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### Constraints faced by Acidlime farmers in Tenkasi district of Tamil Nadu

CR Monikha, M Elavarasan, M Balasubramaniam and Sethupathi S

Krishi Vigyan Kendra, Tirunelveli, Tamil Nadu, India

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Corresponding Author: CR Monikha

#### Abstract

Acid lime cultivation is an important agricultural activity in Tamil Nadu, especially in the Tenkasi district, due to its favorable climatic and soil conditions. This fruit has high economic and nutritional value, contributing significantly to the livelihoods of many farmers. However, despite its potential, the cultivation of acid lime in Tenkasi faces numerous constraints that hinder its growth. This study identifies and analyzes the key challenges faced by acid lime farmers in the region, including climate change, non-availability of quality planting material, lack of awareness on farming techniques, pest and disease attacks, market price fluctuations, and high labor costs. The study aims to highlight these constraints and suggest possible interventions to improve the productivity and profitability of acid lime farming. The findings suggest that addressing the knowledge gaps, providing targeted training, improving infrastructure, and stabilizing market conditions could help overcome these barriers and increase the success of acid lime cultivation in the region.

**Keywords:** Acid lime, constraints, market price, pest and disease management, quality planting material

#### Introduction

Acidlime is one of the important fruits grown in India among citrus species which are grown commercially. India ranks fifth among major lime and lemon producing countries in the world. The important fruits grown in the country are mango, citrus, banana, apple, guava, sapota, papaya, pomegranate and grapes. Fruits of the citrus family are amongst the most widely grown fruits of the world. Though citrus is mainly a subtropical crop, it is found growing in tropical zone and also in some parts of temperate zone. In Tamil Nadu, acidlime is cultivated both under rainfed and irrigated conditions in the districts of Dindigul, Tenkasi, Virudhunagar, Ramnad, Madurai, Tiruchirapalli, Tuticorin and Theni in an area of 9082 ha with a productivity of 3010 kg/ha. Tenkasi district situated in the Western Ghats region of Tamil Nadu, is an important hub for acid lime cultivation. The district's agro-climatic conditions make it suitable for growing citrus crops. Acid lime, with its high economic and nutritional value, plays a crucial role in the livelihoods of many farmers. Despite its significance, the cultivation of acid lime in Tenkasi faces unique threats that demand immediate attention and strategic interventions.

#### Materials and Methods

The study was conducted in Vasudevanallur and Kadayannallur blocks of Tenkasi District in Tamil Nadu. A sample of 120 acidlime farmers selected through proportionate random sampling. Data collection was made from the selected respondents with the help of a well-structured and pre-tested schedule through personal interview. The collected data were properly analyzed using statistical procedures and the results are tabulated. The present study used 'Henry Garrett's' ranking technique to prioritize these constraints. This approach is followed to

identify key areas that can provide support and interventions to help farmers overcome these challenges and improve their yields and livelihoods (Zalkuwi *et al.*, 2015) <sup>[10]</sup>. During the survey, respondents were asked to rank the constraints impartially. The resulting rank was then transformed into a percentage position using the standard formula.

#### Results and Discussion

The findings on the constraints experienced by acidlime farmers in adopting acidlime technologies are presented in this paper. The constraints were ranked according to their number of respondents who mentioned the constraints and the salient findings are given in Table 1.

**Table 1:** Constraints faced by Acidlime farmers in Tenkasi District (n=120)

S. No.	Constraints	No. of respondents	Per cent	Rank
1.	Climate change and weather variability	86	71.6	VI
2.	Non-availability of quality planting material	93	77.5	IV
3.	Lack of awareness on training and pruning techniques	112	93.3	I
4.	Lack of canopy management	88	73.3	V
5.	Lack of knowledge on value addition	55	45.8	X
6.	Pest and disease attack in acidlime	62	51.6	IX
7.	Lack of knowledge on micro-nutrient management	102	85	III
8.	Lack of knowledge on Post-harvest management	85	70.8	VII
9.	Market price fluctuations	105	87.5	II
10.	High cost of labour	76	63.3	VIII

### **Climate change and weather variability**

It could be seen from the Table 1, seventy one per cent respondents revealed a noticeable increase in average temperatures in Tenkasi district can lead to heat stress, which affects the growth and fruiting of acid lime trees. Excessive heat can also cause premature fruit drop and reduced fruit size and quality. Inconsistent rainfall patterns and water scarcity, particularly in areas dependent on rain-fed irrigation, can severely affect the growth of acid lime. Droughts can result in smaller fruit sizes, reduced yields, and poor fruit quality. The changing climate can alter the behavior of pests and pathogens. Warmer temperatures may favor the proliferation of certain pests, like aphids and citrus leaf miners, and increase the likelihood of disease outbreaks, such as fungal infections, that affect the health of the trees. indicates that prolonged heat stress can lead to reduced fruit size and quality, as well as premature fruit drop.

### **Non-availability of quality planting material**

Surveys conducted with acid lime farmers (77.5 %) in Tenkasi district revealed that a significant proportion of farmers struggle to access quality planting materials for acid lime cultivation. The non-availability of quality planting material is a major constraint in acid lime farming. The use of uncertified and non-standard planting material can lead to poor growth, susceptibility to diseases and pests. Promoting collaboration between agricultural research institutions and local nurseries could improve the overall availability of high-quality planting material.

### **Lack of awareness on training and pruning techniques**

More than ninety three per cent of the acidlime farmers do not followed training and pruning practices. Most of the farmers in Tenkasi district were unaware of training and pruning techniques, allowing trees to grow haphazardly. The absence of proper training and pruning techniques leads to overcrowded canopies, poor sunlight penetration, difficulty in managing the orchard, exhibit poorly shaped canopies, inadequate airflow and reduced fruit-bearing capacity.

This has led to lower yields and a decrease in fruit quality, negatively affecting overall farm profitability. This issue is primarily caused by a combination of limited education, traditional farming practices, and inadequate access to tools and resources. By focusing on targeted education programs, practical resource distribution, and promoting modern orchard management practices, the productivity of acid lime orchards can be greatly improved, ultimately benefiting farmers and contributing to the economic growth of the region.

### **Lack of canopy management**

Seventy three per cent of the acid lime growers reported dense canopies that caused insufficient light penetration, especially in the lower parts of the trees. The lack of canopy management in acid lime orchards is a significant issue that affects both tree health and fruit productivity. Poor light penetration, inadequate airflow, increased disease susceptibility, and reduced fruit yield are direct consequences of neglecting proper canopy care. With the right education, resources, and support, proper canopy management can become an integral part of acid lime

farming, leading to healthier trees and better-quality fruit.

### **Lack of knowledge on value addition**

It could be referred from Table 1 that fifty per cent of the acidlime farmers does not have knowledge on grading techniques and value addition in acidlime. The study shows that a large proportion of farmers had not received any formal training or extension services related to value addition. Only a small percentage (less than 20%) had any exposure to value-added product possibilities, and even fewer had implemented such practices. Inadequate local infrastructure, high initial investment costs and market accessibility plays a vital role for non-adoption of value addition.

### **Pest and disease attack in Acid lime**

More than fifty per cent of the farmers reported that pest and disease attack is high in acidlime crop. Especially, *Phytophthora* root rot is one of the most damaging diseases in acid lime orchards in Tenkasi. The disease is caused by the *Phytophthora* fungus, which infects the root system, leading to root decay, poor plant growth, wilting, and ultimately tree death. *Phytophthora* root rot thrives in waterlogged and poorly-drained soils, conditions that are common in Tenkasi due to the region's heavy rainfall and poor soil drainage.

Followed by Rust mites (*Phyllocoptruta oleivora*), also known as citrus rust mites, are one of the significant pests affecting acid lime (*Citrus aurantiifolia*) cultivation in Tenkasi District, located in Tamil Nadu, India. These tiny pests, despite their small size, cause substantial damage to the leaves, fruit, and overall health of the acid lime trees. The region's tropical climate, combined with unsuitable farming practices and environmental conditions, creates an ideal habitat for the development of rust mite infestations, making it a major concern for farmers.

### **Lack of knowledge on micro-nutrient management**

It could be inferred from Table 1 eighty five per cent of the farmers reported visible symptoms of micronutrient deficiencies, particularly zinc and iron, with common signs including interveinal chlorosis (yellowing of leaves), stunted growth, and poor fruit size. Followed by, farmers observed that their trees showed signs of boron deficiency, manifesting as poor fruit set and deformed fruits. Micronutrient deficiencies have been shown to significantly reduce both the quantity and quality of acid lime fruits in Tenkasi. The lack of essential micronutrients affects photosynthesis, enzyme activation, and the overall physiological function of the trees, leading to reduced fruit yield, smaller-sized fruits, and lower marketability. By addressing this knowledge gap through education, improved soil testing, and better access to micronutrient products, farmers can improve their cultivation practices to achieve higher yields and better-quality fruit.

### **Lack of knowledge on Post-harvest management**

It could be seen from Table 1 that seventy per cent of acid lime-growing areas, improper handling during harvesting, packaging, and transportation leads to significant post-harvest losses. These losses often occur due to inadequate harvesting techniques, poor handling practices, and

inefficient storage methods. In Tenkasi district and similar regions, the lack of knowledge about appropriate post-harvest practices contributes directly to fruit degradation and spoilage.

### Market price fluctuation

Eighty per cent of the acidlime farmers in Tenkasi district reported that they experienced the lowest market prices during the peak harvest season, when supply is high, with prices dropping by 20-30% compared to the off-season. These fluctuations are primarily due to the natural cycles of supply and demand in the market, where an abundant harvest leads to a surplus of fruit, causing prices to decrease.

### High cost of labour

It could be seen from the Table 1 Higher labour wage rate (63.3 %), non-availability of farm labour and minimum working hours per day were the constraints faced by acidlime farmers. The reason for non-availability of farm labour and higher labour wage rate might be rural people were migrated to urban areas due to various reasons like climatic disasters, job, education etc., leads to labour scarcity. Because of labour scarcity, wages for labour were also increased over the past 5 years, with an average increase of 25-40% in daily wages for workers involved in various farming activities.

### Conclusion

The cultivation of acid lime in Tenkasi district faces several constraints that need to be addressed to improve the productivity and profitability of farmers. Climate change, inadequate knowledge of farming techniques, pest and disease issues, market price fluctuations, and high labor costs significantly affect the success of acid lime farming. Interventions such as better access to quality planting material, targeted education on farming practices, pest management strategies, and infrastructure improvements for post-harvest handling can help overcome these challenges. Supporting farmers through government initiatives and research collaborations can also enhance the overall success of acid lime cultivation, contributing to the region's economic growth.

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