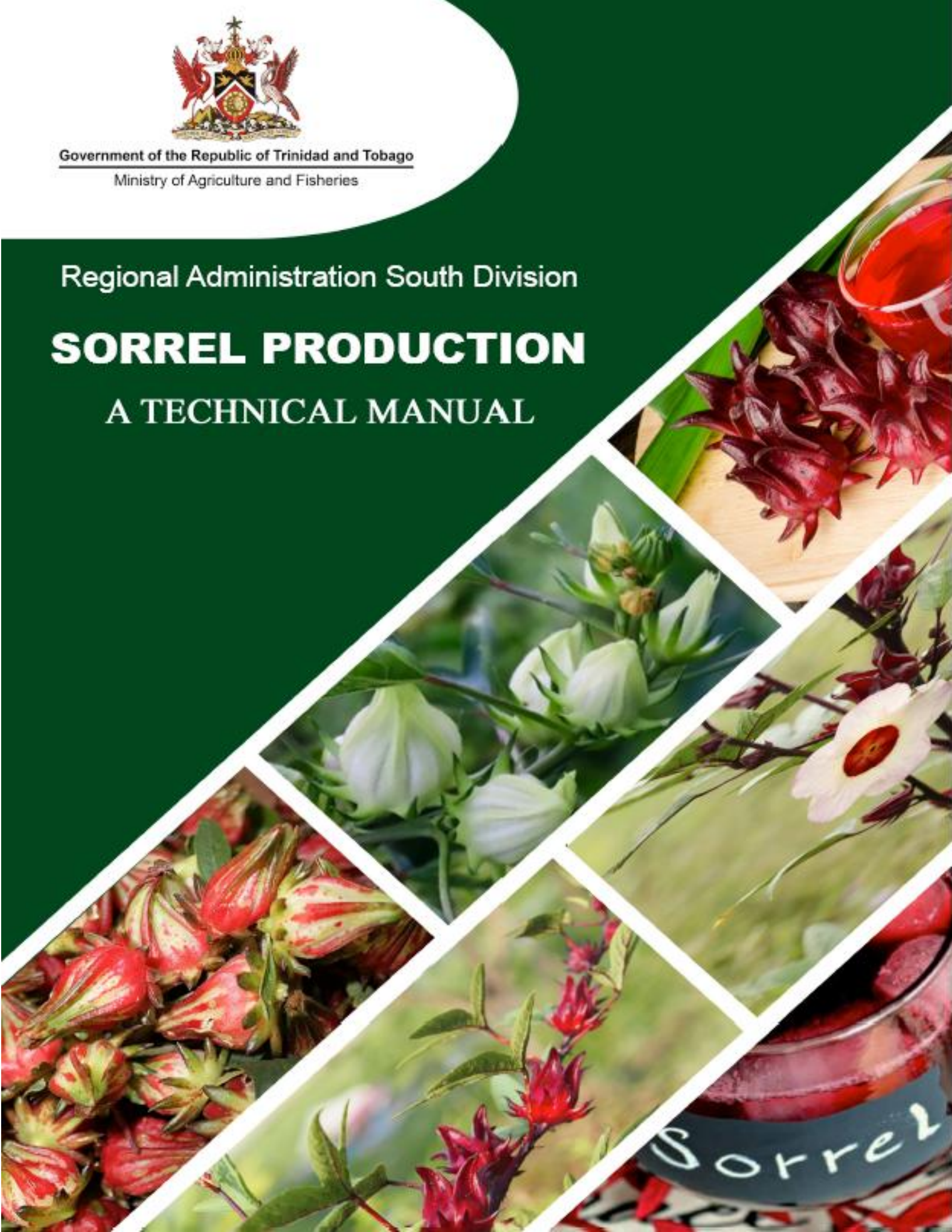
Government of the Republic of Trinidad and Tobago

Ministry of Agriculture and Fisheries

Regional Administration South Division

SORREL PRODUCTION

A TECHNICAL MANUAL



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A Technical Manual

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Regional Administration South Division

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Introduction

The *Hibiscus sabdariffa* Linn. plant, commonly known as Sorrel or Roselle is traditionally grown for its flavourful calyces that are used to make juices and liqueurs for the Christmas season. As a member of the Malvaceae family, Sorrel is related to other known plants such as Cocoa, Cotton, Okra/ Ochro and ornamental Hibiscus.

Plant Botany

Native to Africa, *H. sabdariffa L.* varieties are either annual or perennial, erect, herbaceous shrubs that are usually found growing in tropical and sub-tropical areas. Plants can grow to a height of 2.4 m with lower leaves that have three to seven deep lobes. Leaves are 7.5 cm to 12.0 cm long with serrated margins and are arranged in an alternate pattern on the plant's typically red main stem. Whilst the leaf blade is predominantly green, it has red venation (Morton, 1987), as illustrated in Photograph 1.

Photograph 1: Early Red Sorrel plant in the flowering and fruiting stage

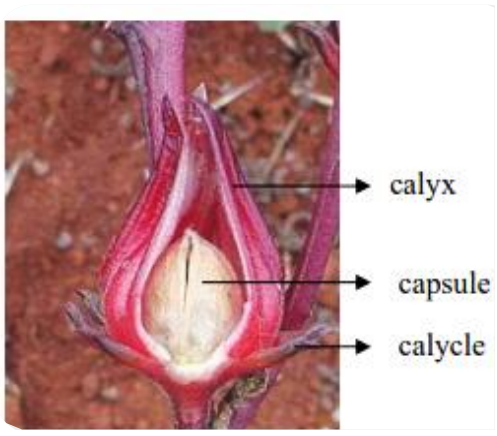
Source: Charles, 2025

The flowers are 8.0 cm – 10.0 cm in diameter and the petals can be found in a range of colours such as white to pale yellow with a dark red spot at the base of each petal (Buratai et al., 2017) as seen in Photograph 1.

At the flower base is the developing fruit (Photograph 2). Fruits comprise of the calyces, seed capsule and the epicalyx/ calycle (Photograph 3). The fruit's calyces are usually white, red, or deep red with the red fruit being the most common. Calyces grow to 2.5 cm - 3.5 cm in diameter and 4.2 cm – 7.2 cm in length when mature at about six months (Aminul Islam et al., 2021). These calyces enclose the velvety 1.25 cm – 2.0 cm long capsule, which turns from green to brown when mature (Morton, 1987). Fruit's seeds are dispersed from the mature capsule when capsules dry and split open.

Photograph 2: Developing fruit at flower base

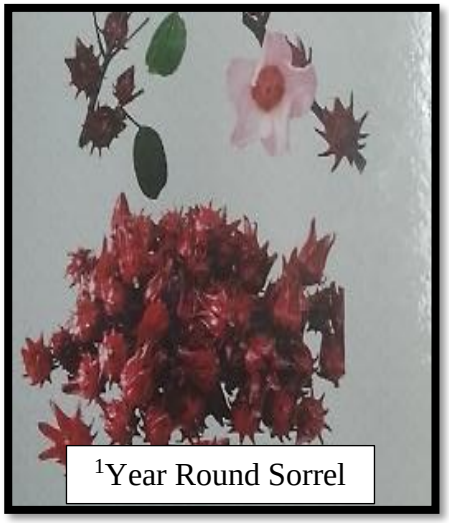
Source: Jackson, 2017



Photograph 3: Parts of the Sorrel fruit

Source: Jawaid, 2014

Cultivated Varieties



[1]Year Round Sorrel

[2]White Sorrel

Popular varieties grown in Trinidad are the Early Red and Black Sorrel varieties with the White and others being less common. Currently, there are five (5) accessions of Sorrel in the Biodiversity Unit at the Research Division, Ministry of Agiculture and Fisheries (MAF) including a Year Round variety. The characteristics of these accessions are outlined in Table 1 and illustrated in the adjacent numbered photographs.

Table 1 Characteristics of Five Varieties of Sorrel

Characteristics	Varieties				
	[1]Year Round Sorrel	[2]White Sorrel	[3]Black Sorrel	[4]Pink and White Sorrel	[5]Early Red Sorrel
Flowering Period	Year round	Short day flowering	Short day flowering	Short day flowering	Short day flowering
Flower Colour	Pink with a red colouration at the base of petals	White with a yellow colouration at the base of petals	Pink with a red colouration at the base of petals	Yellow with a red colouration at the base of petals	White with a red colouration at the base of petals
Maturity Period	Approx. 100 days before first harvest	Approx. 165 days before first harvest	Approx. 123 days before first harvest	Approx. 165 days before first harvest	Approx. 165 days before first harvest
Fruit Colour	Red	White	Black	Pink and white	Red
pH	2.18	2.64	2.25	2.58	3.21
Brix/ Sugar Content	1.9 °Bx	0.7 °Bx	1.7 °Bx	1.1 °Bx	0.6 °Bx
Total Acidity	1.16 % (w/w)	0.97 % (w/w)	1.51 % (w/w)	0.98 % (w/w)	0.57 % (w/w)
Vitamin C Content	19.71 mg/ 100 g	13.10 mg/ 100 g	28.80 mg/ 100 g	13.13 mg/ 100 g	13.71 mg/ 100 g

The Black Sorrel is noted as having the highest Vitamin C content compared to other varieties while the Early Red has the lowest total acidity.

[3]Black Sorrel

[4]Pink and White Sorrel

[5]Early Red Sorrel

Source: Biodiversity Unit, Research Division, MAF

Uses of the Sorrel Plant

Traditionally in Trinidad and Tobago, Sorrel is harvested in time for the Christmas season, where its calyces are used to make Sorrel beverages i.e. juice, wine and liqueur. However, there are other uses as it relates to the different parts of the plant as listed below (Aminul Islam et al., 2021, Apaliyaa et al., 2021 and Ahiduzzaman et al., 2021) and shown in the adjacent Photographs 4 - 6:

Calyces:

- Jellies
- Sauces
- Syrups
- Salads
- Herbal teas
- Food colouring and flavouring

Leaves:

- Salads
- Seasoning
- Cough remedy
- Antihelminthic (Dewormer)

Stems:

- Salads
- Cordage

Flower:

- Decorations
- Tonic tea

Seeds:

- Coffee substitute
- Additive to soups and sauces
- Oil (soap, paint and cosmetics)
- Laxative

Plant:

- Livestock fodder
- Decorative floral arrangements

Root:

- Aperient (Constipation reliever)

Photograph 4: Sorrel Soap
(made from the dried and powdered calyces)
Source: sara_studio, 2025

Photograph 5: Sorrel Liquor
(made from the calyces)
Source: Exquisite Brands, 2024

Photograph 6: Sorrel Salad
(made from the calyces and leaves)
Source: sooziethefoodie, 2022

Nutritional Composition

According to, Aminul Islam et al. (2016) nutritionist have reported that the calyces of Sorrel are high in calcium (Ca), potassium (K), magnesium (Mg), sodium (Na), iron (Fe) and B vitamins (niacin and riboflavin). Table 2, gives a comparative breakdown of the unique nutritional characteristics in 100 g of fresh Sorrel calyces, leaves and seeds.

Table 2 Nutritional composition of 100g of fresh Sorrel calyces, leaves and seeds

Constituents	Fresh Calyces	Fresh Leaves	Seeds
Moisture	9.20 g	85.60 g	8.20 g
Protein	1.15 g	3.30 g	19.60 g
Fat	2.61 g	0.30 g	16.00 g
Fibre	12.00 g	10.00 g	11.00 g
Energy	44.00 kcal	43.00 kcal	411.00 kcal
Ash	6.90 g	1.00 g	7.00 g
Calcium	12.63 mg	213.00 mg	356.00 mg
Phosphorus	273.20 mg	93.00 mg	462.00 mg
Iron	8.98 mg	4.80 mg	4.20 mg
Carotene	0.03 mg	4,135.00 µg	-
Thiamine (Vitamin B1)	0.12 mg	0.20 mg	0.10 mg
Riboflavin (Vitamin B2)	0.28 mg	0.45 mg	0.15 mg
Niacin (Vitamin B3)	3.77 mg	1.20 mg	1.40 mg
Ascorbic Acid (Vitamin C)	6.70 mg	54.00 mg	trace amount
Carbohydrates	10.00 g	9.20 g	51.30 g

Source: Aminul Islam et al., 2016

A Sorrel Farmer's Outlook
Featured Farmer - Mr. Carlvin Delfish

Agriculture is a means of gaining independence, as it allows for the ability to make nutritious food readily accessible. However, this is not without challenge, as farming can be:

- labour intensive;
- stricken by increasingly high input costs;
- lacking in market opportunities;
- subjected to price volatility;
- affected by fluctuations in weather conditions;
- subjected to difficulty in accessing financing;
- burdened by pests and diseases;
- impacted by the unavailability of resources such as water and arable land and;
- subjected to praedial larceny.

Despite these many challenges, the farming community still perseveres because of the love for the Industry and the rewards that can be gained such as a steady income, productivity and customer satisfaction. Therefore, as a crop farmer the goal for my farm is sustainability whilst obtaining optimal productivity and high quality yield at the lowest cost of production.

Sorrel production has proven to be lucrative to me. My marketing channels include the National Agricultural Marketing and Development Corporation (NAMDEVCO) Farmers' Market, Municipal Markets and individual orders. Customers' response has always been positive, as they are satisfied with both the quality and price of my fresh produce. Whilst other varieties are available, customers tend to prefer the Black Sorrel for its taste and deep rich colour when making their traditional Christmas drinks.

Like any other commodity, to produce a successful Sorrel crop, you must adhere to good agricultural practices such as proper field sanitation, pest and disease management and other pre and post production practices.

Sorrel whilst not a crop commonly grown throughout the year, it is an excellent crop of choice for me because of its low maintenance, high customer demand and profitability.

Photograph 7: Mr. Carlvin Delfish in his Sorrel field
Source: Delfish, 2023

Site Selection

When choosing an area to establish any crop, factors such as site history, exposure to sunlight, soil type, topography, water availability and soil pH should be considered. This is important because it could impact:

- crop growth and development;
- crop yield;
- pest and disease incidence;
- soil health and;
- soil retention capability of nutrients and water.

For optimal Sorrel production, choose a site with the following features:

- open to direct sunlight (at least six hours);
- soil with good physical structure and tilth i.e. the soil is friable and allows for ample water filtration, aeration in the root zone, promotes seedling emergence and root penetration for the uptake of soil water and nutrients e.g. loamy soils and;
- soil pH of 4.5 – 7.0.

Land Preparation

When planting on heavy soils i.e. clayey soils, plough and refine the soil to a depth of at least 20.0 cm (Simpson and Johnson, 2015) and then prepare ridges spaced 1.5 m apart and 0.6 m high (Figure 1) to ensure efficient movement of water out of the root zone especially under high rainfall conditions.

On lighter soils i.e. sandy soils, it may not be necessary to plough the soil but ridges should be made, as any waterlogging can be detrimental to Sorrel plants (Simpson and Johnson, 2015). The use of raised beds is very effective in low areas since the area may be prone to increased flooding and waterlogging.

A soil test is recommended prior to planting, as it indicates the soil's nutrient status, its pH and provides fertilizer recommendations based on the health of the soil in the selected area. Soil testing can be accessed through the Research Division, Ministry of Agriculture and Fisheries (*at no cost*) or at private soil testing institutions. If accessing soil testing services through the Ministry, requests can be made via County Offices or directly to the Research Division.

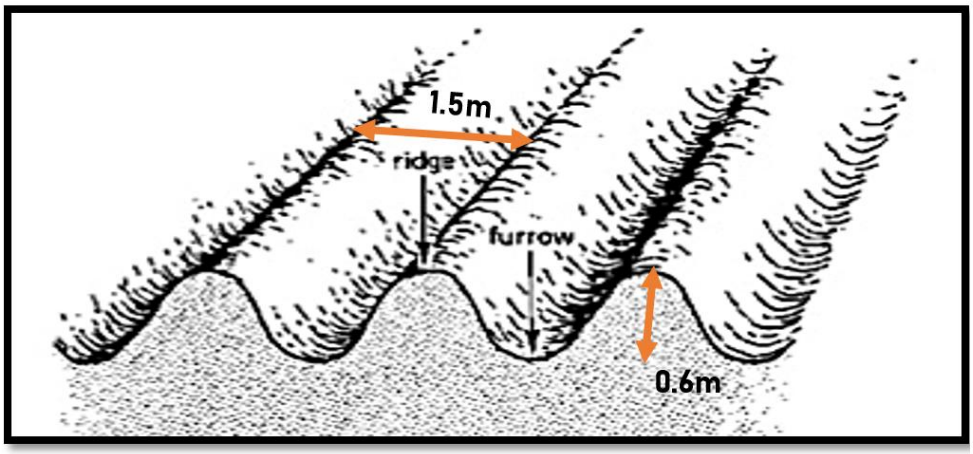


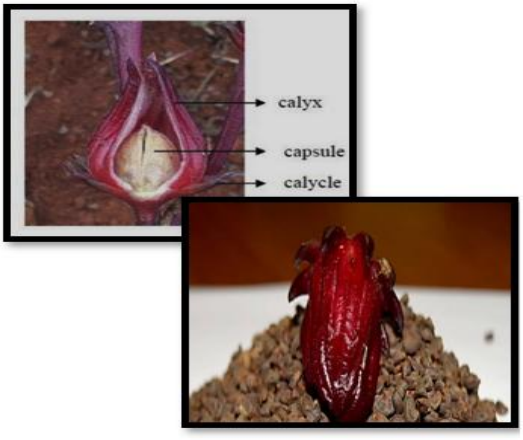
Figure 1 **A top view and cross-section of furrows and ridges**
Source: FAO, 2019

Preparation of Planting Material and Planting

Farmers who produce Sorrel sometimes use transplanted seedlings, if not they sow saved or purchased seeds. Alternatively, stem cuttings can also be used for propagation (Gardenia, 2025). However, the use of seeds is the most common practice.

According to, Simpson and Johnson (2015) seedlings produced in nurseries are susceptible to dieback because of shock, as the young plants' roots are very sensitive and are impacted by the transition into open field conditions. Moreover, field conditions are not sterile and transplanted seedlings that have not been exposed to soil-borne pathogens are more susceptible in comparison to seedlings produced from direct seeding.

When selecting these kidney-shaped, light brown seeds as seen in Photograph 9, for direct seeding or nursery production, choose seeds from the capsules of fruits (Photograph 8) that are from pest and disease-free plants, with large mature fruits to maximize yield, crop quality and profits. Generally, seeds would germinate within 7 – 10 days of planting.



Photograph 8 (Top): Parts of the Sorrel fruit

Photograph 9 (Bottom): Sorrel fruit and seeds

Sources: Jawaid, 2014 (Top) and Trinidad and Tobago Newsday, 2021 (Bottom)

Sorrel is usually planted in May/ June to coincide with the rainy season and the shorter day periods. With the exception of the Year Round variety, Sorrel is generally photoperiodic i.e. the plant's physiological processes such as flowering are stimulated by the relative lengths of daylight and darkness that the plant experiences. Despite the variety, plants should be irrigated from planting to maturity if rainfall is not adequate. The use of drip irrigation is recommended as it regulates the amount of water which is dispensed to each plant root and it uses a small amount of water compared to other irrigation methods (Simpson and Johnson, 2015).

General planting guidelines when using seedlings:

- use seedlings that are about 15.0 cm tall;
- avoid damage to the seedling's roots as this increases their susceptibility to soil borne diseases;
- individual seedlings should be planted in planting holes spaced 1.5 m x 1.5 m between and along ridges at a depth of 4.0 cm – 5.0 cm (4,305 holes/ ha.) or (1,742 holes/ ac.) and;
- water seedlings after planting.

General planting guidelines when using seeds:

- set 3 - 4 seeds directly in the field per planting hole;
- holes should be spaced 1.5 m x 1.5 m between and along ridges and dug to a depth of 2.0 cm – 3.0 cm;
- thin out seedlings by 50% at the 2 - 3 leaf stage and;
- water seeds after planting.

Weed Management

A weed can be simply defined as any unwanted plant. These unwanted plants compete with the crop for space, nutrients, sunlight and water; reducing crop yields. Weeds can also harbour pests and diseases that can affect the growing crop.

In Sorrel production, weeds are usually removed or controlled either manually i.e. cutlassing or mechanically with the use of a brush cutter as seen in Photograph 10. Weed control is especially done prior to the time when the plant's canopy is large enough to shade the ground and suppress weed growth. This is usually 4 - 8 weeks after planting. Mulches can also be used to subdue weeds and as an added benefit help retain soil moisture (Simpson and Johnson, 2015).

A pre-emergent herbicide can also be used prior to planting. This approach subdues weed growth, giving seeds and seedlings enough time to establish.

Photograph 10: Mechanical weed management using a brush cutter

Source: Delfish, 2023

Fertilizer Application

Fertilizers whether organic or synthetic add nutrients to the soil. Use of fertilizers encourages the plant to produce higher yields. A soil test can be done to determine the specific types and amounts of fertilizers to be used for growing the crop at the selected site.

When using manure, it should be well rotted and incorporated in the soil during land preparation and not used as a top dress as is the common practice. Top dressing of fertilizers may result in the following:

- an increase in leaching of nutrients;
- inaccessibility of some nutrient elements to the plant e.g. phosphorus. As once placed outside of the root zone it would not be utilized by the plant as the nutrient is not very mobile;
- prolific weed growth which serves as a reservoir for pests and diseases and;
- serve as a source of contamination and eutrophication of surrounding water sources.

Reasons to use fertilizers:

- To replace lost nutrients from the soil
- To provide the correct balance of nutrients in the soil
- To correct nutrient deficiencies in plants

Rate of application depends on:

- Stage of plant growth
- Soil condition
- Fertilizer analysis

General NPK fertilizer application guide:

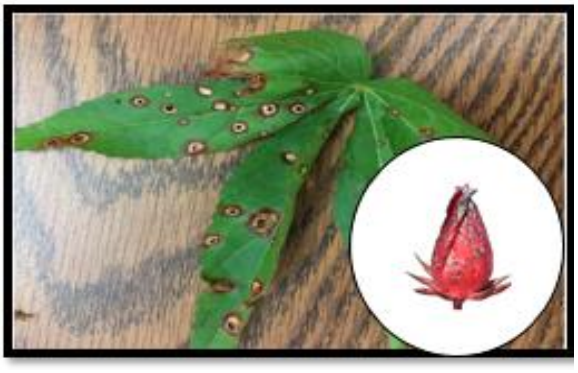
- E.g. 12:24:12 fertilizer: 10.0 g – 15.0 g/ plant two weeks after germination for root and shoot development
- E.g. 12:12:17+2 fertilizer: 10.0 g – 15.0 g/ plant every three weeks after for flower and fruit development

Pest Management

MAJOR PESTS	SIGNS AND SYMPTOMS	TREATMENT
Heterodera radicicola **(Root-Knot Nematode)**  *Source: theshrubqueen, 2020*	• Stunted weak plants • Reduced root growth • Nodules on roots	• Crop rotation • Use of nematicides • Use of marigolds
Maconellicoccus hirsutus **(Hibiscus Mealybug)**  *Source: Jay, 2023*	• Presence of white, cottony egg masses on plants • Growth of sooty mold • Weak plants • Slow plant growth • Leaf drop	• Use of insecticides • Natural predators • Prune infested plant parts
Steirastoma breve **(Cacao Beetle)**  *Source: Nearns, 2018*	• Scarring on young branches due to adult beetles feeding on the thin bark and underlying soft tissues • Weakened branches and young stems • Presence of frass	• Avoid injuring plants to deter oviposition at those sites. As larvae feed subcortically weakening branches and young stems, making them liable to break off in windy conditions. • Use of insecticides

Source: George and Morris, 1984; CABI, 2021 and; Morton, 1987

Disease Management

MAJOR DISEASES	SYMPTOMS	TREATMENT
Root Rot (Pathogen: Fusarium solani)  ***Healthy Plants VS. Infected Plants*** *Source: Liao et al., 2022*	• Poor plant growth • Leaf yellowing and wilting • Decreased root mass due to rotted roots	• Monitor and control excess field saturation • Avoid planting crops that are also prone to this disease • Crop rotation • Use of recommended fungicides
Powdery Mildew (Pathogen: Podosphaera sp.)  *Source: Baiswar et al., 2010*	• White, circular patches on upper surfaces of leaves • Premature death of leaves	• Monitor and control excess field saturation • Use of recommended fungicides • Use of adequate plant spacing • Remove infected foliage and plants
Fruit and Leaf Spot (Pathogen: Corynespora cassiicola)  *Source: Traunfeld, 2018 and Ortega-Acosta et al., 2016 (inset photo)*	• Fungal spots on leaves and fruit • Necrotic leaves and fruits	• Use of recommended fungicides • Monitor and control excess field saturation • Use of adequate plant spacing • Remove infected foliage and plants

Source: George and Morris, 1984; Baiswar et al., 2010; Ortega-Acosta et al., 2015; Plotto, 2004 and Liao et al., 2022

Harvest Management

Harvest Period of Fruits

According to, Osei-Kwarteng et al. (2021) plant development is strongly influenced by environmental conditions and genotype. Hence, harvesting of the whole plant or any useful part of the plant is dictated by the growth environment among other factors. Some environmental factors that affect plant development are humidity, rainfall and soil conditions. In Trinidad and Tobago, Sorrel fruits are generally harvested from late November to early February for their calyces. According to, Simpson and Johnson (2015) the calculated fresh weight yield of calyces was 1,050 kg/ ha.

Calyces mature at about 20 days after flowering; this is normally about 2 - 3 weeks when the flowers have dried up and fallen off. However, harvesting of calyces is done when they are still fresh and not showing any signs of senescence. At this time of harvesting, calyces would still have a high moisture content (85%) (Osei-Kwarteng et al., 2021). The longer the capsules remain on the plant after the seeds begin to ripen, the more susceptible the calyx is to sores, sun cracking and general deterioration in quality (Plotto, 2004).

Harvesting Method

In Trinidad, fruits are harvested manually using a clean and sharp hand tool such as a pruning shears/ secateur or knife. Handpicking is also practiced but it can result in the breaking and stripping of stems and the premature harvest of young fruits if not done carefully. However, according to Simpson and Johnson (2015) fruits are easier to break off in the morning than at the end of the day.

During harvesting, avoid damaging/ cutting fruits as these points create opportunity for pathogens to enter, multiply and spread disease leading to fruit quality decline.

In addition, always use clean harvesting tools and avoid fruits being exposed to the ground and/ or other unclean surfaces.

The use of crocus bags, plastic bags and/ or buckets as harvest containers should be avoided as they create a micro- climate conducive to spoilage. This is because of the lack of air flow and fruit respiration within these containers that cause an increase in temperature and relative humidity. Furthermore, fruits are more compacted resulting in the bruising and breaking off, of calyces, diminishing fruit quality and making fruits more susceptible to pathogens. Stackable harvest crates are therefore recommended for storing harvested fruits (Photograph 11).

The advantages of using crates include:

- they have slits/ holes to allow for airflow for the reduction of temperature and humidity build-up;
- reduced compaction and crushing;
- reduced fruit loss and;
- they are reusable and easy to clean.

Photograph 11 Stackable harvest crates
Source: https://www.vegcrates.com/product-source

Harvesting Frequency

Fruits are harvested approximately every 10 days until the end of the growing season. According to, Osei-Kwarteng et al. (2021) regular harvesting of Sorrel fruits, encourages prolonged flowering resulting in, increased plant productivity. With each fruit yielding approximately 7 g – 10 g of calyx.

Postharvest Management

Commodities start to lose quality at harvesting which is further diminished by how produce are handled postharvest. The postharvest management of any commodity including Sorrel, involves the handling, storage and transportation of the crop which are crucial to maintaining the quality, shelf life, safety and marketability of produce and their by-products (Osei-Kwarteng et al., 2021). After harvesting, fruits should be allowed to cool down before further handling, to decrease fruit temperature from field heat and respiration as this minimizes fruit degradation, softening and wilting. A simple example of fruit cooling is the placing of fruits in a shaded and well-ventilated area for a period of time. Fruit temperature is impacted by the time of day for harvesting and as such should be done during cool periods.

Considerations for managing yield quality and minimizing postharvest losses include:

- crop production factors e.g. nutritional status, water relations and day length;
- harvesting at the recommended stage of maturity for the economic part of importance and harvesting method;
- minimization of crop damage during harvesting and handling;
- use of treatments e.g. pesticides;
- minimization of conditions that cause the proliferation of pathogens and;
- storage and transport conditions e.g. packaging, temperature (precooling and store temperature) and type of transport (Thompson, 1996).

Reference is made to Figure 2, which illustrates a general flow chart of the postharvest handling operations for fruits.

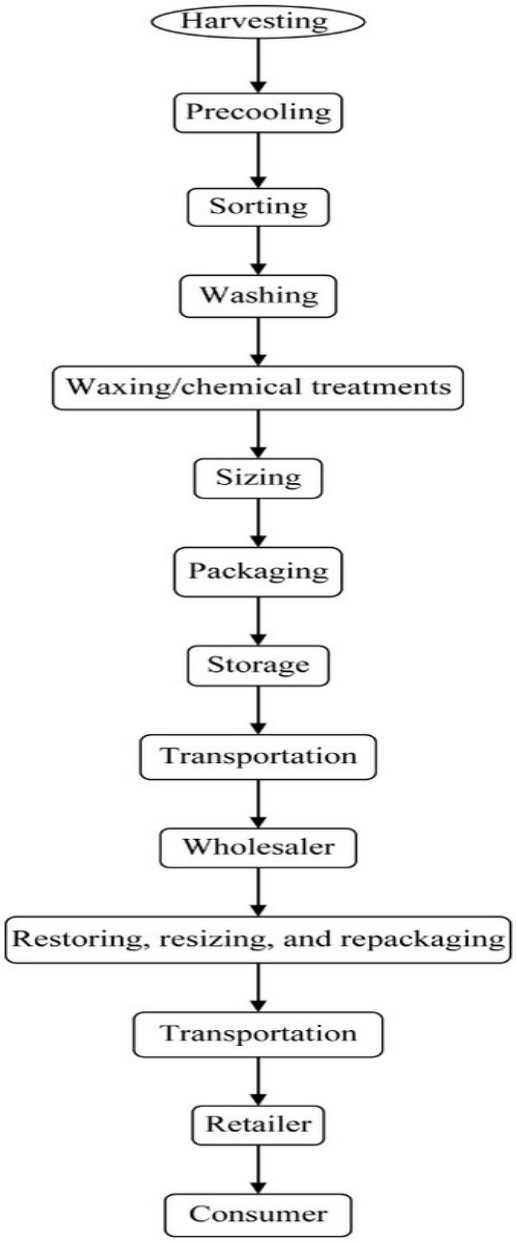


Figure 2 Postharvest handling operations of fruits

Source: Prasad et al., 2017

Processing and Value-Added Products

In Trinidad and Tobago, the calyx is the part of the Sorrel plant of most economic importance. When processing Sorrel for their calyces, the first step is their removal from the seedpod/ capsule which is known as shelling. Calyces can be separated from the seedpod by hand peeling, by making a circular cut with a knife between the fruit's proximal end and calycle to remove the seedpod or by pushing a sharp-edged metal tool through the fruit's fleshy tissue separating it from the seedpod (Photograph 12). Locally this shelling process is usually done by hand peeling.

Photograph 12 Separation of calyces from seedpod using a tool

Source: Simpson and Johnson, 2015

Shelled calyces can be frozen, boiled or dried for the purpose of storage and/ or value-addition. Drying of the calyces can be done via direct sunlight, air-drying or by mechanical means. According to, Osei-Kwarteng et al. (2021) calyces can be left to dry on the plant reducing the need for drying after harvesting or the calyces of harvested fruits can be placed in a covered and well-ventilated area to air dry. When drying via mechanical means equipment such as ovens and dehumidifiers are utilized.

A simple way to dry calyces at home for use outside of the Sorrel season according to MyTropicalPlantAdventures, 2023 is to:

1. de-seed fresh Sorrel fruits and wash the calyces
2. prepare baking sheets/ trays by lining them with parchment paper or aluminium foil
3. place calyces in a single, even and thin layer on top of the lined baking sheets/ trays
4. place baking sheets/ trays in the oven at a temperature of 170 ^{0}F (≈ 77 ^{0}C)
5. remove sheets/ trays from the oven after 2 hours, to turn over calyces to ensure even drying; after which return sheets/ trays back to the oven with calyces in an even layer
6. remove calyces from the oven after 4 – 6 hours, as they should be completely dried (calyces when properly dried would be crisp)
7. cool and place in a zip lock bag for storage

Screen-shots 1 - 5 illustrate the transformation of the calyces before, during and after the drying process.

Screen-shot 1: Fresh calyces on the baking sheet before placement into the oven
Source: MyTropicalPlantAdventures, 2023

Screen-shot 2: Calyces after 2 hours in the oven
Source: MyTropicalPlantAdventures, 2023

Screen-shot 3: Calyces after 4 hours in the oven
Source: MyTropicalPlantAdventures, 2023

Screen-shot 4: Dried calyces
Source: MyTropicalPlantAdventures, 2023

Screen-shot 5: Dried calyces packaged in a zip lock bag
Source: MyTropicalPlantAdventures, 2023

Sorrel is very versatile and can be used to create an array of value-added products inclusive of dried calyces. To demonstrate this versatility, the following are a few local Sorrel value-added products depicted in Photographs 13 - 15:

Photograph 13: Sorrel Parfait
(made from calyces)
Source: Bel Air Store Ltd., 2023

Photograph 14: Sorrel Port Wine
(made from calyces)
Source: Tropical Fruit Wines TT, 2021

Photograph 15: Sorrel Relish
(made from calyces)
Source: plantingseedscaribbean, 2024

An example of the processing and development of Sorrel value-added products is illustrated in the flow chart (Figure 3) below.

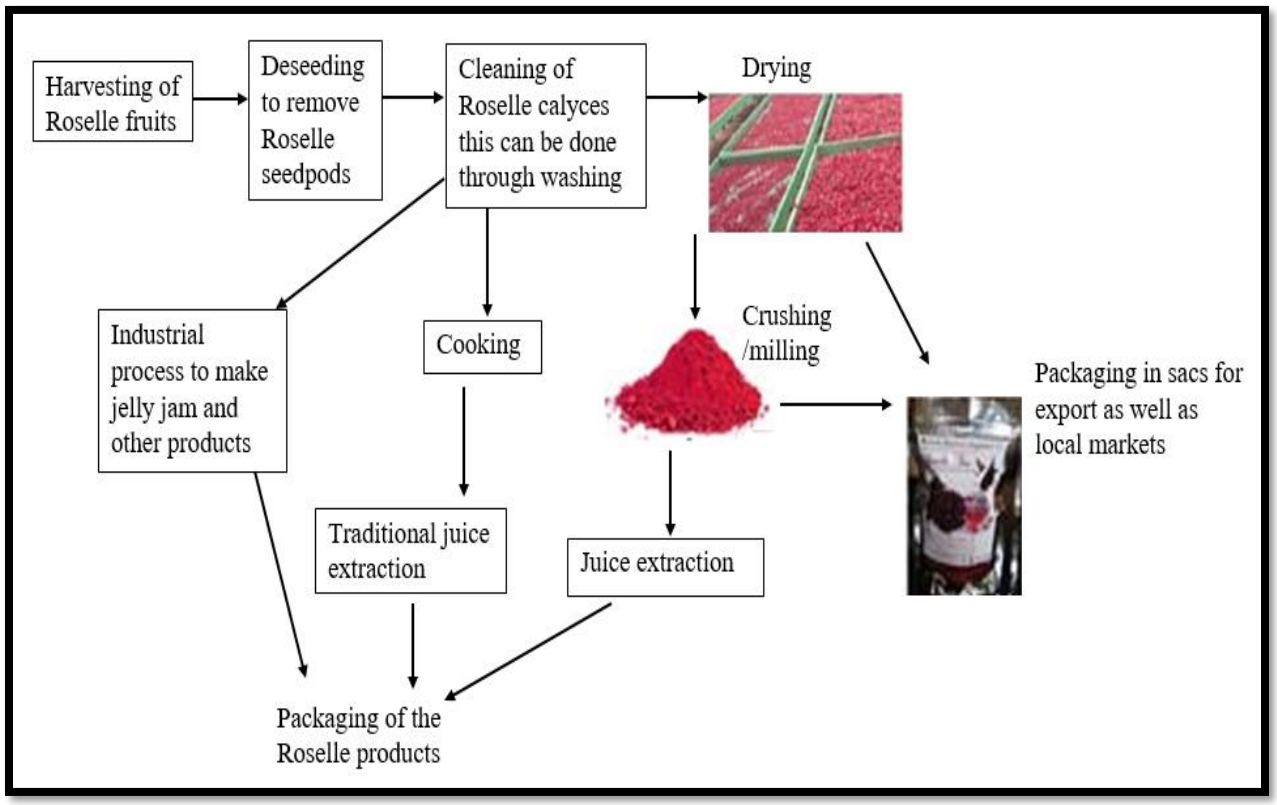


Figure 3 Postharvest processing steps of Sorrel calyces

Source: Osei-Kwarteng et al., 2021

Recordkeeping

Recordkeeping is the act or practice of documenting, storing and organizing important information for future reference. Recordkeeping is useful in all facets of life inclusive of farming and; as it relates to crop production, it should be a routine action to account for all activities surrounding cultivation onwards to marketing.

Benefits of recordkeeping

1. It's a form of tracking:
   - what works and what does not
   - whether a profit, breakeven or loss was made
   - what is actual or potential profits and yield
   - when a specific activity should be carried out
   - crop history… *a key in planning, making recommendations and solving crop issues*
2. It's a part of Good Agricultural Practices (GAP)
3. It makes accessing loans easier
4. It's a major part of price setting
5. Helps in making decisions
6. Increases efficiency and productivity…. *Remember agriculture is a business*
7. It's a point of reference (as you may forget)
8. It's a part of accounting for your work/ investment
9. The Ministry's District Officer would ask… *it helps validate you as a producer*

Types of information to be recorded

- Total revenue and total expenses (both are used to determine whether a profit, loss or breakeven was made)
- Production data … *when to harvest, yield, when an activity was done, how much was done, field conditions etc.*
- Chemicals used, the rate, why it was used, results gained and follow up chemical etc.
- Crop seasonality…. *times when the most profit can be gained*
- Sales information
- Input and output inventory
- Market commitments
- Financial transactions (*accounts payable and accounts receivable*)

NB. A record does not have to be complicated it could be as simple as writing in a book, that is kept in a safe place.

How to record

Records can be digital and/ or paper based however they should always be clear, concise, accessible, orderly and practical.

Sample Crop Record Form

Crop	No. of Plants	Acreage Planted	Date Planted	Date Harvested	Yield	Remarks

Cost of Production

ACTIVITY	UNIT	NO. OF UNITS	UNIT COST	TOTAL COST
Land Preparation				
Brush Cut	Acre	1	$1,000.00	$1,000.00
Plough	Acre	1	$1,000.00	$1,000.00
Rotovate	Acre	1	$1,000.00	$1,000.00
Bed Formation, Drain Formation and Edging	Acre	1	$1,000.00	$1,000.00
	Sub-Total			***$4,000.00***
Planting				
Seeds (Rate: 3 seeds/ hole)	Ounce	8	$30.00	$240.00
Labour	Man Days	5	$200.00	$1,000.00
	Sub-Total			***$1,240.00***
Fertilizer Application				
High Phosphate (i.e. 12:24:12)	Bag (100lbs)	0.5	$260.00	$130.00
High Potassium (i.e. 12:12:17+2)	Bag (100lbs)	5	$580.00	$2,900.00
Labour	Man Days	8	$200.00	$1,600.00
	Sub-Total			***$4,630.00***
Pest and Disease Management				
Insecticide	Bottle (1,000ml)	1.5	$145.00	$217.50
Fungicide	Bottle (1,000 ml)	1	$380.00	$380.00
Labour	Man Days	5	$200.00	$1,000.00
	Sub-Total			***$1,597.50***
Weed Management				
Pre-emergent Herbicide	Bottle (500ml)	5	$90.00	$450.00
Labour (spraying and brush cutting)	Man Days	6	$200.00	$1,200.00
	Sub-Total			***$1,650.00***

ACTIVITY	UNIT	NO. OF UNITS	UNIT COST	TOTAL COST
Harvesting				
Labour	Man Days	7	$200.00	$1,400.00
Harvest Crates	Units	5	$150.00	$750.00
	Sub-Total			***$2,150.00***
Transportation				
Load and Transport	Trips	1	$250.00	$250.00
	Sub-Total			***$250.00***
TOTAL EXPENDITURE				**$15,517.50**

NB. This is a general costing as there are many factors that can affect individual production cost.

Benefits of Cost Breakdown

1. Improved Budgeting
2. More Effective Decision Making
3. Improved Return on Investment
4. Increased Efficiency
5. Increased Profitability

Source: *https://fastercapital.com/content/What -is-Cost-Breakdown.html*

Marketing

Marketing is the promoting and selling of products and/ or services. Thus, with effective marketing, income and customers' demand for the product/ service would increase. In addition, the product/ service brand would become better known. Moreover, profit can be maximized if the product or service offered has a low input cost, is of superior quality, is appealing, has special benefits, is inexpensive, is in demand, known about and has little to no competitors and/ or substitutes.

For effective marketing, market research and advertising should be done. Market research is any organized effort to gather information about target markets or customers. It is a very important component of any business strategy. Therefore, producers/ farmers should consider the following 7-Ps for effective marketing:

- **P**roduct;
- **P**rice;
- **P**hysical environment;
- **P**romotion;
- **P**lace of sale;
- **P**rocess;
- **P**erson's willingness to buy.

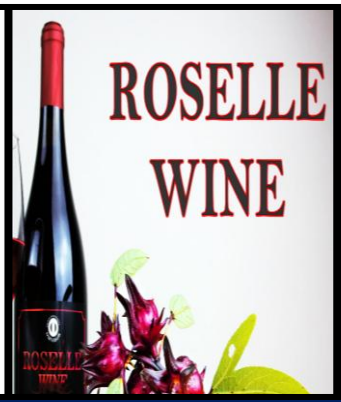
Sorrel is commonly sold in its raw form at roadside stalls and markets i.e. wholesale, municipal and farmers' markets. However, these fruits are perishable and farmers should consider its shelf life, price, marketing strategy and market requirements e.g. variety, ability to supply, overall product presentation (*packaging, size, colour, marks/ damages etc*.) to successfully market their product.

In Trinidad and Tobago, the National Agricultural Marketing and Development Corporation's (NAMDEVCO) website www.namistt.com is a good option to observe current wholesale and retail prices; along with observing the price point being used in the area you intend to sell to ensure competitiveness in the market and maximum potential earnings.

Marketing Pointers for Potential Sorrel Farmers/ Producers

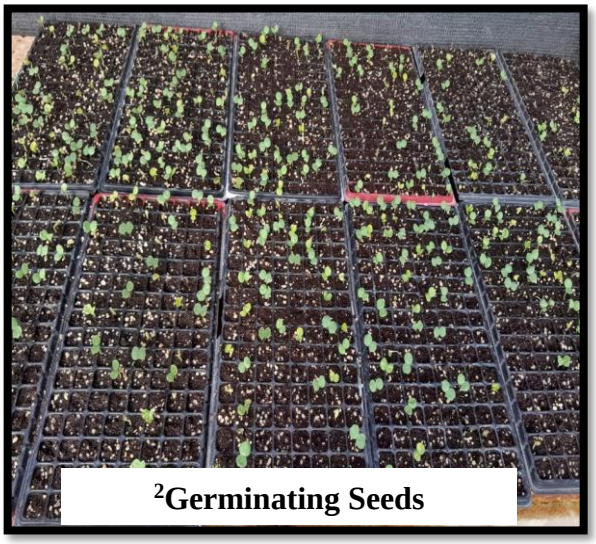
- Do a crop feasibility study- an evaluation of the overall benefit of pursuing production prior to implementation/ planting. Evaluation factors should include:
  - level of crop production knowledge;
  - market conditions i.e. commodity availability, price point for goods, product demand, volumes available and presence of substitutes e.g. pre-packaged drinks instead of fresh fruits;
  - profit margin;
  - risks e.g. spoilage, theft, decrease in market price;
  - logistics e.g. transport arrangements, access to target market, storage capability and storage capacity;
  - crop financing and;
  - crop seasonality.
- Plan your business – plant to coincide with market need; know who is your target buyer and where you intend to sell your produce even prior to planting
- Apply recommended production practices to maximize yields and profits; and decrease cost of production
- Give yourself market options
- Be mindful of current market trends and pricing to assist with price setting
- Communicate effectively what your expectations are with contract buyer/ wholesaler e.g. payment arrangements
- Know what your target market requires of you e.g. variety, size, amount, market days and delivery schedule
- Be consistent in supply and quality
- Be ethical and timely with supply

Value Added Products made from Sorrel from different Countries

Roselle Flower Tea	Dried Sorrel	Roselle Jam
		
Source: Taru Brand, 2023	*Source: Semaj Products, 2024*	*Source: Herbanext Laboraatories, 2023*
Roselle Extract	**Roselle Candy**	**Roselle Petals**
		
Source: Bionutricia, 2020	*Source: Leilanis Attic, 2024*	*Source: Morish Botanicals, 2023*
Roselle Wine	**Sorrel Seed Oil**	**Roselle Vinegar Drink**
		
Source: Omnibor Brewery, 2020	*Source: eOil.co.za, 2024*	*Source: Fu Kitchen Malaysia, 2024*

Sorrel Production Illustrated by Photos

[1]Site Selection



[2]Germinating Seeds

[3]Seedlings

[4]Growing Plant

[5]Established Field

[6]Flowering Plants

Source: Delfish, 2023

[7]Flowering and Fruiting

[8]Flower and Fruit

[9]Immature Fruits

[10]Mature Fruits

[11]Harvesting

Source: Delfish, 2023

Fun Recipe

Source: https://www.instagram.com/minhealthtt

MINISTRY OF AGRICULTURE AND FISHERIES (MAF) CONTACTS

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Back Cover Photograph

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