

## IMPACT OF DROUGHT ON ARECANUT IN KARNATAKA

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### Introduction

India is the largest producer of arecanut in the world with an area of 0.313 million hectares, producing 0.379 million tons of arecanut (CMIE, 2002). Arecanut is one of the major commercial crops mainly grown in Karnataka, Kerala and Assam. These three states occupy 89% of the total area and 83% of the production of arecanut in India. Karnataka occupies about 39% of area and 43% of production of arecanut in India. Large scale area expansion took place during the last two decades because of the remunerative prices of arecanut. The year 1999 experienced a drastic fall in arecanut prices (Retinam and Sivaraman, 2001). The low prices prevailed in the market since then, widely affected the arecanut farmers who entirely depend on the crop. The areca growing tracts in Karnataka experienced a severe drought in the current year (2003).

The survey was conducted in four major areca-growing districts (Dakshina Kannada, Shimoga, Chikmagalur and Tumkur) of Karnataka to estimate the crop loss in arecanut due to severe drought in the year 2003. To cover large number of gardens with limited time and resources, purposive sampling method has been used in the selected taluks of four districts. The taluk-wise area under arecanut and the rainfall data were obtained from the respective district horticultural offices and statistical offices.

The taluks were selected based on the area under arecanut and the geographical locations. Visual observations on the condition of garden and approximate area were taken from the gardens of both sides of the randomly selected road routes of the selected taluks. Gardens are scored for severity of drought based on the field observations, mainly those of leaves. Drought Severity Indices (DSI) ranged from 0 to 4 with 0 index for healthy and 4 for maximum damage were given in table 1.

To estimate the percentage loss of yield in different severity groups, observations on yield (nut fall/nut set) were taken from the randomly selected gardens. In each taluks, 2 gardens of each severity groups (if available) and from each garden 20 palms were selected at random to estimate the yield loss. By pooling the data over the taluks/districts, the percentage yield loss in each groups were worked out.

Current and the normal year rainfall data were compared to see the reasons for this year's severe drought. To see any relationship between drought severity and holding size, the gardens were classified based on holding size viz, 0-1, 1-2, 2-5 and more than 5 acres. Two-way table of holding size and disease severity index were worked out.

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The lists of the selected taluks, area under arecanut and taluk/district wise summary of the field observations are given in Tables 1 to 4. The percentage yield losses in different DSIs are given in Table 5. Even in healthy gardens, due to the long dry spell during the summer, an average yield loss (nut fall) of 5% is observed. Taluk/district wise estimated area under different severity groups indicates that there is difference in the spatial distribution of yield loss or drought severity.

**Dakshina Kannada:** Dakshina Kannada (DK) is the major arecanut growing district in Karnataka with an area of 26,635ha. Out of the 5 taluks in DK, crop loss survey was conducted in 4 taluks (Table 1). The survey indicates that 78% of the area in the district were not shown any symptoms of drought (DSI=0), 12% of the area shows minimum damage (DSI=1) and only 1% shows maximum damage (DSI=4). The estimated yield loss in the district was 13%. The maximum crop loss was observed in Puttur taluk (19%) followed by Belthangady taluk (18%), Bantwal taluk (10%) and the minimum yield loss were observed in Sullia taluk (6%). The presence of rivers and relatively high water table could be the reason for less damage in Sullia and Bantwal taluks compared to Belthangady and Puttur taluks.

**Shimoga:** Shimoga is the second largest arecanut growing district in Karnataka with an area of 26628ha. The survey was conducted in 4 out of 7 taluks in Shimoga. The survey indicates that 86% of the area in the district were not shown any symptoms of drought (DSI=0), 10% of the area shows

minimum damage (DSI=1). The estimated yield loss in the district was 9%. The maximum crop loss was observed in Shimoga (11%) followed by Bhadravathy (9%), Sagar (8%) and the minimum crop loss were observed in Thirthahalli (7%).

**Chikmagalur District:** Chikmagalur is one of the major arecanut growing district with an area of 18311ha. The survey was conducted in 7 out of 8 taluks in Chikmagalur. The survey indicates that 64% of the area in the district were not shown any symptoms of drought (DSI=0), 18% of the area shows minimum damage (DSI=1) and 4% shows maximum damage (DSI=4). The estimated yield loss in the district was 20%. The maximum yield loss was observed in Tarikere (40%) followed by Chikmagalur (31%) and Kadur (21%). The normal annual rainfall received by these taluks was relatively very low (Table 7) and usually by the end of April the water sources for irrigation would be exhausted. During the month of May usually these taluks receive enough rainfall to sustain the arecanut garden. In the current year (2003) the rain fall during May was negligible and it severely affected the arecanut gardens in these taluks. In other taluks the estimated yield loss was comparatively low (<11%).

**Tumkur:** Tumkur is another major arecanut growing district with an area of 13,899 ha. Although the annual rainfall is very low, the gardens are mainly irrigated through borewells. The survey was conducted in 6 out of 10 taluks in Tumkur. The survey indicates that 60% of the area in the district were not shown any symptoms of drought

(DSI=0), 14% of the area shows minimum damage (DSI=1) and 8% shows maximum damage (DSI=4). The estimated yield loss in the district was 19%. The maximum yield loss was observed in Koratagere (36%) and Madhugiri (30%), which are non-traditional areas where the acreage under arecanut is very less. Usually May month provides adequate rainfall to sustain the arecanut gardens in these areas. In the current year due to the lack of rain fall during May coupled with the exhausted ground water sources caused heavy damage. In other taluks the estimated yield loss varied from 11 to 16%.

An inverse relationship was observed between holding size and the drought severity (Table 6). This indicates that the drought mainly affected the small farmers who do not have adequate irrigation facilities to withstand the long dry spell.

### Summary

The survey indicates that the impact of drought on arecanut was very severe in Tarikere, Chikmagalur and Kadur taluks of Chikmagalur district and Koratagere and Madhugiri taluks of Tumkur district. The damage was comparatively low in Shimoga district. In Dakshina Kannada, the maximum yield loss was observed in Puttur and Belthangady taluks. The drought mainly affected the farmers with smallholdings who lack proper irrigation facilities. The estimated average yield loss of the four districts was 14.5%.

### References

- CMIE. 2002. *Indian Harvest*, Center for monitoring Indian economy Pvt Ltd.  
 Rethinam, P., and Sivaraman, K. 2001. *Arecanut (Areca catechu Linn.)- Present status and future strategies. Indian journal of arecanut spices and medicinal plants 3(2): 35-50.*

Table 1

Estimated area (ha) in different drought severity group and yield loss (%)

#### Dakshina Kannada District

Taluk	Area (ha)	Estimated area (ha) in different drought severity index group					Estimated yield loss (%)
		0	1	2	3	4	
Puttur	5337	3475 (65)	901 (17)	504 (9)	419 (8)	38 (1)	18.80
Bantwal	5144	4265 (83)	588 (11)	172 (3)	73 (1)	47 (1)	10.65
Belthangady *	6684	4583 (69)	1046 (16)	472 (7)	508 (8)	75 (1)	17.70
Sullia	7025	6642 (95)	354 (5)	21 (0)	8 (0)	0 (0)	6.23
Mangalore	2445	*	*	*	*	*	*
<b>Total</b>	<b>26635</b>	<b>(78)</b>	<b>(12)</b>	<b>(5)</b>	<b>(4)</b>	<b>(1)</b>	<b>(13.34)</b>

Figures in brackets are % values

\* Not conducted the survey

**Table 2**

Estimated area (ha) in different drought severity group  
Shimoga District

Taluk	Area (ha)	Estimated area (ha) in different drought severity index group					Estimated yield loss (%)
		0	1	2	3	4	
Shimoga	5243	4054 (77)	910 (17)	244 (5)	29 (1)	7 (0)	11.07
Thirthahalli	5618	5302 (94)	126 (2)	189 (3)	0 (0)	0 (0)	6.97
Sagar	3161	2795 (88)	290 (9)	61 (2)	15 (1)	0 (0)	8.43
Bhadravathy	8139	6871 (84)	898 (11)	317 (4)	53 (1)	0 (0)	9.42
Hosanagara	1772	*	*	*	*	*	*
Soraba	1694	*	*	*	*	*	*
Shikaripura	1001	*	*	*	*	*	*
<b>Total</b>	<b>26628</b>	<b>(86)</b>	<b>(10)</b>	<b>(3)</b>	<b>(1)</b>	<b>(0)</b>	<b>(9.31)</b>

Figures in brackets are % values \* Not conducted the survey

**Table 3**

Estimated area (ha) in different drought severity group  
Chikmagalur District

Taluk	Area (ha)	Estimated area (ha) in different drought severity index group					Estimated yield loss (%)
		0	1	2	3	4	
Sringeri	1650	1350 (82)	300 (18)	0 (0)	0 (0)	0 (0)	8.64
Koppa	4206	3281 (78)	859 (20)	66 (2)	0 (0)	0 (0)	9.79
Tarikere	5085	1576 (31)	1146 (23)	1027 (20)	668 (13)	668 (13)	40.28
Kadur	2501	1655 (66)	358 (14)	201 (8)	115 (5)	172 (7)	21.22
Chikmagalur	1440	694 (48)	191 (13)	278 (19)	208 (14)	69 (5)	31.02
Mudigere	2181	1704 (78)	409 (19)	68 (3)	0 (0)	0 (0)	10.16
NR Pura	1248	*	*	*	*	*	*
<b>Total</b>	<b>18311</b>	<b>(64)</b>	<b>(18)</b>	<b>(9)</b>	<b>(5)</b>	<b>(4)</b>	<b>(20.18)</b>

Figures in brackets are % values \* Not conducted the survey

Table 4

Estimated area (ha) in different drought severity group  
Tumkur District

Taluk	Area (ha)	Estimated area (ha) in different drought severity index group					Estimated yield loss (%)
		0	1	2	3	4	
Chiknayakanahalli	968	797 (82)	128 (13)	14 (1)	14 (1)	14 (1)	10.74
Gubbi	4272	3365 (79)	307 (7)	246 (6)	215 (5)	138 (3)	15.63
Koratagere	772	381 (49)	152 (20)	19 (2)	38 (5)	181 (23)	35.80
Madhugiri	666	408 (61)	83 (12)	10 (2)	52 (8)	114 (17)	29.81
Sira	2264	1709 (75)	306 (14)	238 (10)	11 (1)	0 (0)	12.50
Tumkur	3170	2319 (73)	601 (19)	118 (4)	38 (1)	94 (3)	14.12
Tiptur	235	*	*	*	*	*	*
Kunigal	755	*	*	*	*	*	*
Pavugudi	251	*	*	*	*	*	*
Thruavakare	546	*	*	*	*	*	*
<b>Total</b>	<b>13899</b>	<b>(60)</b>	<b>(14)</b>	<b>(4)</b>	<b>(3)</b>	<b>(8)</b>	<b>19.27</b>

Figures in brackets are % values

\* Not conducted the survey

Table 5

DSI	Percentage yield loss	
	Mean	SE
0	4.95	0.65
1	25.20	2.11
2	49.80	3.09
3	73.95	3.30
4	98.50	1.20

Table 6

Percentage distribution of drought severity in different holding sizes

DSI	Size of holding in acres			
	0-1	1-2	2-5	> 5
0	59.47	71.70	86.51	93.33
1	21.53	16.04	7.95	6.67
2	9.68	5.87	2.41	0.00
3	4.60	3.56	1.69	0.00
4	4.72	2.83	1.45	0.00

Table 7

District	District/Taluk	Rainfall (mm)			Yield loss %
		May (normal)	May '03	Total (normal)	
Dakshina Kannada	Puttur	152	26	2893	18.80
	Bantwal	222	7	2960	10.65
	Belthangady	66	8	3616	17.70
	Sullia	109	47	2747	06.23
Chikmagalur	Sringeri	24	0	3233	08.64
	Koppa	58	2	2082	09.79
	Tarikeri	89	4	638	40.28
	Kadur	119	0	665	21.22
	Chikmagalur	258	35	860	31.02
Shimoga	Mudigere	24	36	1601	10.16
	Shimoga	86	3	865	11.07
	Thirthahally	42	0	2097	06.97
	Sagar	76	0	1673	08.43
	Badravathy	93	0	675	09.42
Tumkur	Tumkur	52	1	435	14.12
	Gubbi	68	0	371	15.63
	Koratagare	80	0	406	35.80
	Madhugiri	37	0	311	29.81
	Sira	57	3	467	12.50
	Chiknayakanahalli	52	13	410	10.74

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\* Development of certified seed production programme for indigenous paprika alike chillies.

\* Improving/Standardizing proper post harvest technology and streamlining the marketing arrangements.

\* Survey for Identification of indigenous paprika alike chillies having potential for development and scope for exports.

\* Organic farming in paprika is to be popularized for sustainable production and export.

\* Transfer of proper technical know-how on cultivation practices including integrated nutrient, pest and disease management practices.

\* Organizing the cultivation of desirable paprika varieties and their marketing system to ensure a remunerative return to farming community.

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