

Prospects of coconut cultivation in Tamil Nadu – A SWOT Analysis

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Abstract

Coconut is an important horticultural crop of the state of Tamil Nadu spreading across an area of 4.44 lakh hectares. Coconut is a victim of the catastrophes of climate change events like high temperature, excessive or deficit rainfall and increased atmospheric CO₂ concentration. Coconut plantations in the state are hit by several pests and diseases, some of which are lethal, fatal and are debilitating in nature. An analysis of Strength, Weakness, Opportunities and Threats (SWOT) for the prospects of coconut cultivation in the state revealed that edaphic and climatic factors, less labour requirement compared to other field crops of the state and access to technologies remain the great strength, while tropical cyclones hitting coastal districts of the state, failure of monsoon, wide fluctuations in copra price, lack of producer-centric market intelligence are the striking weakness for coconut cultivation. Improved varieties and hybrids with desired traits, establishment of processing industries, international cargo terminals to tap export market and crop insurance scheme in the event of climatic aberrations, remain the major opportunities while declining soil fertility, debilitating pests and dreadful diseases and poor scientific management owing to the fragmented land holdings are the major threats of coconut cultivation in the state of Tamil Nadu.

Keywords: Coconut, SWOT analysis, Farm Gate Price, Processing, Tripartite Linkage, Tropical Cyclones

Introduction

Agriculture inevitably forms the backbone of Indian economy as more than 50 % of the population is dependent directly or indirectly on this noble profession for their livelihood. Coconut, inseparably embedded in the social heritage and cultural identity of the country, is being eulogized as “*Kalpavriksha*” or the Tree of Heaven (Ashokkumar *et al.*, 2018). Coconut exert profound influence on the rural economy of many countries across the globe wherein it provides livelihood security to 64 million farm families, 12 millions being Indians. Globally, out of 12.5 million ha of the area under coconut, nearly nine million hectares is contributed by three major countries *viz.*,

Indonesia, the Philippines and India. It is a benevolent provider of all amenities to mankind and has a very few substitute for itself in its multiple uses. The crop is always celebrated as a 'Symbol of Rural Prosperity' because of its indispensable role in employment generation for the rural front. In India coconut has a well documented history of about three thousand years and is proclaimed as a crop of small and marginal farmers as 98 % of the coconut plantations in India vests with holdings < 1.0 ha (Singh, 2010). Economic contribution of coconut to Indian Gross Domestic Product (GDP) is about Rs.27,900 crores (Anon, 2020).

According to Union Ministry for Agriculture and Farmers' Welfare, India is a prominent contributor for the global coconut production and

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productivity. India ranks third in the world map of coconuts in area (17 percent) and first (31 percent) in coconut production across the world. Tamil Nadu, Kerala, Karnataka and Andhra Pradesh are the leading coconut producing states in India and they together account for more than 90 per cent, with Tamil Nadu alone contributing around 34 percent of the total production in the country (CDB, 2021). As coconut succumbs to an array of biotic and abiotic stresses, a comprehensive analysis of the strength, weakness, opportunities and threats of coconut cultivation in the state is imperative for strategic planning to tide over the depression in this plantation crop sector.

Overview of Tamil Nadu

Tamil Nadu is geographically located between 8°5' & 13°35' N latitude and 76°15' & 80°20'E longitude. Tamil Nadu enjoys semi-arid to dry sub humid climate which paves way for higher productivity of most of the crops. Tamil Nadu is the 11th largest state of the country with a total geographical area of 130.33 lakh ha and is one of the water starved states with only three percent of the nation's water resources. The average annual rainfall of the state is 947 mm which is less than the average annual rainfall of the nation of 1200 mm. Maximum rainfall (47 %) is received from North-East Monsoon (October–December) followed by South–West Monsoon which contributes 36 %, 14 % from summer showers during March – May and 3 % from winter rains (January – February). The per capita availability of water is 750 cubic meters per year compared to the all India average of 2200 cubic meters.

Coconut acreage in Tamil Nadu

In Tamil Nadu, coconut cultivation has spread over an area of 4.44 lakh hectares during 2020-21 (CDB, 2021). Trend analysis revealed a steady expansion in acreage from 2000-01 till 2014-15 and a sharp decline thereafter, mainly attributed to the drought experienced by the state after 140 years, with 62 % rainfall shortage in north east monsoon compared to the normal during 2016. Of the two decades from 2000 - 2020, the highest area expansion was witnessed during 2011-12 which was 10.44%

higher than the previous year (**Table 1**). During 2018-19, coastal districts of Tamil Nadu were ravaged by Gaja cyclone damaging atleast one crore coconut trees. In a study at Tamil Nadu Agricultural University (Sankar and Kowshika, 2020), it was well documented that, districts such as Coimbatore, Vellore, Thanjavur, Madurai, Theni, Dindigul, Tirunelveli and Kanyakumari of Tamil Nadu were found to be highly suitable for coconut cultivation during 2000-2005. Over the years, coconut cultivation expanded to other districts like Krishnagiri, Dharmapuri and Salem and the area is still expanding in Krishnagiri, Tiruppur, Viruthunagar and Sivagangai districts.

Table 1. Area ('000 ha), production and productivity of coconut in Tamil Nadu from 2000 to 2019

Year	Area		Production		Productivity	
	('000 ha)	Annual Growth Rate (%)	(million tonnes)	Annual Growth Rate (%)	(nuts per ha)	Annual Growth Rate (%)
2000 - 01	323	-	3192	-	9867	-
2001 - 02	335.8	+ 3.96	3293.6	+ 3.18	9808	-0.60
2002 - 03	345.9	+ 3.01	2860.7	-13.14	8270	-15.68
2003 - 04	352.7	+ 1.97	2560.5	-10.49	7260	-12.21
2004 - 05	357.10	+ 1.25	3243.5	+ 26.67	9083	+ 25.11
2005 - 06	370.6	+ 3.78	4867.1	+ 50.06	13133	+ 44.59
2006 - 07	374.6	+ 1.08	5429.9	+ 11.56	14995	+ 14.18
2007 - 08	383.37	+ 2.34	4968.2	-8.50	12959	-13.58
2008 - 09	389.60	+ 1.63	5365.0	+ 7.99	13771	+ 6.27
2009 - 10	390.0	+ 0.10	5770.6	+ 7.56	14796	+ 7.44
2010 - 11	390.0	0.00	5770.6	0.00	14796	0.00
2011 - 12	430.7	+ 10.44	7057.8	+ 22.31	16387	+ 10.75
2012 - 13	465.11	+ 7.99	6917.2	-1.99	14872	-9.25
2013 - 14	465.11	0.00	6917.2	0.00	14872	0.00
2014 - 15	465.11	0.00	6917.4	0.00	14873	0.01
2015 - 16	459.74	-1.15	6171.1	-10.79	13423	-9.75
2016 - 17	461.06	+ 0.29	6570.6	+ 6.47	14257	+ 6.21
2017 - 18	441.49	- 4.24	6020.4	- 8.37	13637	-4.35
2018 - 19	436.94	- 1.03	5370.4	- 10.80	12291	-9.87
2019 - 20	437.57	+0.14	5373.2	+0.05	12280	-0.08
% change (2000 - 21)	+ 33.6 %		+70.4 %		+23.9 %	

Production scenario of coconut

About 5439.33 million nuts were produced from coconut plantations of Tamil Nadu during 2020-21 (CDB, 2021). The production scenario registered a mild ascend during 2000-01 to 2010-11 and a very sharp increase during 2011-12 with an annual growth rate of +37.82 % (Table 1). Slide in coconut production during 2014-15 was mainly attributed to climatic shift, water stress and erratic rainfall experienced in the state. Again, the drastic decline in coconut production experienced at state level during 2017 was due to break down of southwest monsoon and failure of northeast monsoon, with the water reservoirs short by 82 % of normal levels in Tamil Nadu. The drop in production was severe in Tamil Nadu compared to the other water deficit states of South India during 2017. Water stress triggered by poor north east monsoon in the key coconut growing areas of the state has impacted coconut production resulting in a reduction of 30-40% output during the period. Again during 2018-19, the slide in production was due to abiotic stress *viz.*, drought and heat stress along with pest incidence especially Rugose Spiraling Whitefly.

Productivity trends of coconut

Coconut productivity per hectare was 12,225 nuts during 2020-21 (CDB, 2021) which registered a steep increase from 2000-01 to 2011-12 and thereafter showed a conspicuous plunge (Table 1). It was mainly attributed to cyclonic storms, water stress, incidence of debilitating pests like Rugose Spiraling Whitefly and dreadful diseases like Root wilt in the major coconut regions across the state.

Farm gate price of coconut

Farm gate price of coconut registered a magnificent increase from 2003 and reached an all time high of Rs. 20.79 per nut during 2018 in the state of Tamil Nadu which can be attributed to the slump in production of coconut during 2018. During 2019, farm gate price of coconut plummeted compared to the previous years due to glut in coconut oil in the world market owing to its low demand (Fig. 1.).

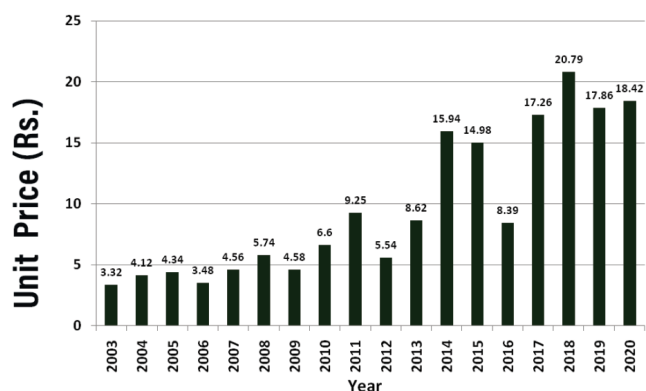


Fig.1. Farm gate price of coconut (2003 – 2020)

Strengths of coconut cultivation in the state

- Tamil Nadu is one of the leading coconut producers of the nation because of the synergism of edaphic and agro-climatic factors like temperature of 27-30°C for most part of the year, relative humidity > 70 % and mean annual rainfall of 1000 mm, conducive for coconut cultivation. Soils of Tamil Nadu are predominantly of red calcareous type which favours coconut cultivation.
- Labour requirement for various field operations in coconut farming is less compared to other field crops, which demand intense human labourer atleast once every 15 days, of the state.
- Rural unemployed women are actively engaged in multifarious areas of coconut industries like coconut oil extraction, copra making, broom stick making, coconut chips production etc., and thereby help in constant money flow in the rural front.
- The state provides every possible avenue for increasing the productivity and net returns of coconut gardens through intercropping with cocoa, banana, nutmeg, flower crops, medicinal plants and animal components.
- Unlike other agricultural commodities, exploitation by middle men is very less as there is regular advisory of day-to-day market rates of copra through mobile apps.
- Farmers Producers' Organizations of the state ensure fair, reasonable and steady price to coconut and the farmers are in a position to market their produce in an economically viable fashion.

- Farmers get benefited from the Coconut Development Board assisted schemes like Establishment of Regional Coconut Nurseries to distribute quality seedlings to the farmers, Laying out of Demonstration Plots to showcase the cutting edge research technologies and Replanting and Rejuvenation schemes for coconut gardens to help farmers undertake replanting in the case of crop failure due to biotic/abiotic stresses.
- Water resources of the state provide support to coconut cultivation in Tamil Nadu. The total surface water potential of the state is 24864 M.cum with 17 major river basins, 61 reservoirs and about 41,948 tanks and coconut plantations derive benefit from them except during drought years. Unseasonal rainfall does not have a damaging effect on coconut cultivation unlike other crops in which sowing to harvest operations are mostly dependent on rainfall.
- In Tamil Nadu, benefit cost ratio from coconut cultivation is higher to the tune of 2.31 compared to 1.5 – 1.8 in other food and non food crops
- Constant money flow is realized in coconut farming in every 28 – 35 days and the farmer need wait for long (four months to one year) in other crops.
- Under the aegis of Tamil Nadu Agricultural University, Coconut Research Stations located at Veppankulam and Aliyarnagar, ICAR – AICRP (Palms) centres and 14 Krishi Vigyan Kendras located across the state render technical guidance and support to the coconut growers. Coconut growers also enjoy diverse schemes offered by the Coconut Development Board stationed at the state headquarters - Chennai.
- Unlike other horticultural crops, coconuts have long shelf life and as they do not warrant immediate disposal after harvest, farmers can store their produce in the farm until fair rates are obtained.

Strengths of coconut cultivation in the state

- Tamil Nadu is a vulnerable hotspot to tropical cyclones and coconut plantation is a victim to the catastrophes of weather extremities and cyclonic events. High velocity

winds during triple cyclones of 2005, Nisha (2008), Jal (2010), Thane (2011), Nilam (2012), Vardah (2016) and Gaja (2018) devastated coconut plantations across several thousand acres which took several years for reclamation, rejuvenation and revival.

- Coconut plantations are highly susceptible to debilitating pests and dreadful diseases like Eriophid mite, Red palm weevil, Slug caterpillar, Leaf blight, Root wilt and Rugose Spiraling Whitefly bringing down the productivity. Unlike annual crops, the plant protection operations could not be performed with ease, the toll is very high in terms of nut yield and marketability.
- Fluctuating price chart of copra is contributing a lot to the farmers' woes. The state witnesses a seasonality of prices with distress sale during the peak season and hence the net returns from unit area always follow a plateau.
- State is entirely dependent on rains for recharging its water resources, monsoon failures lead to acute water scarcity. Drought severely affects all aspects of coconut farming. Effects are manifested as drooping of fronds, set back in spathe emergence, loss in yield to complete crop failure. In Tamil Nadu during the years 2002, 2003, 2012, 2016, 2018 and during 2019, 24 out of 32 districts were declared drought hit. In the case of field crops, farmers forego one or two crops until the receipt of normal rains which is not possible in perennial crops like coconut.
- Small and marginal coconut growers of Tamil Nadu generally handle coconut in commodity form. Product diversification together with producer-centric market intelligence facilities is deficit in the state to help the farmers tide over the price risks of the product.

Strengths of coconut cultivation in the state

- Improved varieties and hybrids of coconut help the farmers to accrue higher yields during the potential bearing period of the palms.
- Coconut-based processing industries are gaining momentum in the state and there is vast

scope for employment opportunities for the rural youth in coconut-based agro industries due to huge demand for desiccated coconut powder, activated charcoal, shell carbon, virgin coconut oil etc., in the domestic and foreign markets.

- There is scope for flourishing international trade owing to the well connected International Cargo Terminals located across the state. Export potential of coconut-based products like tendernut water in TetraPak, desiccated coconut powder, coir pith briquette could be fully tapped with the existing technologies.
- Labour requirement for day-to-day field operations is quite less compared to field crops because of the possibility of mechanization in coconut farming and plethora of evidences accumulated state that farmers resort to coconut in the wake of labour shortage.
- Crop insurance scheme to help the farmers overcome the crop loss due to climatic aberrations together with natural calamities like flood, drought, cyclone, storm-surge and transboundary pests and diseases.

Threats

- Horizontal expansion in coconut area in the state is at the cost of the area under food crops like rice and groundnut
- Coconut cultivation entails continuous export of nutrients out of the farms in terms of nuts, spathe, coconut fronds etc., and as little is returned back to the system, there is possibility of nutrient mining and deterioration of soil health in perennial coconut farming systems
- Coconut cultivation of the state is in the form of fragmented holdings which are not scientifically managed resulting in unstable returns from the system. As majority of coconut plantations are possessed by small and marginal farmers, the gardens are managed well during price hike and neglected during price fall.

Conclusion

Coconut is one of the traditional palms of Tamil Nadu and is in a comfortable position and in profitable preposition in the state. Water facilities, acute labour scarcity, scope for mechanization for operations from irrigation to harvest, favourable agro-climate and good returns compared to other field crops are the key factors underlying area expansion of coconut in the state. Animal husbandry is an inevitable component of agriculture and coconut culture provides ample scope for integration of animal components and many compatible intercrops, thereby improving the returns of the small and marginal farmers. Although coconut presents a wide array of opportunities in terms of product diversification, export market, constant money flow etc., to the resource poor farmers, SWOT analysis reveals that strategic planning and tripartite linkage from researchers-farmers- policy makers can help in sustaining the glory of this wonder palm in the state.

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