the fruit on the stem end for about an hour.
- **Carrying container:** containers used for carrying and transporting harvested fruit should be sturdy and well ventilated; plastic crates or cardboard boxes with good ventilation are recommended.
- **Timing:** fruit should be harvested no more than 24 hours before delivery or pick up is scheduled.

### Post harvest

Post harvest refers to all practices involved in preparing or storing fruit for sale. Good postharvest practices maintain or increase crop quality and help fetch the best prices, safeguard food safety, and minimize losses.

- **Water bath:** fruit should be cooled as soon as possible after harvesting. One option is to place fruit in tubs containing cool water for 45 min to an hour or in icy water for 10 to 15 min. A water bath also helps to lift debris, insects and some of the hardened sap naturally exuded onto the fruit surface. Because breadfruit floats, a weight of some type should be used to hold the fruit completely under water.
- **Packaging and storage:** fruit should be dried and held in ventilated plastic crates or cardboard boxes for delivery or pickup in a cool, shady area.

---

<sup>1</sup> [http://hawaiihomegrown.net/images/stories/pdfs/Breadfruit\\_Production\\_Guide\\_web\\_edition.pdf](http://hawaiihomegrown.net/images/stories/pdfs/Breadfruit_Production_Guide_web_edition.pdf)