

Threats in production of coriander (*Coriandrum sativum*) in Andhra Pradesh

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Abstract

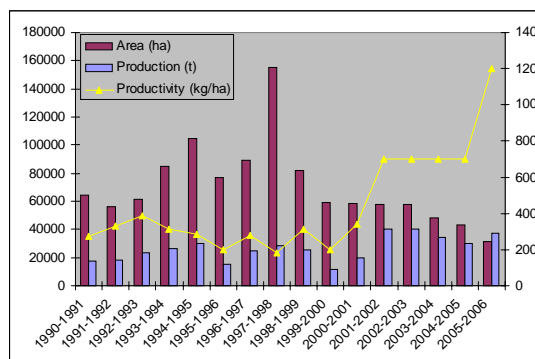
Andhra Pradesh ranks first in the southern states of the country in production and productivity of coriander and ranks second in country. Coriander is cultivated in nearly 31298 hectares in Andhra Pradesh with a production of 37548 metric tonnes. The productivity of the crop increased from 275 kg/ha in 1990 to 1200 kg/ha by 2005-06. The reduction in crop coverage has become a serious concern for the department of horticulture and as well as farmers. The major factors that affected the shift were cultivation of alternate crops and changing cropping patterns, vagaries in climate, non-availability of quality seed, terminal moisture stress and fluctuations in market prices. This study also focuses on achievements of the state in crossing the average national productivity of the crop through strong research by AICRP on Spices and efforts of Department of Horticulture in extension programmes.

Key Words: Coriander, Production, Constraints, Prospects

Coriander, *Coriandrum sativum* Linn. (Apiaceae) is one of the earliest spices known to mankind for its intrinsic aromatic and fragrant qualities of both seed and leaves. The pleasant aroma of the spice is due to the presence of a terpene tertiary alcohol i.e. linalool or coriandrol. (Pruthi, 1976 and Lewis, *et. al.* 1979). The dried seeds are used as spice as well as condiment and important constituent in curry powders and masalas. The crop is grown in almost all the states with a total area of 3.4 lakh hectares with a production of 2.23 lakh metric tonnes (2005-06, Spices Board). The major growing states are Rajasthan, Madhya Pradesh, Andhra Pradesh, Orissa, Tamil Nadu and Karnataka. Among these, Andhra Pradesh ranks first in the southern states of the country in production and productivity of coriander and ranks second in country. The crop is cultivated in almost all parts of the state. Coriander is cultivated in nearly 31298

hectares in Andhra Pradesh with a production of 37548 metric tonnes (2005-06, Department of Horticulture, Govt. of A.P.) (Fig 1 & 2).

It appears from the Fig 2 that there is a fluctuation in area, production and productivity of coriander, which stabilized



(Source: Department of Horticulture, A.P.)

Fig. 1. Area, Production and Productivity of Coriander in A.P.

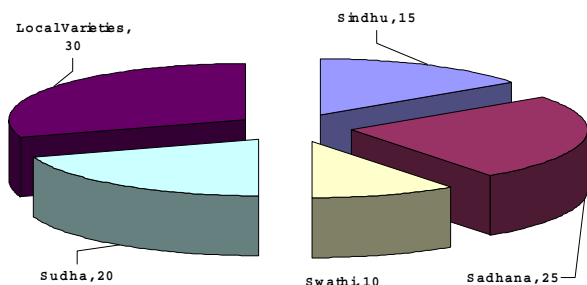


Fig. 2. Extent of varietal adoption

after 2001-02 with quantum jump in productivity 2005-06. If we analyze the dynamics of area coverage, the fluctuations indicate that the coriander cultivation is affected by the choice of cultivating alternate crops in rabi and in rice fallows, climate, productivity, increased returns from other crops due to increased irrigation facility resulted in diversion of grain spice for other commercial crops, and market price.

Cultivation of alternate crops and changing cropping patterns

Coriander is a crop chosen among the competitive crops bengalgram, cotton (depends on kharif rain fall), tobacco, chillies, sunflower and groundnut. The crop area seems to be strongly correlated with areas of bengalgram and sunflower indicating that these crops are selected under similar situations indicated by significant correlations at 0.05% level ($\gamma = 0.91$ and $\gamma = 0.86$ respectively). However, area of coriander is significantly negatively correlated at 0.05% level with area of tobacco, chillies and groundnut ($\gamma = -0.86$, $\gamma = -0.81$ and $\gamma = -0.84$ respectively) indicating that the increase area

of these crops significantly reduced the area of coriander (Table 1).

- correlation is significant at 0.05 level ** correlation is significant at 0.01 level
- During 1970 to late 1990, with expansion of tobacco and chillies and shift to groundnut resulted in reduction of coriander area from one lakh hectares to sixty to seventy thousand hectares by 1990. Further, from 1990-1997, coriander area rose again to one lakh hectares due to increased demand and problems in cultivation of tobacco and groundnut.
- Later, since 2002, twenty seven thousand hectares of coriander area shifted to bengal gram area due to increased market prices of bengalgram because of introduction of kabuli varieties and the advantage of bengalgram in late sown conditions.
- Shift from coriander was essentially due to availability of better alternate commercial crops like chillies and cotton, availability of irrigation water and better productivity of alternate crops like bengalgram.

Vagaries of climate

Choice of crop depends largely on rainfall pattern as indicated by correlation of weather to coriander area, production and productivity (Table 2). It shows in the years with high rainfall during the kharif, coriander is not opted. In the districts of Anantapur and Kurnool, due to high rainfall, coriander is not an option, where as it is

Table 1. Correlation between the area of Coriander and its competitive crops

	Coriander	Bengalgram	Cotton	Tobacco	Chillies	Sunflower	Groundnut
Coriander	1						
Bengalgram	0.91*	1					
Cotton	0.334	0.423	1				
Tobacco	-0.859*	-0.809	-0.593	1			
Chillies	-0.813*	-0.877*	-0.222	0.715	1		
Sunflower	0.858*	0.707	0.65	-0.849*	-0.613	1	
Groundnut	-0.84*	-0.882*	-0.733	0.936**	0.672	-0.834**	1

* correlation is significant at 0.05 level ** correlation is significant at 0.01 level

Table 2. Correlation between rainfall and Coriander production

Area	Rainfall										
	Area Production Productivity					Andhra Pradesh		Major Producing Areas			
	Kharif		Rabi			Total	Kadapa	Anantapur	Kurnool	Prakasam	Total
1											
Production	-0.123	1									
Productivity	-0.633(**)	0.754(**)	1								
Kharif	-0.148	-0.373	-0.092	1							
Rabi	0.255	0.12	0.021	0.233	1						
Total	0.016	-0.221	-0.059	0.873(**)	0.679(**)	1					
Kadapa	0.019	0.021	0.058	0.689(**)	0.486	0.764(**)	1				
Anantapur	-0.227	0.002	0.234	0.726(**)	0.352	0.725(**)	0.761(**)	1			
Kurnool	-0.042	0.046	0.084	0.823(**)	0.293	0.769(**)	0.757(**)	0.829(**)	1		
Prakasam	0.502(*)	-0.164	-0.266	0.520(*)	0.554(*)	0.671(**)	0.598(*)	0.446	0.515(*)	1	
Major Producing Area	0.104	-0.033	0.01	0.796(**)	0.503(*)	0.854(**)	0.910(**)	0.862(**)	0.891(**)	0.770(**)	1

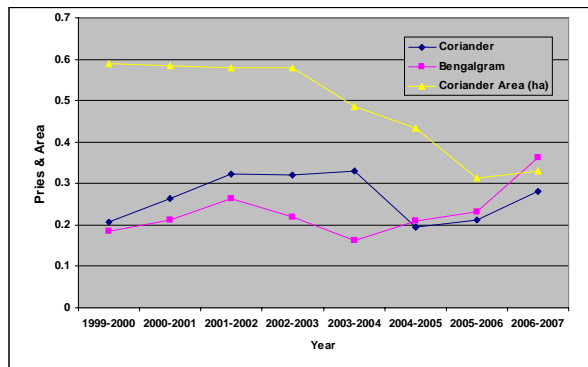
** Correlation is significant at the 0.01 level.

* Correlation is significant at the 0.05 level.

reverse in the case of Prakasam district. In Kadapa district, area changes did not correlate with rainfall which is due to consistent rainfall during the years studied.

Non-availability of quality seed

Unlike field crops, Seed Replacement Ratio for Seed Spices is at the best 25-30% where it is desirable to achieve 100%. The total seed requirement is estimated as 650 MT to cover an area of 43000 ha. Under National Horticultural Mission, the state has taken up production of quality seed to the tune of 45 MT every year. Farmers are using the foundation seed from ANGRAU and producing up to 25 MT every year to facilitate farmer to farmers seed exchange. However, total quality seed production is just 10% of the requirement of the state, leading to poor production and productivity. Regarding varietal adoption, the varieties grown in the state are mostly developed by ANGRAU Fig 3.



(Source: AGMARK, Website)

Fig 3. Variation in prices of Coriander and its competitive crop:

Fig 3 indicates that still there is 30% area is not covered by the high yielding varieties, mainly due to lack of access to seed material of such varieties

Terminal Moisture Stress

Studies on the effect of terminal moisture stress taking into consideration of rainfall both in kharif and rabi indicates that the crop is very sensitive to terminal moisture and is critical in deciding the productivity of the

crop. A study of performance of hundred and twenty four germplasm lines over a decade indicated that during the years where cumulative rainfall of November and December is less than 20 mm, the mean yield levels were 421 kg per hectare. Whereas, in the years where cumulative rainfall of November and December is more than 20 mm, the yield level was 711 kg/ha, that is 41% more. Similarly, a performance of Sadhana as check in germplasm trials over eleven years (1996-2006) indicated that yield reduction during the years of low rainfall (< 20 mm in November and December) was 34%. The data suggests, terminal moisture stress is most important factor in deciding the production and productivity of the state.

Market Price

The price of coriander is on declining trend since 2002 while prices of pulses like bengal gram have shown increasing trends (Fig 4). This data suggests the price edge of the competitive commodities like bengalgram with better realization made dents in to the coriander growing areas. However price based area is a fluctuating situation and the prices of pulses come down farmers may switch over to coriander.

Present Scenario

Due to the collaborative efforts of the AICRP on Spices and Department of Horticulture, A.P. Government, the state of Andhra Pradesh surpassed the national average productivity in coriander (national average productivity 609 kg/ha) by reaching the productivity of 700 kg/ha (2002-03), which is completely from rainfed production systems. This is a great achievement on behalf of the A.P. state as coriander is grown in other states of our country as an Irrigated-Dry crop having high productivity. Reasons for this achievement may be due to:

- Realizing the fast dwindling area of coriander, since 2001-02, government of Andhra Pradesh initiated special programmes to deliver quality seed, training to farmers, FLDs, and area expansion programmes.

- Apart from these, introduction of new high yielding variety Sudha through minikits paved way for rapid acceptability of that variety adoption in the state to an extent of twenty percent. The variety has an yield advantage of 21% over the most popular variety Sadhana. By the consistent extension efforts the variety now occupies 20% of total coriander area of the state and getting popular in neighbouring states like Maharashtra, Orissa and Tamilnadu.
- Strong extension programmes from ANGRAU and department of horticulture through print and visual media promoted the use of latest production technologies like biofertilizers, management of micronutrient deficiencies, powdery mildew and grain mould management.

These efforts cumulatively resulted in achieving the higher productivity in the state.

There is another facet to the changes in production. Though the area under coriander reduced from 2002-03, the total production from the state increased from 25000 metric tonnes over the past decade to 38000 tonnes during 2002-06.

Challenges ahead and prospects

There is a grave need to address the issue of reduction in crop area as the crop is over taken by other pulse or commercial crops. Though productivity of the crop increased during the past years, there is a need to achieve full potential of the crop i.e. a productivity of 1500 kg/ha. Most of the times, the crop suffer from periods of moisture stress thus preventing the farmers realizing higher yields. Management of drought and evolution of drought tolerant varieties may have larger impact on overall production and productivity of the crop. As the crop productivity is highly dependent on residual soil moisture and rabi rain fall, development of water management strategies play crucial role in increasing the productivity. The crop also responds to higher doses of N and K

against the existing recommendation, which needs to be popularized among the farmers. There is also a need for development high input responsive varieties and high essential oil containing varieties. Coriander use as organic spice is increasing rapidly. Strengthening seed production also vital for improving the production and productivity of the state. Main emphasis has to be given to the farmers to produce their own seed. Government has to provide sufficient funds to state seed producing firms like APSSDC, NSC for multiplication of high yielding varieties like Sudha, Sadhana, and Swati which are released by ANGRAU. Such a cooperative effort will not only improve the

productivity of the seed spices but also improve the research efficiency of respective centers. Coriander has unique flexibility to be brought under organic fold by simple modifications in its cultivation as this crop is presently grown under less intensive cultivation. This can be exploited to bring more areas under organic coriander fold.

References

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