

Original Research Article

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## Cost Returns and Input Use Pattern for China Aster Cultivation in Chikkaballapura District of Karnataka, India

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### ABSTRACT

The present study is an attempt to estimate the cost returns and input use pattern of China aster producing farms in Chikkaballapura district of Karnataka, where China aster is cultivated extensively. Descriptive statistics were used for estimating the input use pattern of cultivation of Arka kamini and Arka Poornima variety of China aster farmers. The study is based on the primary data collected from 70 randomly chosen China aster cultivators comprising of 35 sample farmers each growing Arka kamini and Arka Poornima varieties of China aster. The results revealed that farmers realized 12 per cent higher gross returns (Rs. 2,56,500 acre<sup>-1</sup>) from cultivation of Arka kamini crop compared the cultivating check variety (Rs. 2,25,750acre<sup>-1</sup>) which indicated cultivation of Arka kamini was more efficient compared to check variety. The results of the descriptive statistics analysis shows that the human labor, machine labor, seedlings, chemical fertilizers and plant protection chemicals of Arka Kamini variety was Rs. 11,012, 908 5,225 3,865 and 2,790 per acre respectively while in case of check variety was Rs. 9,842, 571, 6,588, 2,400, and 2,756 per acre respectively.

#### Keywords

Descriptive statistics analysis cost and returns

#### Article Info

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### Introduction

China aster [*Callistephus chinensis*(L.)Nees.] belongs to the family Asteraceae and is native of China. The genus *Callistephus* derives its name from two Greek words 'Kalistos' and 'Stephos' means 'most beautiful' and 'a crown', respectively. China aster is one of the most preferred flower crops cultivated widely due to its wide spectrum of attractive colours and comparatively longer vase life (Chaitra and Patil, 2007). It is an important

commercially cultivated flower crop grown as cut flower, loose flower, bedding plant, for flower decoration, for preparation of bouquets and garlands. The flowers of China aster are used for flower arrangement, interior decoration, garland making, worshipping (Munikrishnappa, 2013).

In addition to its cultivation, China aster can be used in landscape gardening to provide mass aesthetic effect. It is estimated to be grown in 1,020 ha with a production of flower

800 million tonnes in India. China aster is commercially grown by marginal and small farmers in Karnataka, Tamil Nadu, Andhra Pradesh, Maharashtra and West Bengal (Raghava, 1984). This crop can be grown throughout the year under Bangalore conditions (Rao *et al.*, 1997).

### **Technology profile**

In India, breeding in China aster was first pioneered by S.S. Negi and S.P.S Raghava during 1984-85. Work on this aspect at ICAR-IIHR, Bangalore led to the development of quality and high yielding varieties such as Arka Kamini, Arka Poornima, Arka Shashank and Arka Violet Cushion. Suneetha *et al.*, (2003) estimated genetic diversity of twenty eight varieties of China aster. Khangjarkpam *et al.*, (2014) studied four China aster genotypes released from ICAR-IIHR, Bangalore such as Kamini, Poornima, Shashank and Violet Cushion and their reciprocal cross combinations *viz.*, Kamini x Poornima, Poornima x Kamini, Shashank x Violet Cushion and Violet Cushion x Shashank.

The varieties grown by farmers are mainly Local Pink, Local White and Local Violet which are inferior in yield and flower quality. Hybridization is a breeding method used for developing new F1 hybrid cultivars and improves the varietal wealth, by adding new types with improved characters.

### **Parameters to be measured in relation to the technology**

Weight of flowers/plant,  
Number of flowers/plant,  
Flower stalk length,  
Number of leaves/plant,  
Flower diameter,  
Number of ray florets/flower head,

Number of branches/plant,  
Plant height and number of disc florets/flower head.

In the present study has attempted to analyse the input use pattern, estimate the economics and constraints involved in cultivation of China aster. Findings of the study would help the followed by farmers, policy maker's researcher and to take appropriate decisions for enhancing productivity and production.

### **Materials and Methods**

To assess the economics and input use pattern of China aster cultivation, the required primary data were collected from 70 farmers in Chikkaballapura districts of Karnataka, comprising of 35 farmers cultivating Arka Kamini and 35 farmers growing local varieties (Arka Poornima) of China aster under irrigated condition the data were collected through personnel interviews with the help of pretested schedule designed for the study.

Data were analysed using the descriptive statistics technique. Arka Kamini variety of China aster released from Indian Institute of Horticultural Research (IIHR), Bangalore is selected for the study.

### **Descriptive statistics**

Descriptive statistics provide simple summaries about the sample and about the observations that have been made. It deals with the presentation of numerical facts, or data, in either tables or graph form, and with the methodology of analyzing the data.

### **Input and cost concepts**

The total costs were divided into two broad categories:

- a. Variable Costs
- b. Fixed Costs

### **Variable costs**

The variable costs include cost of seeds, manure, fertilizers, wages of human and bullock labour, machine labour, plant protection chemicals, miscellaneous charges interest on working capital and repair and maintenance charges.

#### **Seeds**

The cost of purchased seeds was based on the actual amount paid by the respondents.

#### **Farm yard manure**

The quantity of FYM used in the cultivation of paddy was measured in terms of. The cost was imputed at the market price in the village including cost of transportation and other incidental charges if any.

#### **Fertilizers and plant protection chemicals**

The cost of fertilizers and plant protection chemicals was based on the actual prices paid by the farmers including the cost of transportation and other incidental charges, if any.

#### **Labour**

The cost of hired labour was calculated at the prevailing wage rates paid per day (8 hours) in the study area for Men, Women and Bullock labours and Machine labour during the study period. The cost of family labour (human, animal and machinery) was calculated considering the prevailing market rate in this region through imputation.

#### **Miscellaneous charges**

This includes the expenses incurred by

sample farmers for procuring input materials and marketing of produce in the market and other expenses.

#### **Interest on working capital**

The working capital consists of the expenditure on seeds, labour, farm yard manure, chemical fertilizers and plant protection chemicals, Interest on operational capital was calculated at the rate of 7 per cent per annum (the rate at which commercial banks advance short term loans).

#### **Fixed costs**

These include depreciation on farm implements and machinery, interest on fixed capital, land revenue.

The measurement and definitions of fixed cost components are as follows.

#### **Depreciation charges**

Depreciation on each capital equipment and machinery owned by the farmers and used for land cultivation was calculated for individual farmer based on the purchase value using the straight line method. Thus the

Annual depreciation =  $\frac{\text{Purchase value} - \text{Junk value}}{\text{Useful life}}$

#### **Useful life of the asset**

The average life of the asset as indicated by the experts (Agril. Engineers) was used in the computation of the depreciation. The depreciation cost of each equipment was apportioned to the crop based on its percentage use.

#### **Interest on fixed capital**

Interest charges on fixed capital were calculated at the rate of 9 per cent, as the

fixed deposits in commercial banks would fetch this rate of interest. The items considered under fixed capital are implements and machinery. Interest was considered on the value of these assets after deducting the depreciation for the year.

### **Land revenue**

Actual land revenue paid by the farmers was considered.

### **Rental value of land**

It was imputed by taking the prevailing rents in the study area per acre per annum.

### **Cost of cultivation**

It is the sum of variable costs and fixed costs and expressed on per acre basis.

### **Gross return**

The gross returns were computed by multiplying the quantity of main product and by-product obtained with respective prices received.

## **Results and Discussion**

The Table 1 shows that total variable, fixed costs and total cost of cultivation of Arka Kamini and Arka Poornima varieties and the per cent change in these costs of Arka Kamini over the check variety. There was not much difference in case of fixed costs.

But, there was three per cent difference in case of variable costs between the two varieties *i.e.* Arka Kamini had three per cent

higher variable costs compared to the check variety.

Overall, Arka Kamini had higher cost of cultivation *i.e.*, 3.5 per cent higher cost of cultivation compared to the check variety. In case of variable costs, Arka Kamini had higher costs with respect to Human labour, machine labour, PPC, FYM and irrigation. While, Check variety had higher variable costs in case of seedlings and chemical fertilizers.

The increase in human labour use in Arka Kamini is, because it demands more pickings compared to check variety and lesser use of PPC is, because it is more resistant to pests and diseases compared to the check variety.

The lesser use of fertilizers is because it has higher nutrient efficiency compared to check variety. The higher seedlings use in check variety is, because survival percentage is very less in field condition.

The Table 1 depicts that the difference in yield, price per tonne and returns from Arka Kamini and Arka Poornima. Arka Kamini has higher yield, higher price per tonne, higher returns compared to the check variety.

Arka Kamini has eight per cent higher yield, 12 per cent higher gross returns, 16 per cent higher net returns and four per cent higher price per tonne compared to the check variety.

The high yield is due to the increased number of flowers per plant compared to the check variety and higher price per tonne is because it has longer vase life, its deep pink colour and demand for export to neighboring states.

**Table.1** Comparative Economics of Arka Kamini Variety and Check Variety of China aster cultivation (Rs. / acre)

Particulars	Arka Kamini (n=35)		Arka Poornima (n=35)		%change over the check variety
	quantity	Value (Rs)	quantity	Value (Rs)	
<b>A. Variable cost</b>					
Human labour(man days)	35	12250	31	10850	11.43
Bullock labour(pairday)	1.89	1395	1.58	1208	13.41
Machine labour(hours)	7.2	6757	6.5	5857	13.32
Seedlings(Rs.)	6123	7654	6252	8128	-6.19
FYM(tonnes)	6.5	19,500	6	18,000	7.69
Chemical fertilizer(kgs)	180	2,895	300	4,350	-50.26
PPC (Rs)	-	3,000	-	2,500	16.67
Irrigation(inch)	5	800	4.75	700	12.5
Mulching material(Rs)	-	9,000	-	9,000	0.00
Transportation cost (Rs)	-	1,500	-	1,400	6.67
Subtotal(Rs)	-	64,751	-	61,993	3.26
Interest on working capital at 7 %( Rs.)	-	4,533	-	4,340	5.16
Total variable cost(Rs)	-	69,284	-	66,333	3.06
<b>B. Fixed cost</b>					
Land revenue(Rs)	-	15	-	15	0.00
Depreciation(Rs)	-	650	-	600	7.69
Rental value of land(Rs)	-	15,000	-	15,000	0.00
Subtotal(Rs)	-	15,665	-	15,615	0.36
Interest on fixed cost at 10%(Rs)	-	1,567	-	1,562	0.23
<b>Total fixed cost</b>	-	17,232	-	17,177	0.26
<b>Total cost of cultivation(A+B)</b>	-	86,515	-	83,509	3.47

**Table.2** Yield and returns from China aster cultivation (Per acre)

Yield and Returns	Arka Kamini (n=35)	Arka Poornima (n=35)	%change over the check variety
Yield (Kg/acre)	5700	5250	7.89
Gross Returns(Rs)	256500	225750	11.99
Net returns(Rs)	169985	142241	16.32
Price received (Rs/kg)	45	43	4.44
Returns per rupee of investment	2.96	2.70	

**Table.3** Input use patterns for Arka Kamini and check variety

Variables	Arka Kamini variety (n=35)				Arka Poornima variety (n=35)			
	Mean	S.D	Min	max	Mean	S.D	min	max
area under China aster (acre)	0.87	0.32	0.5	1.5	0.9	0.43	0.5	2
Human labour(Rs)	11,012	4,496	3,400	22,000	9,842	4,496	3,400	22,000
Machine labour (Rs)	908	680	150	3,000	571	394	90	1,100
Seeds (Rs)	5,225	2,934	1,725	15,000	6,588	5,313	1,725	27,300
Chemical fertilizers (Kg)	3,865	1,449	1,350	7,350	2,400	1,040	1,000	4,900
PPC(Rs)	2,790	2,744	600	16,000	2,756	2,835	500	17,550
Gross return (Rs)	2,29,007	70,788	1,15,500	4,67,500	2,03,035	4,30,742	1,12,500	27,20,000

The input use pattern of Arka Kamini and check variety was showed from the Table 3. The average input i.e., human labour (Rs. 11,012) was highest in both the varieties. The average input use of Arka Kamini was more in machine labour (Rs.908), chemical fertilizers (Rs. 3,865) and plant protection chemicals (Rs. 2,790) compared to check variety. The average input use of check variety was more only in seeds (Rs.6, 588) compared to Arka Kamini variety.

The gross returns realized by the Arka Kamini farmers growing as pure crop was Rs. 2,56,500per acre whereas it was Rs. 2,25,750 by check variety (local variety of China aster) farmers with a difference of Rs. 30,750 per acre, higher than check variety of Farms. The net return of Arka Kamini was the higher (Rs. 1, 69,985 per acre) Arka Kamini of China aster farms than (Rs. 1,42,241 acre) for check variety farms, with a difference of Rs. 27,744 higher than the local variety of China aster. The results of the descriptive statistics analysis shows that the human labor, machine labor, seedlings, chemical fertilizers and plant protection chemicals of Arka kamini variety was Rs. 11,012, 908 5,225 3,865 and 2,790 per acre respectively while in case of check variety was Rs. 9,842, 571, 6,588, 2,400, and 2,756 per acre respectively.

Input use pattern have been estimated for one

of the important flowers, viz. China aster using descriptive statistics analysis. The variables influencing Input use pattern the of China aster production have been analysed determined using the descriptive statistics. The input use pattern in China aster production among different categories of farmers highlighted that most of the applied inputs were found to be in lower than the recommended acreage. This suggests that there is potential to increase the overall production, by in China aster cultivation.

The Arka Kamini variety of China aster performing well in field conditions and offering higher returns to the farmers in comparison with check varieties. The main emphasis of this study is on increasing the production, income and employment opportunity at farmer's level. In this context, the study will be of great importance to recognize whether the improved IIHR (Indian Institute of Horticultural Research) technology verities is profitable and whether it has provided additional production opportunities to the technology adopters.

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