



Yield gap among coconut growers in Tumkur district of Karnataka

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Abstract— Plantation crops are a vital section of our agrarian economy. They are important for the growth and development of farming sectors in many Indian states. Coconut is one important plantation crop which not only contributes significantly to foreign exchange earnings but also provides significant direct and indirect employment opportunities. So, coconut plantation's impact on the socio-economic development of farming sector is profound and immense. The present study on Yield gap among the randomly selected 120 coconut growers from Tiptur, Turuvekere, Chikkanayakanahalli and Sira taluks of Tumkur district was conducted during the year 2022-23. The research objective was to assess the yield gap among coconut growers. The yield gap analysis showed that there existed an overall yield gap of about 28.90 per cent where Sira taluk had the highest yield gap of about 34.34 per cent among other taluks followed by Chikkanayakanahalli taluk showing 30.54 per cent yield gap followed by the Tiptur taluk with 26.70 per cent yield gap and then followed by Turuvekere taluk with 24.04 per cent of yield gap. Among the overall coconut growers more than two-fifth of coconut growers (46.67 %) fall under medium level of yield gap followed by high level of yield gap (27.50 %) and then by low level of yield gap (25.83 %). The Kruskal-wallis one-way Anova to know the significant difference in the yield gap among the taluks, disclosed that there is a significant difference in the yield gap among taluks with H-value of 15.03 significant at one per cent level.



Keywords— Coconut growers, Karnataka, Kruskal-wallis one-way Anova, Tumkur, Yield gap

I. INTRODUCTION

Agriculture is a vital part of India's economy and among the various agricultural sectors, Plantation crops contribute immensely to our agricultural economy, significantly driving growth and development in numerous Indian states. This sector contributes substantially to foreign exchange earnings and provides extensive direct and indirect employment, making it essential for overall socio-economic development of the Indian farming community. Among the plantation crops, Coconut is one such vital crop which holds a prominent position symbolizing resilience, versatility and cultural significance within the Indian agricultural landscape.

India is amongst the largest coconut producing countries in the world with around 31% share of global production (Coconut Development Board, 2021)[1]. In the Indian scenario, coconut cultivation holds particular importance, especially in Karnataka state, which has become one of the leading hubs for coconut production. Tumkur district in Karnataka state, often hailed as 'Kalpatharu Nadu' or the 'Land of Coconuts' plays a pivotal role in strengthening the state's coconut yield. Tumkur district alone contributes around 29% of the total coconut cultivation area and nearly 30% of production in the state (Coconut Development Board 2021-22)[2].

Now a days we can say that developing new technologies is not a major challenge in our nation, as

agricultural scientists possess the capability to innovate as needed. The primary concern lies in the widespread adoption and utilization of modern farm technologies by coconut growers. If coconut growers do not adopt such improved technologies from time to time, it may become difficult for the coconut growers to harness the potential yield as expected. Here, Extension institutes come handy to deliver support to coconut farmers through the dissemination of knowledge, provision of technical expertise, promotion of best practices and technologies to ensure the success and advancement of coconut farming in the country.

Despite such efforts by the research and extension functionaries, there exists a notable disparity between expected potential yield and the actual yield obtained at the field level in coconut production. This disparity suggests that there is untapped potential and opportunities for improvement within coconut farming practices to reduce the yield gap. So, studying the yield gap in the coconut production and the areas which are needed to be focused becomes imperative in light of coconut sector’s significant role in the Indian agrarian economy. Also, maximizing productivity becomes crucial for enhancing the economic growth and sustainability considering the substantial contribution of the coconut crop to India’s GDP and export revenue.

Addressing the yield gap can lead to increased output which in turn could boost earnings of the coconut growers and strengthen the country’s position in the global coconut market. In essence, studying the yield gap in coconut production is essential for leveraging India’s position as a key player in the global coconut industry, maximizing economic returns and promoting sustainable agricultural practices among coconut growers. With this backdrop, this research paper seeks to study the yield gap among coconut growers in Tumkur district there by inform policy formulation, guide extension services and facilitate stakeholder interventions aimed at promoting sustainable agricultural development in the region.

II. MATERIALS AND METHODS

The present study was conducted in Tumkur district of Karnataka in the year 2022-23 using *Ex-post-facto* research design. Tumkur district was chosen purposively for the reason that coconut cultivation is being taken up in most of the taluks of the district and it is one of the top coconut growing districts in Karnataka state. Considering the highest and lowest productivity, out of ten taluks in Tumkur district, Tiptur, Turuvekere, Chikkanayakanahalli and Sira taluks were selected purposively. By using simple random sampling, thirty coconut growers from each chosen taluk were selected. Thus, the total sample constituted was 120 coconut growers from four taluks.

Yield gap refers to the difference between the potential yield of the coconut palm obtained at the research station and coconut grower’s actual yield. The index developed by Nagaraj (1999)[3] for Yield gap was used which refers to the percentage of the yield potential realized:

$$(1) \text{ Yield gap Index} = \frac{\text{Potential yield} - \text{Actual yield}}{\text{Potential yield}} \times 100$$

Potential yield refers to the maximum yield obtained in the coconut growers environment or research station. The potential coconut yields were arrived based on the yields mentioned in package of practices of University of Horticultural sciences, Bagalkot. The potential yield of coconut is 100 nuts/palm.

Actual yield refers to the actual coconut yield per plant obtained by the coconut growers (respondents) in the study area. It was used to compute the Yield gap index. Then the categorization of the coconut growers into three categories was done using mean and standard deviation as a means of check.

Yield gap category	Criteria
Low	Less than (Mean - 1/2SD)
Medium	Between (Mean ± 1/2 SD)
High	More than (Mean + 1/2 SD)

III. RESULTS AND DISCUSSION

3.1 Yield gap among coconut growers

According to data from Table 1 about the yield gap analysis, there was an overall yield gap of about 28.90 per

cent between the potential farm yield and the actual farm yield of coconuts obtained in the current study. Among chosen taluks, Sira had the highest yield gap of about 34.34 per cent followed by Chikkanayakanahalli with a yield gap of 30.54 per cent, Tiptur with a yield gap of

26.70 per cent and then Turuvekere with a yield gap of 24.04 per cent. The potential yield of coconut was 100 nuts per palm, as shown in the table while Tiptur coconut growers actual farm yield was only 73.30 nuts per palm leaving an average yield gap of 26.70 nuts per palm. There was an average yield gap of 24.04 nuts per palm where Turuvekere coconut growers actual yield was 75.96 nuts per palm. With an average yield gap of 30.54 nuts per palm, Chikkanayakanahalli coconut growers produced 69.46 nuts per palm actual farm yield. According to the

actual farm yield of Sira coconut growers, the average yield was found to be 65.66 nuts per palm leaving a yield gap of about 34.34 nuts per palm. The probable reason might be that Turuvekere and Tiptur taluks considered to have good irrigation sources, whereas the Chikkanayakanahalli and Sira taluks are considered dry or rainfed tract. So, we can say that untapped potential and scope is there for improving the yield in coconut production.

Table 1: Yield gap among coconut growers (n=120)

Sl. No	Taluks	Potential Yield (nuts/palm)	Actual Yield (nuts/palm)	Yield gap (nuts/palm)	% gap	Overall Actual yield (nuts/palm)	% gap
1	Tiptur	100	73.30	26.70	26.70	71.10	28.90
2	Turuvekere		75.96	24.04	24.04		
3	Chikkanayakanahalli		69.46	30.54	30.54		
4	Sira		65.66	34.34	34.34		

% = Percentage

3.2 Overall yield gap among coconut growers

As depicted in the Table 2, study revealed that in case of Tiptur taluk, significant number of coconut growers (46.67 %) were found to come under medium level of yield gap followed by low level of yield gap (36.66 %) and then by high level of yield gap (16.67 %). While in Turuvekere taluk, half of the coconut growers (50.00 %) come under the medium level of yield gap followed by low level of yield gap (36.67 %) and then by high level of yield gap (13.33 %). Whereas looking in to the case of Chikkanayakanahalli taluk, significant number of coconut growers (43.33 %) were found to come under the medium level of yield gap followed by high level of yield gap (40.00 %) and then followed by low level of yield gap

(16.67 %). From Studying the case of the Sira taluk, significant number of coconut growers (46.67 %) come under the medium level of yield gap followed by high level of yield gap (40.00 %) and then followed by low level of yield gap (13.33 %). Thus, among the overall coconut growers more than two-fifth of coconut growers (46.67 %) fall under medium level of yield gap followed by high level of yield gap (27.50 %) and then by low level of yield gap (25.83 %). This may be the result of low technological expertise, a lack of desire to use good agricultural practices and a shortage of resources among coconut growers. The findings of Vikas (2020)[4] are in agreement with this trend.

Table 2: Overall yield gap among coconut growers (n=120)

Level of yield gap	Tiptur (n ₁ =30)		Turuvekere (n ₂ =30)		Chikkanayakanahalli (n ₃ =30)		Sira (n ₄ =30)		Total (n=120)	
	f	%	f	%	f	%	f	%	f	%
Low < (29.72 – 10.97)	11.00	36.66	11.00	36.67	5.0	16.67	4.00	13.33	31.00	25.83
Medium (29.72 ± 10.97)	14.00	46.67	15.00	50.00	13.0	43.33	14.00	46.67	56.00	46.67
High > (29.72 + 10.97)	5.00	16.67	4.00	13.33	12.0	40.0	12.00	40.00	33.00	27.50
Mean=29.72					SD=21.95					

f = Frequency and % = Percentage

3.3 Comparison of yield gap among coconut growers with Kruskal-Wallis One-way ANOVA

The Table 3 showing the Kruskal-wallis one-way ANOVA to know the significant difference in the yield gap among the taluks, showed that there is a significant difference in the yield gap among taluks with H-value of 15.03 significant at one per cent level. Where Turuvekere taluk

performed better with 47.38 mean rank then followed by the Tiptur taluk with mean rank of 49.28 then by the Chikkanayakanahalli taluk with mean rank of 70.60 then by the Sira taluk with mean rank of 74.73 where it implies that as the mean rank value is less/decreased the yield gap is also less/decreased and vice versa.

Table 3: Comparison of yield gap among coconut growers with Kruskal-Wallis One-way ANOVA (n=120)

Sl. No	Taluks	Sample size	Mean rank	H-Value
1	Tiptur	n ₁ = 30	49.28	15.03**
2	Turuvekere	n ₂ = 30	47.38	
3	Chikkanayakanahalli	n ₃ = 30	70.60	
4	Sira	n ₄ = 30	74.73	

**Significant at one per cent level

IV. CONCLUSION

In conclusion, studying the yield gap among coconut growers holds immense importance for the sustainable development of coconut farming sector in Tumkur district and beyond. By identifying the factors contributing to this gap, policymakers, agricultural extension services and stakeholders can develop targeted interventions to address the challenges effectively. Closing the yield gap not only enhances the livelihoods of coconut farmers but also strengthens the resilience of the agricultural sector, fosters economic growth and ensures food security. Moreover, it can contribute to the overall prosperity and well-being of coconut-growing communities, thus laying the foundation for a successful socio-economic growth and development of coconut growers.

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