



ECOLOGICAL, SOCIAL AND ECONOMIC SUSTAINABILITY: A RETURN TO AGROFORESTRY

Agroforestry has been the primary land management system for food, fibre, fuel and medicine production in the Pacific Islands for thousands of years. Traditional agroforestry systems throughout the tropics are models for sustainable production that preserve biodiversity, fulfil necessary ecosystem functions, provide wildlife habitat and conserve natural resources. Anyone who has lived in the Pacific Islands has also experienced that indigenous cultures are deeply rooted not only in individual crops but, more important, the worldview that all living things work together in an entirely interconnected universe. For example, a traditional Pacific Island agroforestry system may include breadfruits, bananas, coconuts, taro, sweet potatoes and many other traditional plants, which are all considered to be connected to each other as well as to soil, atmosphere, the ocean and so on.

Over the past century, traditional agroforestry systems in the Pacific have been increasingly displaced by mechanized, chemical-intensive monoculture. This process – known as agrodeforestation – has occurred to a greater degree in island nations such as Hawai'i and Guam and to a lesser degree in places such as Samoa and Yap. As commercial interests, often foreign, direct island farmers towards single-species, high-input plantings, the agricultural knowledge of countless past generations is vanishing. Sadly and ironically, as the age-old knowledge behind indigenous Pacific polyculture systems is being lost, today's consumers, farmers and policy-makers are increasingly interested in sustainable agricultural systems.

Sustainability solutions are often suggested that are devised by the same mindset that has nearly obliterated proven sustainable systems in many regions of the Pacific.

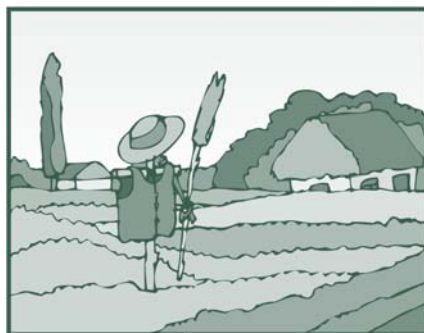
How can today's small family farms be ecologically, socially and economically sustainable? An approach that can work in many places combines traditional multistorey agroforestry and well-planned family business practices. The traditional practice includes three-dimensional space, time (crop successions) and biodiversity, which together can provide ecological sustainability by building soil, reducing

erosion, balancing pest-predator populations, and much more. Socially, agroforestry systems can provide a range of culturally significant foods and non-wood forest products, e.g. medicines and craft materials, as well as spiritual places that are essential for rituals, healing and other practices.

Fortunately, family farms can exploit many commercial advantages that naturally extend from agroforestry systems. The inherent diversity of agroforestry systems leads to a potentially broad crop portfolio, allowing farmers to reduce the market risks of single-crop systems, distribute labour more evenly over the year, and derive income from different crops over short-, medium- and long-term time horizons after planting. Having various crops available throughout the year supports opportunities in a wide range of markets: wholesale, retail, local, export, etc., which can increase overall income. Agroforestry lends itself to trials of new crops and crop varieties. Enterprising agroforestry practitioners are well positioned to add value to their products through small-scale local processing, appropriate packaging and branding, and certifications (e.g. bird friendly, organic, etc.). Finally, farmers can reduce risk of losses by cultivating in diverse systems that are less prone to pests and diseases and buffer against the effects of climate change.

A return to agroforestry modelled on traditional systems holds promise for today's family farmers who are seeking the multifaceted benefits that agroforestry has provided for millennia.

The following two crop examples are excerpted from: C.R. Elevitch and K. Love. 2011. Farm and forestry production and marketing profiles: highlighting value-added strategies. In C.R. Elevitch (ed.). *Specialty Crops for Pacific Island Agroforestry*. Permanent Agriculture Resources (PAR), Holualoa, Hawai'i. <http://agroforestry.net/scps/strategies-highlights-7-crops.pdf>



Vaccinium reticulatum

'Ōhelo berry (*Vaccinium reticulatum*)

Native plant domestication and variety selection.

'Ōhelo berry is a small native Hawaiian shrub related to cranberry and blueberry. It is endemic to Hawai'i, i.e. found nowhere else in the world, but now being introduced into Oregon, United States of America. It had not been domesticated until recently. A project undertaken by the United States Department of Agriculture (USDA) has developed types both for berry production and for ornamental use. As a native plant, 'ōhelo berry has unique appeal to chefs and others who are always looking for speciality ingredients with a Hawaiian character.

Description. The small shrub reaches 10–130 cm in height. Berries vary widely in colour from yellow to red to dull black.

Uses. The cranberry-like fruit is used primarily to make jam and jelly, but is also used in various dishes and baked goods. New markets for 'ōhelo as an indigenous ornamental plant are also being developed.

Agroforestry. Because 'ōhelo berry has only recently been brought into cultivation, there are no examples of integrating the plant in agroforestry systems. However, because of its natural tendency to colonize disturbed or exposed drier lava sites, it has potential to be grown as an understory crop in an open orchard on such sites.

Markets. 'Ōhelo berry is usually processed into jam or jelly and sold in farmers' markets and grocery stores throughout Hawai'i. One market is higher-end restaurants that aspire to diversify their offerings by incorporating uniquely Hawaiian ingredients. In this case, the fruit is used both as a sweet and a savoury.

Adding value. 'Ōhelo is sold unprocessed to hotel chefs and jam manufacturers, and

is usually sold as preserves on the retail market. A wide range of products incorporating the fruit can be envisaged: sauces, flavourings and fruit mixes. Its status as the only endemic Hawaiian fruit that is used commercially imparts a unique identity, which adds significantly to its value compared with similar exotic fruits.

Environment. *Ōhelo* berry is commonly found at 640–3 700 m on Maui and Hawai'i islands, but also grows on Kaua'i, O'ahu and Moloka'i. It usually grows as a pioneer on exposed lava flows, such as alpine or subalpine shrubland. Hawai'i residents gather *Ōhelo* berries when in season from the national parks and high elevations to process into jam, jelly and pie filling. Potential negative impacts of wild-gathering activities may include spreading of invasive weed species and competing for berries with the endemic nene goose (*Branta sandvicensis*).



Eugenia uniflora

Surinam cherry (*Eugenia uniflora*)

Chef-driven demand. Surinam cherry is a juicy, sweet-tart fruit generally considered "kids' food" for picking and eating immediately. In Hawai'i tasting trials of unusual fruits several years ago, chefs were attracted to the strong, resinous flavours of Surinam cherry and began developing unusual dishes highlighting it. By developing a market among chefs over a few years, Surinam cherry has increased in price from US\$1.25/lb (0.45 kg) to 6.50/lb.

Description. Surinam cherry is a large shrub that can achieve heights in excess of 8 m, but because of its slow growth it can take decades to reach this height. It is often referred to as a tree. A member of the Myrtaceae family, the plant is related to guava, *jaboticaba*, mountain apple and other members of the genus *Eugenia*, which includes many edible species. There

are two distinct variations found in Surinam cherry, a common red-coloured fruit and a less resinous dark purple to black, often sweeter fruit. The shrub produces fruit in full sun or partial shade.

Uses. Surinam cherry fruits are usually eaten at once, but are also often processed into jam, jelly and relish. The fruit can be pickled and the juice fermented in wine or vinegar. Some chefs use the fruit as the base for exotic curries. Whole fruit or pieces can be used in pies, puddings, salads and ice cream. The leaves contain a pungent oil that repels insects. Infused or decocted leaves have several medicinal uses.

Agroforestry. The tree can produce fruit well even in partial shade and, because of its small stature, it makes a good understory tree. It is also planted in hedges which, when regularly pruned, can become dense and serve as living fences or boundary barriers in edible landscaping.

Markets. Surinam cherry sold as fresh fruit is generally harvested when fully ripe as the fruit then contains more sugar and less resin. The fruit is edible, somewhat firmer and less susceptible to damage when the colour is orange or orange-red, but has a more resinous flavour. Fruit harvested for processing can be picked as soon as it becomes orange. Chefs and jam manufacturers have expressed a desire for fruit at this stage.

Adding value. Because of the quick degradation of the fruit at ambient temperatures, the faster it can move from field to refrigeration, the longer its shelf-life. Fresh fruit packaged for the consumer should be in vented clamshell containers with no more than a double layer of fruit. Packed fruit should be even coloured and inspected carefully for defects and possible infestation. Fruit that leaks juice should be discarded or kept for processing. Fruit harvested for sale to processors should be washed. Freshly picked Surinam cherry chilled within an hour of harvest can maintain its integrity in the produce section of a supermarket for up to 14 days.

Environment. The Surinam cherry is a tropical plant that can be grown at sea level up to 1 500 m in elevation, in tropical or subtropical regions. It has a long taproot and can survive periods of drought. The plant thrives in most soils, but produces more fruit in deep loamy soil. It is intolerant of saline conditions.



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An infinity of forests lies dormant
within the dreams of one acorn.

Wayne Dyer