The Turimiquire Foundation

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"When we dream alone, it is only a dream.
When we dream with others, it is the beginning of reality."
Dom Camera Helder

April 2026

- Our Achievements in Tropical Agriculture -

The Turimiquire Foundation supports a small remote farm in a small river valley in northeastern Venezuela, where we have planted and restored a large variety of fruit trees. Our intent is to establish a planting that offers a number of different kinds of fruit during every season of the year. The climate here is humid tropics with one dry and one wet season per year, although in recent years the climate has been more humid year around. Our trees are planted in three areas, ***Los Dos Pasos Juntos (DP)*** and nearby ***Peligro,*** at about 300 meters (1000 ft.) above sea level; ***Akujena*** at 700 m. (2200 ft.); and a one-and-a-half-hectare farm at 130 m. (426 ft.) we are beginning to develop in western Venezuela, ***El Fruturo***, as of last year. This is on a flat alluvial plain, warm and humid. We have also experimented with some fruit tree introductions in arid areas near sea level in Cumaná and Cariaco, in wetter coastal Irapa on the Paria peninsula, and in wetter, higher mountain areas such as Caripe and Nirgua in diverse parts of Venezuela.

Fruit tree introduction and development is one of the best agricultural services that can be offered to tropical areas, being especially helpful to *campesino* peasants with small family farms. The use of perennial crops like fruit trees lessens the need to slash and burn new land each year. Trees provide shade cover, organic matter, erosion-prevention, beauty. Trees gather more solar energy than ground crops with their much greater leaf surface. In Venezuela with its home-steading ethic of "the land belongs to he who works it", fruit trees are considered solid title to a piece of land, demonstrating real commitment.

Economically fruit tree crops have many advantages besides preventing the need to destroy forests to clear new land each year. They install a long-term steady improvement, producing more each year as they progressively require *less* care, shading out undergrowth, becoming sturdier. They tend to be higher priced in the market due to being planted less because of the long wait until production. Planting uncommon fruit varieties offers the small farmer an opportunity to tap specialty markets and sidestep the harsh competition against mechanized monocrops.

Fruit from trees provide an attractive improvement in the diet of tropical families. They are high in vitamins, ready to eat, appealing to children, a source of high-quality liquid. In the tropics there is an astounding variety of food from trees, many sweet, many acid, and even many acid+sweet fruits. There are cooked starches like breadfruit from fruit trees, oils and protein sources like avocado and *akee*, fruit and nut combinations like cashew and jackfruit. There are also permanent leaf crops such as the *chaya* bush from Mexico, with its highly

nutritious leaves and shoots. There's even a fruit tree--the *calabash* tree--that will grow nice bowls for you.

Rather than trying to convince people to plant fruit trees by talking about the value of fruit tree crops, what we have found most effective is to plant the trees. The fruit will eloquently make its case and provide the seed. Many good tropical fruits have not been introduced to areas because their seeds are viable for a short time only, making them difficult to bring from afar. The list that follows comes from 30 years of studying literature on tropical fruit, studying our land and climate, searching out seed near and far and then trying it. I have listed the species in an informal, subjective order of significance at the farm, with common name in English, Spanish, scientific name, varieties and number of trees, followed by brief comment on our experience with each type.

Mango, *Mangifera indica L.*: 100+ trees, 7 grafted varieties and various varieties from seed = 15+ varieties. The two local varieties are long established and include large old trees. Mangos produce May to September--abundantly. The grafted varieties sometimes produce later; they suffer from humidity which causes fruit to crack and rot, and flowers to not set. In planting more mangos in recent years to take advantage of drier areas, we have discovered that in Venezuela there is now only one variety of grafted mango commercially available—Hayden, and that is often a degraded version probably from seeds somewhere along the line. So after many attempts to graft I managed to reproduce several genuine Haydens from our tree at Dos Pasos, as well as Kent and Keitt, two excellent grafted varieties now growing in the drier part of the valley, near the road, as well as two other grafted varieties, name unknown, quality very good, that we have reproduced.

Avocado, ***aguacate***, *Persea americana Mill.:* 80 trees, many individual local seed varieties, very good quality, some old, large trees, many new from seed selected by us—with years in production. Season is June to October. A few years ago a deadly root fungus, *fitostora* wiped out most of the avocado trees in the upper valley, including Akujena. By laying down large amounts of mulch we were able to save most of the trees at Dos Pasos, but they did not produce as they did before the disease. Over the years the avocado trees have continued to improve production. At Fruturo we have 5 producing trees though not as high quality as our eastern trees. We are planting numerous avocados from good seed there, and three grafted Pollock avocado plants, as they grow very well there.

Cashew, ***merey***, *Anacardium occidentale:* Several hundred trees, most already established, we have selected and planted a few with large nuts and good-eating fruit. Red, yellow and crosses, much variety. March to August, abundant production, we sell the nuts in local *campesino* market.

Orange, ***naranja***, *Citrus sinensis:* 40 trees - 5 valencia, 1 pineapple, 10 other grafted, 24 from selected seed. Main harvest Nov. - Feb. , some production year-round. Not perfect citrus climate, sometimes very good, sometimes not. Leafcutter ants a constant battle.

Tangerine, ***mandarina***, *Citrus reticulata:* 25 trees - 3 grafted, 2 types from seed, good quality. Less attractive to leafcutter ants than other citrus.

Grapefruit, ***toronja***, *Citrus x paradisi:* 4 trees. Some production year round, trees prone to disease.

Lime (key lime), ***limón***, *Citrus aurantifolia:* 10 trees, disease (and theft) vulnerable. 4 new in Fruturo,

Lime (Persian), ***limón francés***, *Citrus latifolia:* 2 or 3 trees. In Fruturo 4 adult trees, 12 grafted seedlings growing quickly.

Rough Lemon, ***limón cajero***, *Citrus jambhiri:* good production almost all year, disease resistant.

Tangelo, *Citrus x tangelo:* 1 mature tree, fruit somewhat insipid, 1 younger tree of better quality.

Pummelo, *Citrus maxima:* 5 trees.

Orangelo, ***chironja***: cross of orange x grapefruit; 2 trees.

Coconut, ***coco***, *Cocos nucifera:* 17 trees. Dwarf - 3 types; Tall from local seed. Sudden losses the last three years due to disease.

Jakfruit, ***jaca***, *Artocarpus heterophyllus* Lam.: 30 trees. Very successful introduction, growing well in all places. Also planted in Cumaná, Cariaco (arid climate) where it has proven to be very productive, and Cocollar, Caripe (cool, humid mountain).

Champedak, *Artocarpus integer Merr.* : 2 trees, has had disease or deficiency problems.

Breadfruit, ***arbol de pan***, *Artocarpus altilis*: 3 trees in production, several seedlings. We have had trouble with loss of trees to root disease or other. Difficult to propagate.

Breadnut, ***castaña***, *Artocarpus altilis*: 4 trees. Easy to reproduce.

Durian, *Durio zibethinus,:* 120 trees, 8 in production, a number from seed of our own trees; trees attempted in Cumaná, arid climate, have died; establishing seedlings in our lower, less humid place has been difficult. In the last three years we have managed a large increase in durian plantings at our places as well as with neighbors. There are 30 in Fruturo and 40 planted by farmers and ag schools in the state of Apure.We are very excited about this difficult introduction. Chuck Ehmann brought the seed--which is only viable for one week--from Malaysia in a heroic run of jets, bus, on foot. The seeds were from a durian fruit that won a fair of hundreds of durian. Other seed were from a selected heirloom varieties. The trees are delicate to start, needing heavy shade and irrigation. We have the first producing durian trees in Venezuela, and have been distributing seedlings to neighbors, farmers and university horticulturists. Our modest production is in great demand from the local Chinese populace.

Mangosteen, ***mangostán***, *Garcinia mangostana* L.: 3 trees in production, 12 seedlings, several seedlings in nursery. We listed mangosteen as a failed introduction with varied attempts by us with seedlings brought from U.S., Thailand, Puerto Rico. Then I found one seedling in the nursery that began to grow after years with only cotyledons. We planted it, and after more than 20 years, it produced fruit (worth the wait). We have planted the few seeds from it and found that with immediate planting they do not go through years of just two seed leaves with no growth, like our introductions from abroad, and began to produce sooner, in 10 years.

Akee, ***seso vegetal***, *Blighia sapida: 9* trees, 2 varieties. Successful introduction that has been producing for many years now. Troubled by humidity.

Canistel, ***huevo vegetal***, *Pouteria campechiana:* 12 trees. Producing; fruit occasionally damaged by fruit fly maggots. Not attacked by leafcutter ants.

Sapote (red), *Pouteria sapota:* 3 trees. Producing, already new seedlings from these first trees.

Sapodilla, ***níspero***, Manilkara sapota *(Achras* sapota): 18 trees; 2 grafted, others from carefully selected seed. They have been producing for several years, but the climate is not favorable to them, too humid. Mediocre quality, some trees won't fruit, fruit subject to worms.

Black Sapote, ***sapote negro***, *Diospyros ebenaster:* 10 trees. They have been producing for years; trees have grown well. Also planted in Cariaco and Cumaná (arid, sea level).

Malay Apple, ***pomalaca***, *Syzygium malaccense* Merr & Perry: 3 trees in Fruturo that produce several harvests per year, 1 young tree at Dos Pasos now.

Star Apple, ***caimito***, *Chrysophvllum cainito:* 2 trees; fruit very susceptible to fruit fly worms.

White Sapote, ***sapote blanco***, *Casimiroa edulis:* 3 trees. Presumably too warm, too low altitude here, but one in Akujena has carried a few fruit.

Chupa-chupa (yellow andean sapote), *Quararibea cordata:* 2 trees at Dos Pasos died after several years of poor growth; the one at Akujena has had difficulties, but is producing its first fruit now.

Sugar Apple, ***riñón***, *Annona squamosa* L.: 2 trees in Fruturo. The first fruit tree of our plantings to produce fruit at Dos Pasos, but the climate is too humid, most trees we've planted have eventually died, fruit is seldom good, attacked by insects and disease. They do well at house in Cumaná.

Soursop, ***guanábana***, *Annona muricata* L. : 5 trees. 30 trees in production at Fruturo. This fruit used to grow practically wild, was abundant throughout Venezuela, except at high altitudes. Now it is a difficult crop, subject to disease and insect damage.

Soncoya, ***manirote***, *Annona purpurea*: 4 trees, young.

Pond Apple, *Annona glabra* L.: 2 trees; producing.

Mountain Soursop, *guanábana cimarrona*, *Annona montana* Macf. 5 trees; producing.

Biribá, *Rollinia mucosa* Baill.: 11 trees. In production, starts carrying fruit 3 or 4 years after planting. This annonaceous fruit is of good quality and well adapted to our climate, a felicitous introduction after other *Annona* failures.

Pejibaye, ***pijigüao***, *Bactris gasipaes* HBK.: 12 trees that have been producing for years with many shoots--a rapid entry into production of trees that are growing well here. Does better it higher, more humid altitude. 3 newly planted in Fruturo.

Mulberry, ***mora***: 4 trees of a tropical variety whose fruit is sweet rather than acid, popular with birds as well as children.

Macadamia Nut, *Macadamia integrifolia*: 2 trees, the majority planted at the lower latitude in DP and Peligro died after a few years. One at Akujena has set fruit for three years now, the nuts are very good raw.

Surinam Cherry, ***pitanga***, *Eugenia uniflora*: 12 trees; red and black varieties. Some have produced both in Akujena (whence came some of our later trees) and in DP and Peligro. Some have grown a lot and not yet produced, one produced after long delay. There is a wild fruit here, pauji, that is similar.

Papaya, ***lechosa***, *Carica papaya* L.: 18 trees, 6 in Dos Pasos, 12 in Fruturo, more on the way.

Guava, ***guayaba***, *Psidium guajava*: 15 trees various types. Grows wild, usually wormy.

Wild Guavaberry, ***guayabita***, *Eugenia punicifolia or Psidium sartorianum* (Berg): 2 or 3 trees cultivated, grows wild, common.

Ice-cream Bean, ***guamo***, *Inga* edulis: 5 trees of large pod; many wild types.

Mauritius Palm, ***moriche***, *Mauritia flexuosa:* 15 trees, grows next to slow-running water.

Date Palm, ***datil***, *Phoenix dactylifera* L.: 2 trees. Do not belong in this climate--too humid--and need male and female trees.

Güeto, Many trees; wild palm with edible fruit, mostly not planted by us, but cleared.

Carambola, ***tamarindo chino***, *Averrhoa carambola*: 5 trees. Two large tree producing abundantly, the rest young trees just beginning to flower.

Mamey, *Mammea americana*: 5 trees, two have produced, not very well, the other young.

Monk's Plum, ***ciruela de fraile***, *Bunchosia argentea:* 2 trees.

Barbados Cherry, ***cereza***, *Malpighia glabra*: 3 trees.

Monos Plum, 3 trees. Been there for years and have never produced.

Purple Mombin, ***ciruela huesito***, *Spondias purpurea*: 3 trees. Prone to fruit fly worms.

Rose-apple, ***pomarrosa***, *Syzygium jambos*: wild volunteers.

Lanson, *Lansium domesticum:* 4 trees, growing slowly, but okay now after difficult start. These finally produced in Akujena, fruit was popular, so now we have a number of seedlings recently planted.

Cacao, *Theobroma cacao*: 8 plants, several producing at Dos Pasos.

Ginep, ***mamón***, *Melicoccus bijuga*: 2 trees, one doing well, other in poor soil growing slowly.

Cotoperiz, *Talisia oliviformis:* 2 trees, of good size, but have yet to produce.

Loquat, ***níspero japonés***, *Eriobotrya japonica Lindl.*: 2 trees at upper place. The altitude is still too low for this fruit tree, but they do produce a few acid fruits.

Coubaril, ***algarrobo***, *Hymenaea courbaril:* 3 or 4 trees semi-cultivated--grows wild here.

Merecure, *Moquilea macrocarpa or Licania pyrifolia*: 2 trees, grows wild in southern Venezuela. **Tree Gourd**, ***totumo***, *Crescentia cujete L.* : 9 trees, various types of gourds.

Herbaceous Introductions

Bananas, ***cambur***, *Musa acuminata or Musa x paradisiaca* L.: 12 varieties.

Plantain, ***plátano***, *Musa acuminata or Musa x paradisiaca* L.: Many producing in fruturo. At Dos Pasos the ones planted fruited once, then petered out.

Pineapple, ***piña***, *Ananas cosmosus merr.*: many plants, 3 varieties.

Sugar Cane, ***caña,*** *Saccharum officinarum L.*: 3 varieties.

Passion Fruit Vine, ***parchita*** *, Passiflora edulis.* Also now a *passionfruit* vine from Hawaii, species name not known, but good to eat, sweet.

Amaranth, ***pira***, *Amaranthus* spp.: 2 varieties of spinach amaranth. Grain type and salad type did not last.

Quail Grass, *Celosia argentea:* similar to amaranth, spinach.

Chaya, *Chaya onidoscolus:* from Mexico, nutritious leaves and shoots, edible cooked. Easy to grow, tolerant to both drought and humid climate.

Elephant Grass, ***pasto elefante***: The Ag school in Cariaco gave us 6 cuttings of their most productive cut fodder. It is easy to grow and much liked by the donkeys and mules, so it is now planted throughout the valley, spread from those six cuttings.

Jamaican Sorrel, ***rosella****, Hibiscus sabdariffa:* red calyx high in pectin, used as a drink or for preserves. Leaves also edible, sour. Has recently become commercially popular.

Ginger, ***gengibre***, *Zingiber officinale:* 2 varieties.

Tries that Did Not Take

Rambutan, *Nephelium lappaceum:* seedlings transplanted from Puerto Rico that lasted a while, then faded out.

Persimmon, *Diospyros kaki:* Seedlings survived for many years, but hardly growing, and no chance of producing; some died shortly.

Cherimoya, *Annona cherimola mill*: sprouted and survived a year, but needs higher altitude, 1100m and up.

Apple, ***manzana***, *Malus domesticus*: a tropical variety of *delicious* has been developed in Venezuela, but was very susceptible to disease from humidity and insect pests in our trials. Needs either a higher altitude or drier climate.

Tree tomato, ***tomate de arbol*** *Cyphomandra betacea:* survived 6 months at Akujena, but needs higher altitude.

Carob, *Ceratonia siliqua*: poor soil may have caused the demise of the seedling, but more likely it required a Mediterranean climate.

Litchi, *Litchi chinensis:* needs Mediterranean climate, some cool days to set fruit.

Fig, ***higo***, *Ficus carica* L.: produces in arid climate of Cumaná, but ferociously attacked by pests on the Brito, too humid.

Grape, ***uva***, *Vitis vinifera:* same as fig, needs arid climate, though one vine of a very resistant variety continues to grow but not produce at Dos Pasos.

Kiwi, *Actinidia chinensis*: needs cooler climate.

Tamarind, *Tamarindus indica* L. : grows on lower Brito and in Cumaná, but dies out after a couple of years at Dos Pasos and Akujena.

Strawberry, **blackberry** and **sweet passion fruit** needed higher altitude, cooler climate. Doing well at our house in Mérida.

Pomegranate, ***granada***, *Punica granatum:* needs the more arid climate of Cumaná.