Perennial Vegetables

Plant once and harvest for years.

Beth Doerr
ECHO Forum, Accra

Perennial Vegetables

Perennials: plants that live for at least 3 years

Vegetables: plant parts that are typically cooked and taste savory (culinary definition)
Perennial Vegetables

Benefits:
- Year round food
- Healthy ecosystem
- Provide beauty
- Low maintenance
- Build soil
- Multi-purpose

Records indicate that 3000 native African plants have been used for food. Out of Africa’s top vegetables today only 3 are native: cowpea, yam and okra.
Perennial Vegetables

Plant once and harvest for years.

Valuable Vegetables

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Local Names: Madze, efan, muotsu, swie, grins, hondi
**Amaranth** (*Amaranthus sp.*)

- Young leaves, stems and flower heads used; throw out water if using older leaves
- Young leaves and growing tips can be used in salads
- Leaf powder used to fortify other foods
- Leaves up to 33% protein with lysine and methionine, vit A, vit C, Fe, Ca
- Seeds have good protein content (%17) and oil; can be parched and milled into flour or popped
- Good forage crop for animals

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**Amaranth** (*Amaranthus sp.*)

- Can harvest within 3 weeks
- Avg green weight yield of 4-14t/ha; 40t/ha possible; 10m² yields 60kg
- C4 plant; shade tolerant
- 3000mm annual rainfall, 22-40C, well-drained soil, pH 5.5-7.5
- Climate: humid lowlands, dry savannas, uplands
Local Names: aboboi, akyii, epi roro, guiijiya, okboli ede, agbaroro
Bambara Bean (*Vigna subterranea*)

- Seeds of this plant are dug from the ground and it is comparable to groundnuts
- Immature seeds can be boiled, roasted or fried
- Dried seeds can be boiled, ground into flour, crushed into a paste, or made into a “milk”
- Considered a complete food: 60% carbohydrate, 20% protein, 6% oil, plus vitamins and minerals; rich in soluble fiber and high in calories
- Beans, leaves and crop residue good animal feed
Bambara Bean (*Vigna subterranea*)

- Avg yield 400kg/ha; potential yields 4000kg/ha
- There are sprawling types and bush types
- Fixes N; possible striga suppression
- Thrives in lateritic soils; produces in areas too hot and dry for groundnuts or maize; drought tolerant and withstands unreliable rainfall patterns; 90-180 days to mature
- 600-1000mm annual rainfall, 20-40°C, loose well-drained soil, pH 5-6.5
- Climate: humid lowlands, dry savannas, uplands
Baobab (*Adansonia digitata*)

- Leaves are steamed or cooked in soups and sauces
- Surplus leaves can be dried and stored
- 15% protein, all essential amino acids, vit A, vit C, Ca, Fe, K, Mg, Ph, etc, and dietary fiber
- Fruit and seeds are edible and used in various beverages and snacks
- Bark used as a fuel, fiber for cord and fabric
- Leaves make excellent animal feed

- Store 10,000 liters of fresh, clean water; claims of trees over 1000 years old; resist fire and drought
- Grows up to 20m tall and 30m circumference
- Scarify seeds by soaking in boiling water for 5 min; seedlings can grow about 1m per year
- 90-2000mm annual rainfall, 28-42C, does not like standing water
- Climate: dry savannas; might have potential in humid lowlands
Cassava (*Manihot esculenta*)

- Native to the Americas
- Leaves are very nutritious, high in protein (#2), vit A & Fe
- Roots are good source of carbohydrates
- Possible to harvest leaves while roots are maturing
- Does well on poor soils and low rainfall
- Tolerates low pH and high AL
- Does not tolerate flooding or saline soils
- Climate: humid lowlands, dry savannas, uplands
Local Names: sokoyokoto, soko, aodoyokoto

Celosia (*Celosia argentea*)

- Fresh young leaves, tender stems and immature flower spikes are edible and produce a tasty and nutritious soup
- Leaves contain 30% protein, vit A, vit C, Ca, & Fe
- Discard cooking water due to oxalates and nitrates
- Good for chickens or cattle (may accumulate oxalates)
- Ornamental and keep their color when dried
- Potential for striga suppression
Celosia (*Celosia argentea*):

- Often reseed themselves
- 3-6 weeks after sowing plants can be thinned and thereafter harvest new leaves and terminal shoots every 1-2 weeks for 3-5 months
- A 5m² test plot produced 8kg=16t/ha (green variety) 14kg=28t/ha (red variety)
- At least 600mm annual rainfall, frost sensitive, grows in most soils, weed potential (world’s prettiest)
- Climate: humid lowlands, uplands
Chufa/Tigernut (*Cyperus esculentus*)

One of the worst weeds for more than 30 countries

- Tubers contain starch, fat, sugar, protein, phosphorus, potassium, and vitamins E and C.
- Tubers contain almost twice the quantity of starch as potato or sweet potato tubers.
- Tubers can be consumed raw, roasted, dried or baked
- Tubers can be ground into a flour and are used for a popular drink in many places called “horchata”.
- Tubers 20-36% oil and have potential as biodiesel.
Chufa/Tigernut \textit{(Cyperus esculentus)}

- One of the oldest cultivated plants of ancient Egypt
- Member of the sedge family
- One plant can produce over 1000 edible tubers in a single growing season
- Grows in almost any warm climate and thrives in difficult conditions
Cowpea (Vigna unguiculata)

- Leaves and stem tips can be steamed or boiled or dried and ground into a leaf powder
- Green pods/beans are boiled, steamed, fried or roasted
- Dried seeds are boiled or made into flour
- Cowpea seed is rich in protein (24%) and in digestible carbohydrates and lysine along with 2% oil
- Low in antinutrients
- Leaves and plant residue good for animal feed and can be dried and bundled as hay
Cowpea (*Vigna unguiculata*)

- Drought tolerant and adapted to poor soils
- Deep roots stabilize soil, biomass protects ground and conserves moisture, fixes N, good intercrop
- Some can mature with as little as 300mm rainfall
- 60-240 days to maturity; typically flower when rains end
- Avg yield 100-300kg/ha dry seed; potential yeilds of 2000kg/ha
- Insects are major constraint, along with humidity
- Climate: dry savannas, uplands

Cowpea (*Vigna unguiculata* subspecies *sesquipedalis*)

- Tender, stringless, succulent, sweet pods can reach 100cm
- High yielding in small spaces
- Developed in Asia from cowpea ancestors
- Leaves harvested in 21 days, pods in 60 days, productive for several months; 11t/ha
- Climate: humid lowlands, dry savannas, uplands
Local Names: oro, oba, abesebuo, goron, biri, oro, moupiki, andok, bobo

**Dika** (*Irvingia gabonensis* and *I. wombo*)

- Edible fruits and seeds
- Fruits eaten fresh or made into jams or jellies or juice; have more vit C than oranges and also have vit A
- Nuts eaten raw, roasted, made into butter or cakes or ground and mixed with spices; kernels are high in oil and protein including 6 of 8 essential amino acids
- Oil used in margarine, soap and pharmaceuticals
- Once oil is extracted the kernel meal is a shelf-stable ogbono soup ingredient
Dika (*Irvingia gabonensis* and *I. wombolu*)

- Deciduous tree reaching 30-40m, native to western Africa
- Vegetative propagation (grafting, cuttings, budding and air-layering) is possible and budded trees produce fruits in 2-4 years
- Thrives in forest conditions with sun or shade, heat, humidity and loamy to clay soils; good for controlling soil erosion
- Climate: humid lowlands
Eggplant \((\textit{Solanum aethiopicum})\)

- High yielding, easy to grow and simple to harvest
- Fruits are cooked, they can be pureed like tomatoes, excess can be dried
- Fruits can be eaten raw
- Some types are sweet and some bitter
- Some have edible leaves (contain solanine so they must be cooked)
- Mild flavor and not especially nutritious; 92% water, some protein, vitamins, minerals and starch, good K
- Spongy texture absorbs other food’s flavor
Eggplant \textit{(Solanum aethiopicum)}

- Related to the Asian \textit{S.melongena}
- Fast maturing and produce for several months
- Storage life up to 3 months and transport well
- Tolerate shade, poor soils and small spaces
- Harvest 70-90 days after sowing; harvest continues 8-10 weeks; for leaves, 5-8 weekly harvests possible
- Yields vary, one test of 3 plants produced 10kg fruits
- 500-1200mm annual rainfall, 15-35C, well-drained soil
- Climate: humid lowlands, dry savannas, uplands

Local Names: neri, niri, guna shanu, denne nai, ibara, ito
Egusi (*Citrullus lanatus*)

- Melon grown for its large white seeds
- Seeds are ground into a flour and used in soups or dumplings or as a seasoning.
- Seeds can be roasted and ground to make a spread, popped like popcorn, parched and eaten as a snack, or compacted into patties and used as a meat substitute
- More than 50% oil (good quality for cooking), 30% protein, high in calories, 3 amino acids, B vitamins

- Seeds store easily
- Harvest 4-6 months after sowing; fruits can remain in the field and keep well
- Average yields of 2-5 fruits per plant
- Grows easily and thrives on poor soils, tolerates range of conditions from damp to dry
- Good ground cover, suppresses weeds and protects soil, few pests or diseases
- 250-500mm annual rainfall, 23-36C, loose soil
- Climate: humid lowlands, dry savannas
Lablab (*Lablab purpureus*)

- Immature pods and seeds are boiled or roasted
- Mature seeds can be used like any bean, boiled, roasted, processed into tofu or tempeh or a paste
- Sprouts are similar to mung bean sprouts
- Leaves and flowers can be used in soups and sauces
- Seeds are 25% protein and have lysine; antinutritional compounds; leaves are 28% protein and high in Fe
- Varieties developed for forage and green manure crops; fodder yields of 5-10t/ha, good for silage, withstands grazing or cutting, can be grazed 60 days after planting

Lablab (*Lablab purpureus*)

- Indian cultivar produced 7.5t/ha, avg yield 2-5t/ha; some produce pods in 60 days; can live 2-3 years
- Deep roots make it a good ground cover, fixes nitrogen, high yielding, resists droughts, stays green and productive well into the dry season; suppresses weeds and rejuvenates soils
- Thrives on acidic soils with low fertility and high Al
- Thrives in high heat and humidity as well as dry areas
- 600-900mm annual rainfall, 18-40C, well-drained soils
- Climate: humid lowlands, dry savannas, uplands
Local Names: nere, nete, dawa-dawa, kinds
Locust Bean (*Parkia biglobosa*)

- Pods mature in dry season
- Sticky, sour pulp is 60% sugar, rich in protein, vitC and food energy
- Pulp is eaten fresh, made into drinks and dried into powder then sprinkled over rice or meat
- Seeds made into fermented sticky balls (dawadawa) for seasoning and soups; keeps well without refrigeration; 30% protein with high lysine levels, 20% fat, 12% sugar, 15% starch, 12% fiber and have Ca and Fe and vitB2

- Seeds sprout easily and grow quickly; grows 20m tall
- Grafting and budding have been done successfully
- Pruning said to speed fruiting
- Yield around 350-500kg/ha
- Provide food, edible oil, fodder, lumber, firewood, green manure, toothbrush sticks
- Survives fire, thrives in full sun and tropical heat
- 600-700mm annual rainfall, frost sensitive, any soil
- Climate: dry savannas
Marama (*Tylosoema esculentum*)

- Seeds rival peanuts or soybeans in nutritive quality and are eaten raw, roasted, boiled, or pounded
- Seeds provide a quality vegetable oil and remaining seedcake is 52% protein
- High protein tubers can be baked, boiled or roasted; typically harvested at around 1kg but one was weighed at 300kg
- Tubers are 90% water, living cisterns which can hold 250kg of water
Marama (*Tylosema esculentum*)

- Survives in poor quality soil under harsh climates (temperatures up to 50°C and little water)
- May take 2-4 years for seed production and for tubers to reach harvestable size
- Climate: semiarid
Local Names: fabourama, fra-fra potato, saluga, tumuku

Mint Potatos (*Solenostemon rotundifolius*)

- Slightly sweet tubers can be eaten raw, boiled, roasted, baked or fried and can replace potatoes in most recipes.
- Tubers can also be dried or processed into flour and stored.
- Nutritious and productive they have vit A, Ca, Fe and 5-13% protein that includes several amino acids.
Mint Potatoes (*Solenostemon rotundifolius*)

- Tubers ready to harvest after 120-200 days
- Produce large amounts of food in a small area; avg yield of 15t/ha and potential yields of 50t/ha
- Propagated by tubers but maybe stem cuttings as well
- Tolerant to high temperatures and rainfall
- 1000mm annual rainfall, deep well-drained soils
- Climate: humid lowlands, dry savannas
- [*Plectranthus esculentus* of Southern/Eastern Africa grows with 450mm annual rainfall]
Moringa (*Moringa oleifera*)

- Leaves can be eaten fresh or cooked or dried into a powder and contain 30% protein (#3), all essential amino acids along with vits A, B, C, Ca and Fe
- Young pods can be cooked and contain 20% protein, all essential amino acids along with vits A, B, C and minerals; mature pods can be cooked or pickled
- Immature seeds can be boiled, roasted or fried and also have oil and can purify water
- Flowers can be used to make a tea or fried
**Moringa** (*Moringa oleifera*)

- One tree can produce 1000 pods in a season and supply leaves year round
- Fast growing, 3-5m per year
- Grown by seeds or cuttings
- 250-1500mm annual rainfall, 20-40°C, well-drained soils
- Climate: humid lowlands, dry savannas, uplands
Okra (Abelmoschus esculentus)

- Pods can be boiled, stir-fried, fried, steamed, baked, grilled, pickled, dried, processed into a flour, etc; thickening agent; high in soluble fiber
- Tender leaves can be cooked or dried and powdered; contain protein, vit A&C, Ca, Fe
- Immature seeds can be eaten like peas
- Mature seeds can be roasted and ground as a coffee substitute; 40% oil producing good quality oil (short shelf life); seed meal used in foods for animals and people
- Stems contain high quality bast fibers and could be a good source for making paper and can be used as a fuel

Okra (Abelmoschus esculentus)

- Robust, productive, fast growing, high yielding plant
- Flowering begins 2 months after planting
- Yields approaching 9000kg/ha; 3 harvests per week for 30-40 days
- Adapts to difficult conditions and can thrive where other food plants are unreliable
- Climate: humid lowlands, dry savannas, uplands
Pigeon Pea (Cajanus cajan)

- Native to Asia
- Immature pods and seeds are boiled
- Mature seeds are boiled or ground into a flour
- Plants also produce fiber and stalks can be used as a fuel source
- Excellent fodder with high nutritional value

Pigeon Pea (Cajanus cajan)

- Seeds mature in 90-260 days
- Average yields of 700kg/ha
- Fixes N
- Drought resistant, can grow with 650mm annual rainfall, 18-30C
Shea \textit{(Vitellaria paradoxa)}

- Egg shaped nuts produce fat that remains solid in tropical conditions
- Shea butter used as cooking fat, in margarine and other foods; and also in soaps, ointments, hair products, skincare products, and to waterproof houses
- Seed kernels eaten fresh or roasted
- Fruit pulp is eaten fresh
- Flowers eaten in salads
- Labor intensive to process
Shea (*Vitellaria paradoxa*)

- Prevent wind erosion, good agroforestry tree; trees are fireproof
- Seeds germinate easily when fresh; difficult to transplant due to long taproot
- Trees take 12-25 years to bear fruits and 30-50 yrs for full productivity
- High yield of 45kg, avg yields 5-20kg of fruit per year = 3-4kg of kernels = 1.5-2kg fat but with traditional extraction equals less than 1kg of shea butter
- Climate: dry savannas
Sweet Potato (*Ipomea batata*)

- Native to the Americas
- Tubers can be boiled, roasted, baked, fried, shredded & toasted, or processed into flour or starch; rich in vit C&A, K and dietary fiber
- Tender leaves are boiled, steamed, stir fried, or dried and stored for later use; rich in protein, Ca, Fe, Zn, vit B
- Tubers vines and leaves make good animal feed
- Toyota has begun making biodegradable plastics from sweet potato starch

Sweet Potato (*Ipomea batata*)

- Avg time to harvest is 4.5 months; 2-9 months
- Grown from cuttings that are rested for 1-3 days
- Easy to grow, relatively free of pests and diseases, and relatively high production
- Able to produce more nutrients per hectare than almost any other crop on poor soils
- Survive at any temperature above freezing
- Require moist, well-drained soil; need adequate water for first few months and tolerate drought after that
- Climate: humid lowlands, dry savannas, uplands
Local Names: kutreku, kulege, akitereku, girigiri, kutonoso, efik, ibibio, pempo
Photo from Lost Crops book

Photo from Lost Crops book
**Yambean** (*Sphenostylis stenocarpa*)

- Seeds boiled, roasted or ground into a paste; 20-29% crude protein with good amino acid levels
- Leaves said to be edible but not much is known; possibly good fodder as well
- Tuberseaten fresh, steamed, boiled, baked, pickled, ground into a flour, etc; 11-19% protein (2x the protein of sweet potatoes or yams) with good amino acid levels

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**Yambean** (*Sphenostylis stenocarpa*)

- Pods mature 150 days after sowing and continue as long as climate remains conducive, harvesting usually ceases after 60 days; tubers take 5-8 months to reach harvestable size
- Seed yields of 2t/ha; tuber yields around 50t/ha
- Fixes N, potential to add 120-150kg N per ha; good in crop rotation for restoring soil fertility
- Tolerates acidic, infertile soils; 900-1400mm annual rain
- Climate: humid lowlands and uplands; grows on marginal soils
Valuable Vegetables

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- Yambean

References

- Lost Crops of Africa, Volume II, Vegetables
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- Plant Resources of Tropical Africa (PROTA)
- World Vegetable Center; AVRDC