



BEHAVIOUR OF MARKET ARRIVALS AND PRICES OF RED CHILLIES (*CAPSICUM ANNUUM*)

G. Mohan Naidu*, V. Meena Kumari and V. Srikala¹

Department of Statistics and Maths, S.V. Agricultural College, Tirupati - 517 502 (Andhra Pradesh), India.

¹Department of Agricultural Economics, S.V. Agricultural College, Tirupati - 517 502 (Andhra Pradesh), India.

Abstract

The present study was conducted to know the statistical investigation of arrivals and price behaviour of red chillies (*Capsicum annuum*) in Khammam and Warangal markets of Andhra Pradesh, India. Purposive sampling was used to select the markets. In both the markets, the highest and the lowest arrivals of seasonal indices were observed during the month of March and November, respectively. On the other hand, in Khammam market the highest price was observed during the month of March while it was lowest in September. In case of Warangal market, the highest and lowest prices were observed during the month of January and October, respectively. Well defined cycles could not be observed during the study period in both markets. The forecasted arrivals and prices in both the markets differed during the study period. A significant relation between arrivals and prices was observed during the period in both the markets.

Key words : Seasonal variation, cyclical variation, correlation coefficient, forecasting.

Introduction

Red chillies are one of the most important commercial crops of India. India is the largest producer and consumer of red chillies in the world. The highest production of red chillies in India comes from Andhra Pradesh, which contributes nearly 57% to the total production followed by Karnataka and Orissa.

To achieve the goal of efficient marketing, the in-depth studies on seasonal variations and prices are needed. Such studies make the farmers aware of the optimum time to sell their produce and also help the policy makers to regulate the supplies and to stabilise the prices. Keeping this in view, the present study was conducted with the specific objectives to examine the seasonal, cyclical behaviours, the relationship and to forecast the arrivals and prices of red chillies in these markets.

Data and Methodology

The data on market arrivals and prices of red chillies were collected from Khammam and Warangal Agricultural Market Committees. The data pertained to the period 2002-03 to 2012-13 (11 years) and were analysed.

Seasonal variations

Seasonal variations are those periodic movements which operate in a period and regular manner during a period of 12 months. Thus, these variations are worked out for data which recorded monthly, daily, weekly, monthly and quarterly. Seasonal variations was computed by using ratio to moving average method (Kumuda Keerthi and Mohan Naidu (2013).

Cyclical variations

The term 'cycle' refers to the recurrent variations in time series that usually last longer than a year and are regular neither in amplitude nor in length. Amongst all the methods of arriving at estimates of the cyclic movements of time series, the residual method is most commonly used (Mohan Naidu *et al.*, 2013). Forecasted arrivals and prices were analysed by using multiplicative decomposition model.

From fig. 1, the peak arrival was found to be during the months of March followed by April and it was the lowest in October succeeded by November. The highest price was recorded during the month of March followed by January while it was lowest during the month of September.

*Author for correspondence: E-mail: naidu_svag2001@yahoo.com

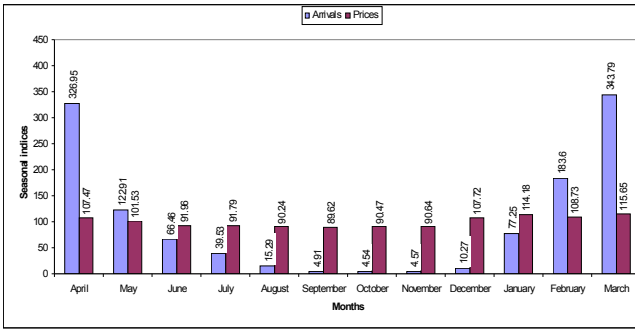


Fig. 1 : Seasonal indices of red chillies arrivals and prices at Khammam market.

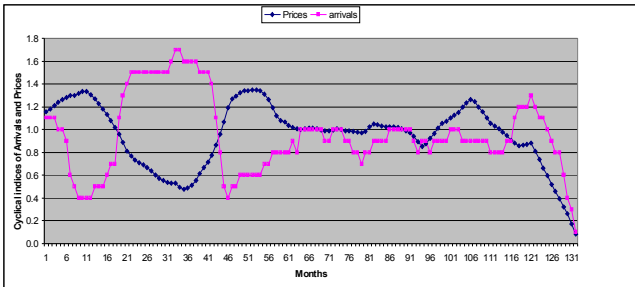


Fig. 2 : Cyclical indices of red chillies arrivals and prices at Khammam market.

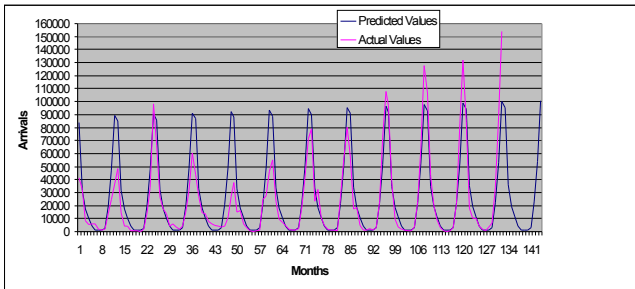


Fig. 3 : Forecasts of red chillies arrivals at Khammam market.

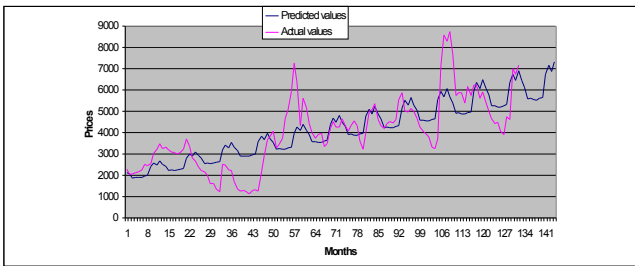


Fig. 4 : Forecasts of red chillies prices at Khammam market.

From fig. 2, it can be observed that a well defined cycle could not be observed in case of arrivals and prices at Khammam market.

In Khammam market the forecasted red chillies price is likely to increase approximately up to Rs. 7337q⁻¹ in March and decrease up to Rs. 5522 q⁻¹ in September while the highest (100854q) and the lowest (1315q)

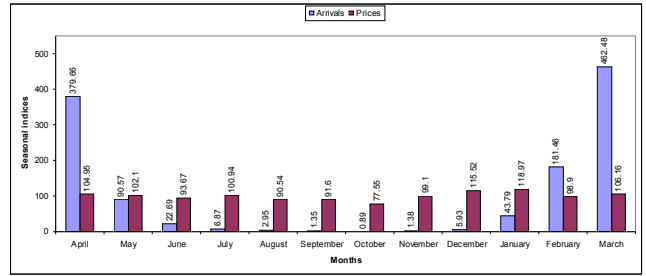


Fig. 5 : Seasonal indices of red chillies arrivals and prices at Warangal market.

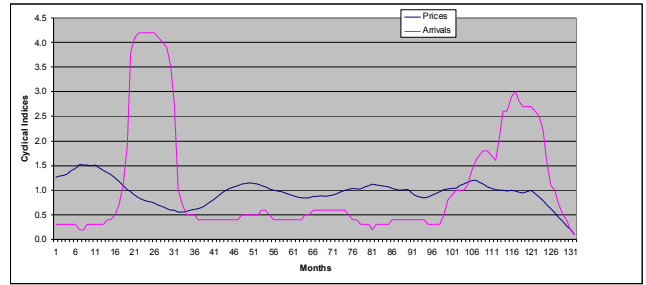


Fig. 6 : Cyclical indices of red chillies arrivals and prices at Warangal market.

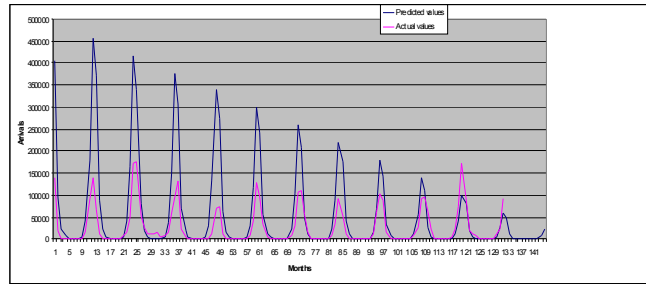


Fig. 7 : Forecasts of red chillies arrivals at Warangal market.

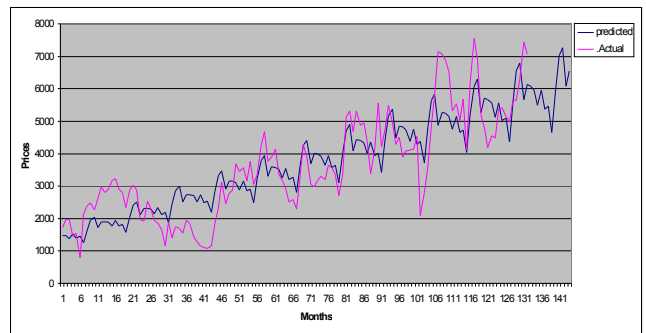


Fig. 8 : Forecasts of red chillies prices at Warangal market.

arrivals may be recorded in March and November respectively (tables 1 & 2 and figs.3 & 4).

From fig. 5, it can be observed that the highest arrival was found to be during the month of March while it was lowest in October. The highest price was recorded during the month of January while the lowest price was observed during the month of October. Similar fluctuations in

Table 1: Forecasts of red chillies arrivals at Khammam market.

Year	Month	Actual	Predicted	Year	Month	Actual	Predicted
2002-03	Apr	41416	83857	2008-09	Apr	79215	89927
	May	32170	31556		May	23330	33838
	Jun	8385	17080		Jun	32169	18314
	Jul	5334	10169		Jul	11015	10903
	Aug	5821	3937		Aug	4544	4221
	Sept	5810	1266		Sept	1700	1357
	Oct	1800	1171		Oct	987	1256
	Nov	958	1162		Nov	1003	1246
	Dec	1608	2655		Dec	793	2846
	Jan	13991	19992		Jan	26951	21427
	Feb	24626	47563		Feb	56413	50972
	2003-04	Mar	36387		89151	2009-10	Mar
Apr		48664	84868	Apr	57924		90939
May		14099	31936	May	17350		34218
Jun		3898	17286	Jun	18632		18520
Jul		4322	10292	Jul	4810		11026
Aug		675	3985	Aug	1156		4269
Sept		580	1281	Sept	1024		1372
Oct		367	1185	Oct	2517		1270
Nov		253	1176	Nov	1420		1260
Dec		1537	2687	Dec	2991		2878
Jan		14347	20232	Jan	22623		21666
Feb		34128	48132	Feb	72361		51541
2004-05	Mar	98143	90215	2010-11	Mar	107985	96598
	Apr	66705	85880		Apr	97093	91951
	May	26489	32317		May	38613	34599
	Jun	17265	17491		Jun	9356	18725
	Jul	14004	10414		Jul	3869	11148
	Aug	3936	4032		Aug	1632	4316
	Sept	5999	1296		Sept	995	1387
	Oct	3557	1200		Oct	874	1284
	Nov	2073	1190		Nov	703	1274
	Dec	4464	2719		Dec	3884	2909
	Jan	15777	20471		Jan	23655	21905
	Feb	31867	48700		Feb	64115	52109
2005-06	Mar	60751	91279	2011-12	Mar	127790	97662
	Apr	43960	86892		Apr	106647	92962
	May	27004	32697		May	42913	34979
	Jun	14369	17697		Jun	19668	18931
	Jul	13643	10536		Jul	9238	11270
	Aug	7824	4079		Aug	2944	4363
	Sept	5739	1311		Sept	656	1402
	Oct	4747	1214		Oct	112	1298
	Nov	3973	1204		Nov	717	1288
	Dec	3385	2751		Dec	2934	2941
	Jan	4323	20710		Jan	21429	22144
	Feb	10745	49268		Feb	83496	52677

Table 1 continued...

Table 1 continued...

	Mar	27049	92343		Mar	131592	98726
2006-07	Apr	37778	87904	2012-13	Apr	84306	93974
	May	15016	33077		May	17795	35359
	Jun	16154	17903		Jun	10193	19137
	Jul	6235	10659		Jul	10133	11393
	Aug	2728	4127		Aug	4491	4411
	Sept	731	1326		Sept	1502	1418
	Oct	270	1228		Oct	757	1312
	Nov	375	1218		Nov	3381	1302
	Dec	1225	2782		Dec	6716	2973
	Jan	24490	20949		Jan	34185	22383
	Feb	27631	49836		Feb	89310	53245
	Mar	46121	93406		Mar	154246	99790
2007-08	Apr	55273	88915	2013-14	Apr	*	94986
	May	23356	33458		May	*	35740
	Jun	9741	18108		Jun	*	19342
	Jul	7189	10781		Jul	*	11515
	Aug	4585	4174		Aug	*	4458
	Sept	1764	1342		Sept	*	1433
	Oct	1050	1242		Oct	*	1326
	Nov	1084	1232		Nov	*	1315
	Dec	2349	2814		Dec	*	3005
	Jan	18189	21188		Jan	*	22622
	Feb	41863	50404		Feb	*	53813
	Mar	71282	94470		Mar	*	100854

Table 2: Forecasts of red chillies prices at Khammam market.

Year	Month	Actual	Predicted	Year	Month	Actual	Predicted
2002-03	Apr	2281	2137	2008-09	Apr	4661	4494
	May	2017	2050		May	4313	4276
	Jun	2064	1884		Jun	4055	3901
	Jul	2121	1909		Jul	4326	3922
	Aug	2149	1904		Aug	4534	3883
	Sept	2249	1918		Sept	4325	3884
	Oct	2531	1964		Oct	3629	3948
	Nov	2457	1995		Nov	3217	3983
	Dec	2545	2404		Dec	4004	4767
	Jan	3027	2583		Jan	5002	5087
	Feb	3241	2493		Feb	5053	4878
	Mar	3485	2687		Mar	5340	5223
2003-04	Apr	3273	2530	2009-10	Apr	4608	4886
	May	3330	2421		May	4320	4647
	Jun	3207	2221		Jun	4201	4237
	Jul	3110	2244		Jul	4425	4257
	Aug	3068	2234		Aug	4506	4213
	Sept	3010	2246		Sept	4444	4211
	Oct	3095	2295		Oct	4597	4279

Table 2 continued...

Table 2 continued...

	Nov	3234	2327		Nov	5554	4315
	Dec	3718	2798		Dec	5859	5160
	Jan	3359	3000		Jan	4989	5505
	Feb	2812	2890		Feb	4982	5275
	Mar	2670	3110		Mar	5116	5646
2004-05	Apr	2379	2922	2010-11	Apr	5000	5279
	May	2232	2792		May	4640	5018
	Jun	2167	2557		Jun	4248	4573
	Jul	2004	2580		Jul	4056	4593
	Aug	1613	2564		Aug	3925	4543
	Sept	1628	2573		Sept	3806	4539
	Oct	1352	2625		Oct	3326	4610
	Nov	1226	2658		Nov	3244	4646
	Dec	2510	3192		Dec	3718	5554
	Jan	2476	3418		Jan	7167	5922
	Feb	2261	3288		Feb	8579	5672
	Mar	2216	3532		Mar	8296	6069
2005-06	Apr	1715	3315	2011-12	Apr	8756	5672
	May	1353	3163		May	7678	5390
	Jun	1265	2893		Jun	5756	4910
	Jul	1299	2915		Jul	5866	4928
	Aug	1218	2894		Aug	5864	4873
	Sept	1141	2901		Sept	5375	4867
	Oct	1290	2956		Oct	6167	4940
	Nov	1309	2989		Nov	5752	4977
	Dec	1259	3585		Dec	6226	5948
	Jan	2158	3835		Jan	6235	6339
	Feb	2937	3685		Feb	5625	6070
	Mar	3685	3955		Mar	5898	6491
2006-07	Apr	3831	3708	2012-13	Apr	5395	6065
	May	4072	3534		May	4984	5761
	Jun	3282	3229		Jun	4632	5246
	Jul	3445	3251		Jul	4423	5264
	Aug	3726	3223		Aug	4475	5203
	Sept	4677	3229		Sept	4067	5194
	Oct	5061	3287		Oct	3896	5271
	Nov	5941	3321		Nov	4745	5308
	Dec	7270	3979		Dec	4611	6342
	Jan	6397	4253		Jan	6989	6757
	Feb	4315	4083		Feb	6748	6467
	Mar	5597	4378		Mar	7167	6914
2007-08	Apr	5164	4101	2013-14	Apr	*	6458
	May	4422	3905		May	*	6132
	Jun	3989	3565		Jun	*	5582
	Jul	3736	3586		Jul	*	5599
	Aug	3914	3553		Aug	*	5532
	Sept	3972	3556		Sept	*	5522
	Oct	3350	3617		Oct	*	5602
	Nov	3500	3652		Nov	*	5640
	Dec	4207	4373		Dec	*	6735
	Jan	4509	4670		Jan	*	7174
	Feb	4270	4480		Feb	*	6865
	Mar	4273	4800		Mar	*	7337

Table 3: Forecasts of red chillies arrivals at Warangal market

Year	Month	Actual	Predicted	Year	Month	Actual	Predicted
2002-03	Apr	141743	404400	2008-09	Apr	109849	209855
	May	18086	95827		May	57553	49418
	Jun	1560	23846		Jun	16359	12219
	Jul	800	7171		Jul	2686	3651
	Aug	567	3058		Aug	963	1547
	Sept	927	1390		Sept	433	698
	Oct	348	910		Oct	184	454
	Nov	285	1401		Nov	313	694
	Dec	2147	5979		Dec	584	2940
	Jan	16210	43839		Jan	8159	21400
	Feb	92550	180370		Feb	35485	87387
	Mar	140198	456411		Mar	94106	219428
2003-04	Apr	68180	371976	2009-10	Apr	53027	177431
	May	11592	88092		May	14373	41683
	Jun	796	21908		Jun	1738	10281
Jul	515	6584		Jul	215	3064	
	Aug	295	2806		Aug	52	1295
	Sept	54	1275		Sept	4	583
	Oct	45	834		Oct	89	378
	Nov	1298	1283		Nov	73	576
	Dec	7093	5472		Dec	1444	2434
	Jan	15910	40099		Jan	13587	17660
	Feb	46939	164873		Feb	63023	71889
	Mar	170433	416914		Mar	105000	179930
2004-05	Apr	174672	339552	2010-11	Apr	89826	145007
	May	50251	80357		May	16738	33948
	Jun	28023	19970		Jun	1463	8343
	Jul	13759	5998		Jul	126	2477
	Aug	11548	2554		Aug	26	1043
	Sept	11677	1159		Sept	85	468
	Oct	17204	758		Oct	32	302
	Nov	5578	1165		Nov	34	458
	Dec	9746	4966		Dec	794	1927
	Jan	16793	36359		Jan	7858	13920
	Feb	62156	149376		Feb	28215	56392
	Mar	96446	377417		Mar	94512	140433
2005-06	Apr	130825	307128	2011-12	Apr	95581	112583
	May	23800	72622		May	63643	26213
	Jun	5535	18032		Jun	22049	6405
	Jul	2068	5411		Jul	2718	1891
	Aug	932	2302		Aug	698	791
	Sept	813	1044		Sept	308	352
	Oct	1157	682		Oct	11	226
	Nov	485	1048		Nov	410	340
	Dec	845	4459		Dec	5908	1421
	Jan	2200	32619		Jan	25039	10180
	Feb	14469	133879		Feb	73352	40895

Table 3 continued...

Table 3 continued...

	Mar	69666	337920		Mar	171160	100936
2006-07	Apr	73874	274704	2012-13	Apr	87280	80159
	May	13897	64887		May	20377	18478
	Jun	3020	16094		Jun	13180	4468
	Jul	520	4824		Jul	9639	1304
	Aug	570	2050		Aug	3395	539
	Sept	1484	929		Sept	265	237
	Oct	698	606		Oct	536	150
	Nov	404	930		Nov	404	223
	Dec	1398	3953		Dec	1751	914
	Jan	8997	28879		Jan	14026	6441
	Feb	42229	118381		Feb	23955	25398
	Mar	128248	298422		Mar	94512	61439
2007-08	Apr	95703	242279	2013-14	Apr	*	47734
	May	33576	57153		May	*	10743
	Jun	6340	14157		Jun	*	2530
	Jul	1549	4237		Jul	*	717
	Aug	413	1799		Aug	*	287
	Sept	557	813		Sept	*	122
	Oct	238	530		Oct	*	74
	Nov	110	812		Nov	*	105
	Dec	884	3447		Dec	*	408
	Jan	8191	25140		Jan	*	2701
	Feb	31518	102884		Feb	*	9900
	Mar	107031	258925		Mar	*	21941

Table 4 : Forecasts of red chillies prices at Warangal market.

Year	Month	Actual	Predicted	Year	Month	Actual	Predicted
2002-03	Apr	1730	1488	2008-09	Apr	3186	3999
	May	1975	1482		May	3290	3924
	Jun	1975	1391		Jun	3207	3631
	Jul	1456	1532		Jul	3637	3946
	Aug	1539	1404		Aug	3558	3570
	Sept	789	1451		Sept	3350	3642
	Oct	2150	1254		Oct	2709	3109
	Nov	2400	1636		Nov	3355	4006
	Dec	2475	1945		Dec	5109	4708
	Jan	2255	2043		Jan	5328	4888
	Feb	2607	1731		Feb	4681	4097
	Mar	2978	1893		Mar	5310	4433
2003-04	Apr	2804	1907	2009-10	Apr	4876	4417
	May	2875	1889		May	4958	4331
	Jun	3182	1764		Jun	4378	4004
	Jul	3235	1934		Jul	3361	4349
	Aug	2908	1765		Aug	4133	3931
	Sept	2798	1816		Sept	5574	4007

Table 4 continued...

Table 4 continued...

	Oct	2338	1563		Oct	4206	3418
	Nov	2886	2031		Nov	4732	4401
	Dec	3030	2406		Dec	5493	5169
	Jan	2875	2517		Jan	4950	5363
	Feb	1971	2125		Feb	4285	4491
	Mar	1919	2317		Mar	4500	4856
2004-05	Apr	2531	2325	2010-11	Apr	3885	4835
	May	2300	2296		May	4090	4738
	Jun	1948	2137		Jun	4117	4378
	Jul	1875	2337		Jul	4133	4751
	Aug	1656	2126		Aug	4525	4292
	Sept	1150	2181		Sept	2081	4372
	Oct	1898	1873		Oct	2811	3727
	Nov	1409	2426		Nov	3600	4796
	Dec	1739	2866		Dec	4837	5629
	Jan	1700	2991		Jan	5806	5837
	Feb	1550	2520		Feb	7142	4885
	Mar	1938	2740		Mar	7068	5279
2005-06	Apr	1849	2743	2011-12	Apr	6863	5254
	May	1427	2703		May	6518	5145
	Jun	1275	2511		Jun	5325	4751
	Jul	1157	2739		Jul	5538	5154
	Aug	1100	2487		Aug	5033	4653
	Sept	1075	2547		Sept	5675	4738
	Oct	1150	2182		Oct	4101	4037
	Nov	1850	2821		Nov	6159	5191
	Dec	2325	3327		Dec	7555	6090
	Jan	3116	3466		Jan	6885	6311
	Feb	2450	2914		Feb	5200	5279
	Mar	2771	3163		Mar	4794	5702
2006-07	Apr	2891	3162	2012-13	Apr	4173	5672
	May	3699	3110		May	4563	5552
	Jun	3442	2884		Jun	4483	5125
	Jul	3565	3142		Jul	5376	5556
	Aug	3142	2848		Aug	5416	5014
	Sept	3761	2912		Sept	5155	5103
	Oct	3048	2491		Oct	4969	4346
	Nov	3344	3216		Nov	5652	5586
	Dec	4252	3787		Dec	5641	6550
	Jan	4688	3940		Jan	6285	6785
	Feb	3764	3308		Feb	7429	5674
	Mar	3880	3586		Mar	7068	6125
2007-08	Apr	4145	3580	2013-14	Apr	*	6090
	May	3383	3517		May	*	5959
	Jun	3180	3258		Jun	*	5498
	Jul	2932	3544		Jul	*	5958
	Aug	2507	3209		Aug	*	5374
	Sept	2593	3277		Sept	*	5468
	Oct	2288	2800		Oct	*	4655
	Nov	3270	3611		Nov	*	5981
	Dec	4272	4248		Dec	*	7011
	Jan	3884	4414		Jan	*	7260
	Feb	3047	3702		Feb	*	6068
	Mar	2972	4009		Mar	*	6549

Table 5 : Correlation coefficients of arrivals and prices of red chillies in both markets from 2002-03 to 2012-13.

Year	Khammam	Warangal
2002-03	0.3200**	0.4028**
2003-04	-0.5489**	-0.6877**
2004-05	-0.0333NS	0.6858**
2005-06	-0.2975**	0.2321**
2006-07	-0.0799NS	-0.0214NS
2007-08	0.6701**	0.2673**
2008-09	0.7127**	0.1196NS
2009-10	0.1127NS	-0.0450NS
2010-11	0.7360**	0.4484**
2011-12	0.4188**	-0.0756NS
2012-13	0.8103**	0.1405NS

NS Non significant at 5% LOS. ** Significant at 1% LOS.

arrivals and prices of chillies were reported by Kasar *et al.* (1996).

From fig. 6, it can be observed that, a well defined cycle could not be observed regarding the arrivals and prices at Warangal market.

In Warangal market the forecasted red chillies price is likely to increase approximately up to Rs. 7260q⁻¹ in January and decrease up to Rs. 4655 q⁻¹ in October while the highest (47734q) and the lowest (74q) arrivals may be recorded in April and October, respectively (tables 3 & 4 and figs.7 & 8).

The degree of relationship between market arrivals and prices of red chillies was studied for different years from 2002-03 to 2012-13 (table 5). Significant correlation coefficient between arrivals and prices, whether positive

or negative means increases in arrivals are associated with increase in prices or otherwise increases in arrivals are associated with decreases in prices.

Conclusion

In both the markets the highest and the lowest arrivals of seasonal indices were observed during the month and November respectively. On the other hand, in Khammam market the highest price was observed during the month of March while it was lowest in September. In case of Warangal market, the highest and lowest prices were observed during the month of January and October respectively. In Khammam market the forecasted red chillies price is likely to increase in March and decrease in September while the highest and the lowest arrivals may be recorded in March and November, respectively.

In Warangal market the forecasted red chillies price is likely to increase in January and decrease in October while the highest and the lowest arrivals may be recorded in April and October, respectively.

References

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