
Dated June 2024

# Sweet Potato or Kumala *(Ipomoea batatas (L.) Lam.)*


Vanuavatu variety

**SCIENTIFIC NAME:** *(Ipomoea batatas (L.) Lam.)*

**COMMON NAMES:** Sweet potato (English), batata (Spanish), potato (Setswana), kūmara (New Zealand), kumala (Fiji)

**FAMILY:** Convolvulaceae

Sweet potato, a root crop originating from Central and South America, was introduced to the Pacific Islands by early Polynesians and European explorers. While some researchers argue it spread through birds and ocean currents, the predominant view supports human-mediated distribution (*Montenegro et al*., 2008).

The distribution and adaptation of sweet potato in the Pacific Islands demonstrates the culture of resilience of Pacific communities. It is cultivated as a perennial crop, although grown as annual in tropical and subtropical lowland agro-ecologies, although it is well adapted to other zones and can thrive in various environments, demonstrating its versatility. Pacific Islanders have long cultivated sweet potatoes due to their crucial role in the traditional food system. The crop helps mitigate food supply gaps caused by agro-ecological stressors such as pests, diseases, and extreme weather conditions.

Sweet potatoes are nutritionally beneficial, providing a good source of energy. The crop's various skin and flesh colors, including yellow, orange, and purple, are not just aesthetically pleasing but also nutritionally significant. Orange-fleshed varieties are rich in beta-carotene, while purple-fleshed varieties are abundant in anthocyanins, both powerful antioxidants.

A standard serving of 3 ½ ounces (100g) of sweet potato contains approximately 140 calories, meeting 7% of daily carbohydrate needs and 13% of daily fiber requirements (Bisone & Maretzki, 1982). Furthermore, sweet potatoes have a low glycemic index, meaning they are metabolized slowly, making them suitable for maintaining stable blood sugar levels (*Teow et al.,* 2007).

In Fiji, there are twelve (12) cultivated varieties of sweet potato. The Research Division of the Ministry of Agriculture in Fiji maintains a collection of about 37 varieties and accessions, reflecting the crop's agricultural importance and genetic diversity in the region.

In 2010, the Ministry of Agriculture and Waterways in Fiji introduced twenty (20) varieties of kumala (sweet potato) from the Secretariat of the Pacific Communities (SPCs) - Centre of Pacific Crops and Trees (CePaCT), followed by an additional ten varieties in 2012. In 2018, Golden Brown was released and with continuous evaluation, a second (2nd) variety has been selected and is now recommended for commercial cultivation in Fiji. This new orange-fleshed variety is not only nutritious but also drought-tolerant, with improved growth, palatability and yield characteristics.

Key features of this new variety include:

1. **High Starch Content:** With a starch content of 5.22%, it is suitable for flour processing.
2. **High Iron Content:** Containing 30.42mg/kg of iron, it is particularly beneficial for pregnant women, who require 27mg/kg of iron daily, and for infants, toddlers, and teenagers, who need 7mg to 15mg daily for growth.
3. **Brix Content:** It has a brix content of 3.36%, indicating its low sugar content, which makes it suitable for processing. The optimum sugar content for sweet potatoes generally ranges from 4.8% to 12.5%, depending on the variety (Zhang et al., 2002).

## CHARACTERISTICS OF THE NEW VARIETY

| | |
|---|---|
| **Origin** | CIP - Bangladesh |
| **Accession** | [IB/BD/01] MOHC |
| **Released name** | Vanuavatu |
| **Yield** | 17 – 25t/ha |
| **Soil type** | Clay loam sandy soil is best |
| **Best time to plant** | April – May towards cooler months, can be year round |
| **Growth habit** | Spreading type with long nodes |
| **Outline of leaf** | Cordate |
| **Storage root shape** | Elliptic |
| **Storage root weight** | 600 – 900g |
| **Av tubers/plant** | 6 - 8 |
| **Tuber flesh colour** | Orange |
| **Harvesting** | 100 – 120 days |
| **Reaction to drought** | Tolerant |
| **Pest and disease** | Resistant to scab, weevil damage around 4 months if not harvested on time |
| **Brix** | 3.36% low sugar content |
| **Protein** | 2.70 % |
| **Eating quality** | Excellent |

## PLANTING:

- Select healthy vine cuttings 30cm to 40cm with 4 to 6 nodes.

## SPACING:

- Traditional Farming System 0.8m x 0.4m
- Mechanized System 1m between rows x 0.4m between plants

## WATER REQUIREMENTS:

- Kumala does not necessarily need a lot of water

## FERTILIZER RATES:

- Kumala needs little amount of nitrogen but significant amount of phosphorus and potassium.
- Current recommendations NPK (13:13:21) at the rate of 100kg/ha or SSP @ 200kg/ha or MOP @ 150kg/ha.

## WEED CONTROL

- Hand weeding is recommended followed by coiling of vines. Do not allow vines to creep for long.
- Allow air circulation between plants.

## PEST AND DISEASE CONTROL

- Crop rotation with dalo and okra to minimise weevil damage
- Select tip of vines for planting materials for better growth.
- Use slips as planting materials

## HARVESTING:

- This variety matures within 100 – 120 days; it is advisable to harvest on time from planting on good loose soil.

## GROSS MARGIN FOR KUMALA

| a] DEVELOPMENT PRODUCTION SCHEDULE FOR KUMALA | | | | |
|---|---|---|---|---|
| | **UNIT** | **AMOUNT** | | **Yr 1** |
| Area to be Planted | Ha | 1.0 | | 1.0 |
| Area Harvested | Ha | 1.0 | | 1.0 |
| Av. Yield Per Ha | Mt | 21.00 | | 21.00 |
| Total Production (less 5% loss) | Mt | 19.95 | | 19.95 |
| **b] CROP BENEFITS** | | | | |
| Price per Ton | $/Mt | 1,360.00 | | 1,360.00 |
| [A] GROSS VALUE OF KUMALA | $ | 27,132 | | 27,132 |
| **c] CROP COSTS** | | | | |
| | | | | **Yr1** |
| **1] Input Costs** | **UNIT** | **AMOUNT** | **RATE ($)/ Unit** | **TOTAL ($)** |
| Ploughing | No | 2.00 | 250.00 | 500.00 |
| Harrowing | No | 2.00 | 200.00 | 400.00 |
| Ridging/Furrowing | No | 1.00 | 200.00 | 200.00 |
| NPK 13:13:21 | 50kg Bag | 2.00 | 64.00 | 128.00 |
| Urea | 50kg Bag | 2.00 | 151.00 | 302.00 |
| Diquat | Litres | 5.00 | 12.00 | 60.00 |
| Glyphosate | Litres | 4.00 | 15.00 | 60.00 |
| Variable Cost | No | 1.00 | 1,500.00 | 1,500.00 |
| Planting Material | Cuttings | 25,000 | 0.10 | 2,500.00 |
| **B] TOTAL INPUT COSTS** | $ | | | 5,650.00 |
| **2] Labour Costs** | **UNIT** | **AMOUNT** | **RATE ($)/ Unit** | **TOTAL ($)** |
| Planting | M/days | 5.00 | 50.00 | 250.00 |
| Maintenance | M/days | 20.00 | 50.00 | 1,000.00 |
| Fertilizing | M/days | 2.00 | 50.00 | 100.00 |
| Harvesting | M/days | 20.00 | 50.00 | 1,000.00 |
| Sorting/Packing | M/days | 10.00 | 50.00 | 500.00 |
| **C] TOTAL LABOUR COSTS** | $ | | | 2,850.00 |
| **D] TOTAL COST OF PRODUCTION** | $ | | | 8,500.00 |
| **E] GROSS MARGIN** | $ | | | 18,632.00 |

| SENSITIVITY ANALYSIS | | | | |
|---|---|---|---|---|
| | **UNIT** | | | |
| MARKETABLE | % | 100% | 90% | 80% |
| YIELD [reduce by 10%] | Mt | 19.95 | 17.96 | 15.96 |
| PRICE | $ | 1,360.00 | 1,360.00 | 1,360.00 |
| GROSS VALUE | $ | 27,132.00 | 24,418.80 | 21,705.60 |
| GROSS MARGIN | $ | 18,632.00 | 15,918.80 | 13,205.60 |
| **PRODUCTION COST PER KG (YR 1)** | **$** | **0.43** | **0.47** | **0.53** |