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Economics study of value-added food products of corn in Chhattisgarh

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Abstract
The main objective of this research is to study the economics of various food products being prepared by the value addition of maize in various food vendors of Raipur city. The specific objectives of the study were to find out the method of preparing those food products, their market demand and to estimate the cost and returns of those value-added food products of maize. The primary data was collected through a pre-tested structured interview schedule. Simple average and percentage methods were used for analysing the data. The major findings of this study revealed that the total variable cost for the making of 161.46 gm sweet corn soup was to be Rs. 59.07. The benefit-cost ratio was observed to be 1:0.69 and the input-output ratio was 1:1.69. The total variable cost for the making of 160gm baby corn chili was to be Rs. 47.46. The benefit-cost ratio was observed to be 1:1.74 and the input-output ratio was 1:2.74.

Keywords: value added food products of corn in Chhattisgarh

Introduction
Maize or corn (*Zea mays*) is cultivated globally being one of the most important cereal crops worldwide. It can be converted through grinding, alkali processing, boiling, cooking and fermenting, into a variety of products such as corn starch, corn flakes and cereals, bio-ethanol, etc. It has many industrial applications, which make this crop very special and different from its close relatives, rice and wheat. According to All India Report on Agriculture Census 2005-06, more than 12 million farmer-households are cultivating maize in India, thus directly influencing their food and livelihood security. Maize is the second most important cereal crop in the world in terms of acreage and is called the 'Queen of Cereals'. Global maize production touched approx. 1040 million MT in 2016-17, wherein, US has been the leading producer, followed by China, accounting for about 38% and 23% respectively. India contributes around 2% of this production chart with a quantum of 26 million MT in 2016-17. In the Indian context, not less than 15 Million farmers are engaged in maize cultivation and it generates employment for more than 650 million person-days at farming and its related business ecosystem levels. Importantly, maize contributes more than 2 per cent to the total value of output from all agricultural crops (5th Indian maize summit 2018 FICCI).
India ranks 4th and 7th in terms of global maize acreage and production, contributing to about 4.6% and 2.4% respectively. Maize is the 3rd most important food grain for our country (after rice and wheat). It is the fastest growing cereal crop in terms of area, production as well as productivity. Over the last few decades, maize cultivation has shifted from being grown only during the kharif in traditional areas (such as Rajasthan, Uttar Pradesh and Bihar), primarily to be used as food, to being grown across non-traditional areas (such as Andhra Pradesh, Madhya Pradesh and Karnataka), across seasons and majorly produced for industrial use. However, the production system continues to be largely rain-fed. Over the last decade, maize consumption in India grew at a CAGR of 5.6% while production grew at just about 2.9%. Maize off-take by the feed industry grew fastest at a CAGR of 8.8% followed by industrial segment (primarily starch), which grew at a CAGR of 6.2%. Off-take for food grew at a CAGR of 0.8%. (FICCI YES-BANK Maize Report_2021)
Every part of the maize plant has economic value; the grains, leaves, stalk, tassel, and cob can all be used to produce a variety of food and non-food products. In India not only, production and consumption of maize have been rising consistently, the consumption pattern has also changed over the years (Kumar *et al*., 2012) [5].
Maize is the second most growing crop in Chhattisgarh after paddy it contributes 119.63 thousand hectares area in which have 306.96 thousand MT productions and productivity was 2566 kg per hectare in kharif (2017-2018).

The farmers of Chhattisgarh are growing maize in both (kharif and rabi) season, due to which the Chhattisgarh governments has recently given a lot of emphasis on processing of maize, which is good employment opportunity for the farmers and rural people in the coming days. The increasing demand for food products prepared of maize in the cities, the nearby farmers are making good profits by starting the production of baby corn and sweet corn. In Raipur city value-added food products prepared from maize are masala corn, popcorn, sweet corn soup, baby corn chilli, corn tikka, corn palak etc.

Material and Methods

1. Sweet corn soup at established vendors

Corn soup is a soup made of (typically sweetcorn). Combine the corn flour and ¼ cup of water in a small bowl and mix well till the corn flour dissolves completely keep aside. Heat the butter in a deep non-stick pan; add the ginger and garlic and sauté on a medium flame for a few seconds. Add the sweet corn, crushed sweet corn and mixed vegetables, mix well and cook on a medium flame for 1 more minute, while stirring continuously. Add 4 cups of water, corn flour-water mixture, salt and pepper, mix well and cook on a medium flame for another 4 to 5 minutes, while stirring occasionally. Serve immediately about 5 - 6 people.

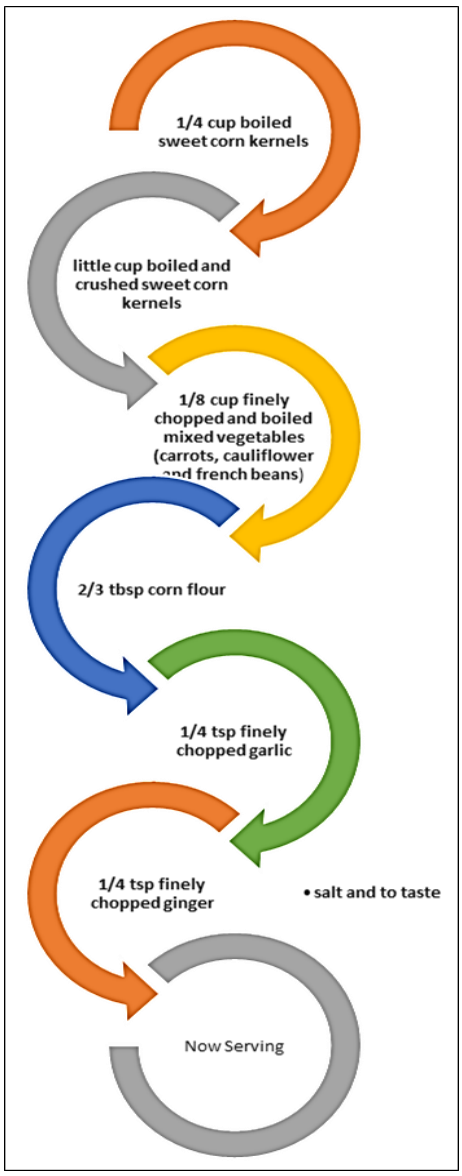

Fig 1: Economics of sweet corn soup

2. Baby corn chilli at established vendors

Firstly, wash the baby corns under running water and keep them aside. Now using a chopping board, finely chop onions, green chillies, and capsicum. You can slice the baby corns or cut two parts of it take a small bowl and put corn flour and water. Mix the ingredients well to get a batter of thin consistency. Now dip the sliced baby corns in the dough and keep it aside. Simultaneously, put a saucepan over medium flame and pour oil in it. Once the oil is heated, put the baby corns in the pan and stir fry. On the other hand, take another frying pan and heat a tablespoon of oil in it. Once heated, add the chopped garlic and cumin seeds, and sauté for a few seconds till the raw fragrance goes away. Next, add finely chopped onions and capsicums in the pan, stir once and cover the pan with a lid. Cook the capsicum and onions for a good 10-15 minutes. Now, add baby corns into the pan and cook for another 10 minutes. Garnish with chopped spring onions and serve hot.

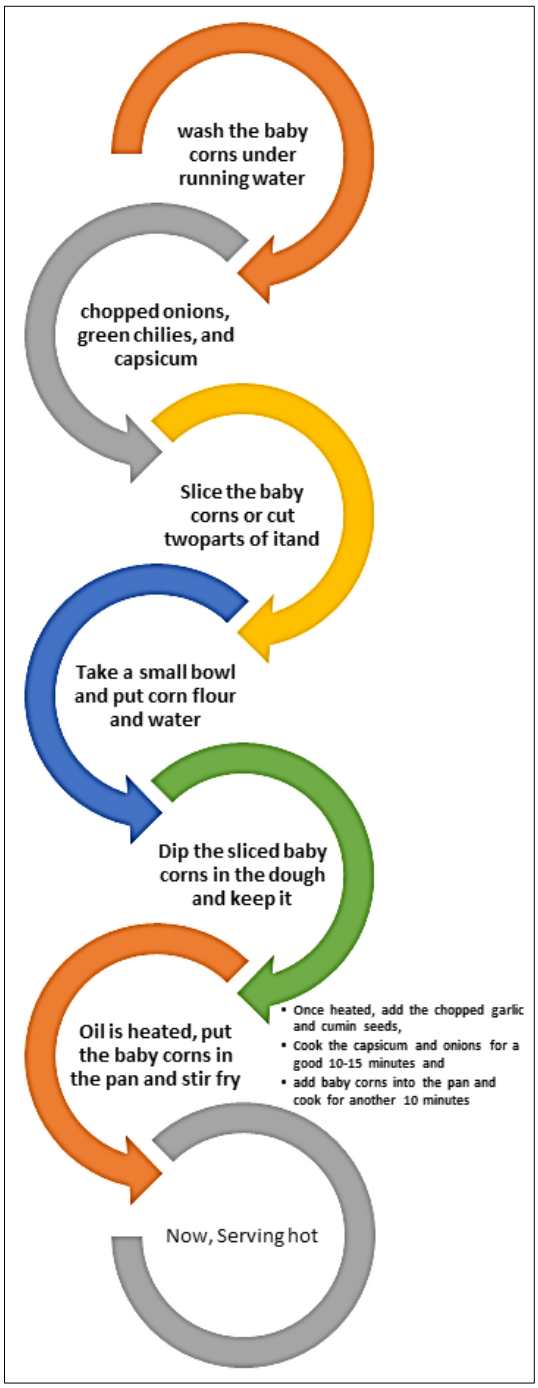

Fig 2: Economics of baby corn chilli

Results and Discussion

1. Cost production of sweet corn soup in Raipur city

Economics of sweet corn soup (per cup 161.46gm) at hotel is presented in table 4.3. It reveals that the total variable cost for making of 161.46gm sweet corn soup was to be Rs. 59.07. The major cost was raw materials about 72.42 percent of the total cost. The cost benefit ratio was observed to be 0.69 and input output was 1.69.

2. Cost production of baby corn chilli in Raipur city

Economics of Baby corn chilli (per plate 160gm) at hotel is presented in table 4.4. It reveals that the total variable cost for making of 160 gm Baby corn chilli was to be Rs. 47.46. The major cost was raw materials about 65.84 percent of the total cost. The cost benefit ratio was observed to be 1.74 and input output was 2.74.

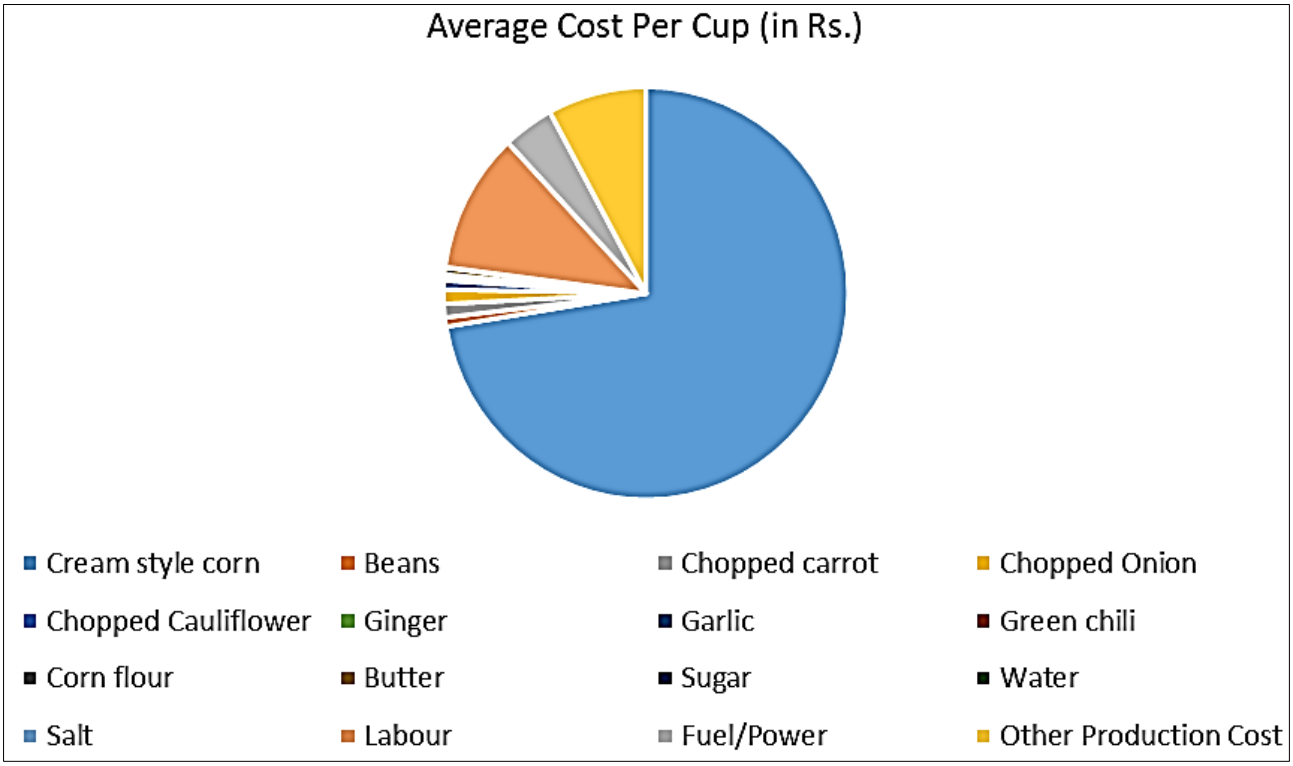

Fig 3: Economics of sweet corn soup

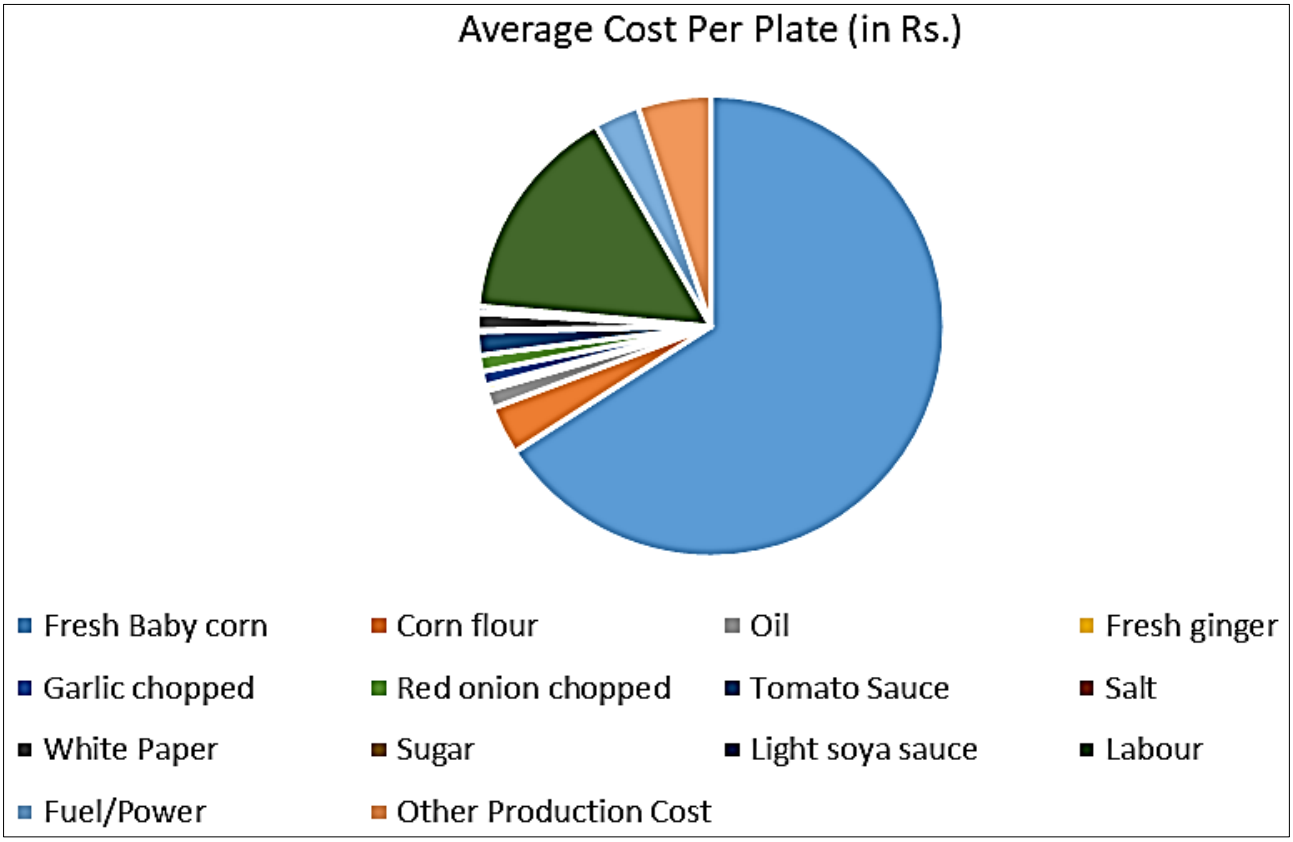

Fig 4: Economics of baby corn chilli

Table 1: Economics of sweet corn soup

S. No.	Items	Quantity	Average cost per cup (in Rs.)	% Age of total cost
1.	**Raw materials**			
	Cream style corn	85.56 gm	42.78	72.42
	Beans	5.95 gm	0.42	0.71
	Chopped carrot	15.43 gm	0.62	1.04
	Chopped Onion	13.33 gm	0.66	1.11
	Chopped Cauliflower	11.80 gm	0.41	0.69
	Ginger	0.55 gm	0.03	0.05
	Garlic	0.55 gm	0.06	0.1
	Green chili	1.85 gm	0.13	0.22
	Corn flour	1.66 gm	0.07	0.11
	Butter	2.5 gm	0.3	0.5
	Sugar	0.16 gm	0.02	0.03
	Water	21.56 gm	0	0
	Salt	0.56 gm	0.01	0.01
2.	Labour		6.5	11
3.	Fuel/Power		2.4	4.06
4.	Other Production Cost		4.66	7.89
	Total Cost	161.46 gm	59.07	100
5.	Sale price (Total return)		100	
6.	Net return/Benefit		40.93	
7.	C/B ratio		0.69	
8.	Input - output ratio		1.69	

Source: Personal survey

Table 2: Economics of baby corn chilli

S. No.	Items	Quantity	Average cost per plate (In Rs.)	% Age of total cost
1.	**Raw materials**			
	Fresh Baby corn	100 gm	31.25	65.84
	Corn flour	20 gm	1.6	3.37
	Oil	06 ml	0.6	1.26
	Fresh ginger	03 gm	0.18	0.37
	Garlic chopped	4.5 gm	0.47	0.99
	Red onion chopped	09 gm	0.54	1.13
	Tomato Sauce	06 gm	0.78	1.64
	Salt	03 gm	0.05	0.1
	White Paper	5.5 gm	0.55	1.15
	Sugar	1.5 gm	0.07	0.14
	Light soya sauce	1.5 gm	0.17	0.36
2.	Labour		7.3	15.38
3.	Fuel/Power		1.5	3.16
4.	Other Production Cost		2.4	5.05
	Total Cost	160 gm	47.46	100
5.	Sale price (Total return)		130	
6.	Net return/Benefit		82.54	
7.	C/B ratio		1.74	
8.	Input - output ratio		2.74	

Source: Personal survey

Conclusion

Raipur has better infrastructural facilities in regard to hotels, transportation and allied amenities. Many prestigious hotels, shopping mall, small street food corners have also grown in Chhattisgarh in order to cater to the needs of the domestic and foreign travelling public. In this the way demand also increase like several corn value added food products (Sweet corn, baby corn and popcorn) in Raipur city. In which the Raipur city different sample was collect in randomly way. Out of the more than 50 established vendors, total 18 vendors were selected on the basis of corn-based value-added recipe delivered to consumer regularly in Raipur city.

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