Cooperative Perspective

ISSN: 0302-7767

5

WPS (VAMNICOM) - 05/2020

VAMNICOM Working Paper Series

Volume 2 Issue 3

Exploring and Designing Market Strategies for Neem Coated Urea

K.K. Tripathy, Sneha Kumari and Saba Sayed

Vaikunth Mehta National Institute of Cooperative Management

October 2020

Working Paper - 5

Exploring and Designing Market Strategies for Neem Coated Urea

Authors

K. K. Tripathy

Director, Vaikunth Mehta National Institute of Cooperative Management

SnehaKumari

Assistant Professor, Centre for Research & Publication, VAMNICOM

Saba Sayed

Research Officer, Centre for Management Education, VAMNICOM

Vaikunth Mehta National Institute of Cooperative Management

(A Grant-in-aid Institution under Department of Agriculture, Cooperation & Farmers Welfare,
Ministry of Agriculture & Farmers Welfare, Government of India)
Ganeshkhind Road, Near Pune University,
Pune - 411007, Maharashtra, India

Disclaimer

The purpose of the working paper Series (WPS) is to provide an opportunity to VAMNICOM faculty, visiting fellows and students to share their ideas and research work before publication and to get feedback and comments from their peer group. A working paper is to be considered only as it represents the research in progress. This paper is the opinion of the authors and errors, if found any, are the fault of the authors. Copies of working paper can be requested from the Centre for Research and Publication, Vaikunth Mehta National Institute of Cooperative Management.

Contents

LIST OF FIGURES

LIST OF TABLES

Abstract

Background

Urea fertilizers, being one of the prime growth soil nutrient agents, provide plants with Nitrogen to stimulate perceptible and green leafy growth. These soil nutrients aid the processes of photosynthesis in plants resulting in proper greening for increased productivity. If coated with neem oil, Urea facilitates a slow, need-based and gradual release of appropriate quantum of nitrogen. Considering above average output and increased returns potential with higher pest and diseases resistance capability, Government of India's 2015 urea policy made it mandatory for 100 percent coating of both domestically manufactured and imported ureawith neem oil. The policy of application of Neem Coated Urea (NCU)relied on various positive impacts viz., higher yield, lower input cost through superior nitrogen use efficiency, reduced usage of total urea and higher gross returns.

Purpose

There has been adequate research on the significant positive impact of the NCU on agriculture crops. While scholars have documented significant impact of NCU on agriculture production and productivity, progressive farmers have reported a sizable and quality increase in their overall crop yield. Despite these inherent benefits, it has been found that NCU as a soil nutrient is not widely used by the farmers effectively and efficiently. We find that there is a need for exploring and designing market strategies for NCU. Driven by the need for the study, the research aims at exploring and designing a marketing strategy for the fertilizer.

Research Design

The study is based on sugarcane farmers. Satara,being one of the top sugarcane producing districts in Maharashtra, has been chosen for the study (Barakade et al., 2011). Villages from one of the sugar factories in Satara district of Maharashtra have been selected to study and understand the marketing strategy for NCU amongst the sugarcane farmers.Kisan Veer Cooperative Sugar Factory has been selected for data collection from the sugarcane farmers. The farmers have been selected based on the sugarcane suppliers in KisanVeer Cooperative Sugar Factory.The farmers have been approached in consultation with the agriculture officers of the sugar cooperative factory. The market potential and sales potential of the sugar factory has been reviewed. The adoption processes of NCUhave been studied based on the type of irrigation pattern and size of land. Both primary and secondary data have been collected. 104 farmers have been selected for conductingthe primary survey. Snowball sampling technique has been used to select farmers for the survey.20 Dealers have also been selected from the regions of Maharashtra using stratified random sampling for understanding the

marketing strategy. Questionnaires and personal interviews wereused to collect primary data. Data has been analyzed using SPSS and WarpPLSsoftware.

Findings

Farmers Perception of the use of fertilizer has been studied. NCU has significantly impacted production and productivity of agriculture crops. The analysis on sales potential and farmers' perception of NCU highlights various key issues in the purchase and use of NCU – a shortage of the urea available in the village, quality of the packaging, high price, promotional strategy, distance of the fertilizer suppliers and unawareness. The results show that shortage of urea, quality of packaging and unawareness; have a significant impact on purchase of NCU. The market strategies of the NCU have been discussed. The study concludes with efficient future marketing strategies.

Research Implications

The study is a pioneer work for understanding the managerial, theoretical and policy implications. The efficient and future market strategy of NCU has been explored.

Keywords: Neem Coated Urea, Farmers, Market Strategies, Perception, Fertilizer, Sales

1. INTRODUCTION

Nitrogen is a constituent of all proteins, enzymes, metabolic intermediates and energy which helps the plants in photosynthesis resulting in proper growth, greening, increased productivity and good soil health (Viets, 1965). It also plays an important role in maintaining soil fertility. Urea is the source of nitrogen as it has the highest percentage of nitrogen and contains nitrogen as the only source which helps in the synthesis of amino acids (Rose and Dekker, 1956). Urea is the most common nitrogenous fertilizer used extensively across the globe because of its acceptability and relatively lower cost. Scientific studies have established that despite being a rich source of nitrogen as high as 46 percent, with associated advantages, Urea has the inherent limitations of heavy water solubility and adverse environmental impact. Nitrogen from urea cannot be used efficiently as 50 to 60 percent of nitrogen is lost through leaching, runoff, or tied up by soil microorganisms (Sinha, 2017). This often results in wastage of urea and nitrogen deficiency in plants. To solve this problem urea has been coated by neem seed oil to increase the nitrogen use efficiency in crops. Neem coating leads to a gradual release of urea into the soil which helps the plants gain desired level of nutrients. This process results in higher yields, lower contamination of ground water besides acting as a natural insecticide. Neem is a key ingredient in the non-pesticidal management of different pests and provides a natural alternative to synthetic pesticides. India's annual production and sale of urea in 2015-16 peaked at 24.48 million tonnes (MT) and 31.97 MT.

The Government has made it mandatory for Urea manufacturers to produce NCU up to a minimum of 75 percent of their total production of subsidized Urea. In January 2015, the government allowed the urea producers to produce Neem coated urea up to 100% of production and made it mandatory to produce at least 75% of domestic Urea as Neem coated. In 2015, the Department of Fertilizers has made neem coating compulsory for both domestic produce and import.

Studies have found that the output efficiency of NCU is greater than the non-neem coated urea. The application of crop-specific right doses of fertilizer has remained a concern for India's farmers. Reports claim that NCU has resulted in increasing the yield of sugarcane crops. Despite several uses and benefits of neem coated urea, it has been observed that many

farmers are not aware of the NCU (Ramappa and Manjunatha, 2017). Researches also claim that the packaging and promotional strategies of NCU needs work to create its' brand in the agriculture input market. There is a research gap in mapping the benefits of NCU application. This has resulted into resolving research questions– (a) whatis the present market share of NCU, in one of the sugar belts of the country, Maharashtra and (b) what strategy needs to be built for promoting NCU use amongst the farmers. An extensive literature review has been conducted and research gaps identified and objectives of the study outlined.

The study is divided into six sections. Section 2 focuses on the literature review followed by identifying research gaps and delineating objectives of the study. Section 3 focuses on the research design followed. Section 4 to 6 of the study document detailed results and discussions, conclusion with future efficient market strategies for NCU, limitations, future research direction and implication of the study.

2. LITERATURE REVIEW

Nitrogen management of crops is of paramount importance (Prasad et al., 2014). Urea is one of the most widely used sources of nitrogenous fertilizer in the world and accounts for 82 percent of the total consumption of nitrogenous fertilizers in India. The application of plain urea, without coating with neem oil, can speed up the process of nitrification where nitrogen escapes to the atmosphere and plants fail to recover it. Nitrogenous soil nutrients leach into groundwater and rivers which subsequently enters into the human body through drinking water thereby causing health issues. The non-neem coated urea was misused in the chemical industry and usedas an additive in milk to whiten it. NCU has led to arresting the diversion of fertilizer to chemical industries. Neem oil coated around granules of urea helps in providing nitrogen to the plants in a slow and phased manner through nitrification. Neem coating leads to a more gradual release of nitrogen, helping plants to absorb more nutrients and result in higher yields. Neem serves as a natural insecticide and controls pests such as caterpillar, beetles etc. It provides an opportunity for small scale industries in rural areas and hence saves money besides increasing crop yield via better nitrogen utilization.Neem oil-water emulsion increases the shelf-life of the NCU. Neem cake left after the extraction of oil from the seeds of neem possesses nitrification inhibition properties.

Several studies have been conducted to find out the relationship between incremental crop yield and the use of NCU. The agronomic efficiency of NCUneeds to be assessed with time to see sustainable result (Datta, 2016).

Table 1 shows that NCU has raised the productivity of sugarcane. There have been researches that reportNCUto be beneficial for sugarcane. The percentage increase in yield has also been found to be high.

Table 1: Impact of Neem Coated Urea on Sugarcane

Crop	**Neemurea product†**	**Location**	**Percent increase in yield over that obtained with urea‡**	**Reference**
Sugarcane	NCU	New Delhi	20.9	Parashar et al. (1980)
	NCU	Pusa	10.2	Singh et al. (1987)
	NCU	Bengaluru	17.5	DHNS, 2017
	NCU	Coimbatore	3.87	Mani et al. (2008)

Source: Compiled by the Authors

†NCU-Neem cake coated urea (200 g neem cake powder1 kg-urea) ‡100 × (YN - YU) / YU, where YN and YU represent yield obtained by applying neem coated urea and uncoated urea at same N level, respectively.

Fertilizer companies in the cooperative sector such asIndian Farmers Fertilizer Cooperative Limited (IFFCO) and Krishak Bharati Cooperative Limited (KRIBHCO) were the first companies to launch NCU in 2015. The price of NCUis marginally higher (5 percent) than the cost of normal urea. There is less than satisfactory realization of the benefits of NCU, asonly 69.5 percent of the sugarcane growing farmers in Maharashtra are found to have been aware of NCU (Ramappa and Manjunatha, 2017).

Neem coating has reduced the release of nitrogen and increased its efficiency. Due to this property, Farmers are using urea for quick results in addition to neem coated urea in sugarcane (Kajale and Shroff, 2018). The government declared the price of neem coated urea as Rs. 5922.22 per MT (in all states except UP) and Rs. 6644.44 per MT (in Uttar Pradesh). The actual price charged by the sellers is marginally higher than the maximum retail price (MRP). This price also depends on the transport cost incurred and the scarcity of fertilizer in the particular season for delivering the stock into the village. Most of the farmers, growing sugarcane, purchase normal urea and NCU from the outlets of private fertilizer companies and cooperatives. 76 percent of NCU and 88 percent of the Normal Urea (Non-NCU) are purchased from private fertilizer dealers. The purchasing pattern of NCU and Non-NCU is shown in table 2.

Table 2: Purchasing Pattern of Neem Coated urea in sugarcane

Particular	**Sugarcane**				**Reference**
	NCU			**Non-NCU**	
	NCU	**Urea**	**Total Urea**	**Urea**	
Quantity (Kgs)	711.4	58.8	770.2	616.4	Kajale et al., 2017
Price (Rs. Per bag of 50kg)	300.1	286.3	299.3	284.6	
Distance	5.4	2.8	5.4	6.0	
Transport	12.1	8.3	11.8	12.7	
Total Cost per bag	312.2	294.5	311.1	297.3	
Quantity (Kgs)	770	-	-	610	Ramappa and

Price (Rs. Per bag of 50kg)	299	-	-	285	Manjunatha, 2017
Distance	5	-	-	6	
Transport	12	-	-	13	
Total Cost per bag	311	-	-	297	

Source: Compiled by the Authors from reports - Kajale et al., 2017; AERC Report and Ramappa and Manjunatha, 2017

2.1 Advantages of Neem Coated Urea

The advantages of NCU are:

- Neem coating leads to a more gradual release of urea, helping plants gain timely and just nutrientsthereby resulting in higher yields.
- Lower underground water contamination.
- Neem serves as a natural insecticide
- Collection activities of neem seeds required for manufacturing of neem oil for NCU has potential to generate employment avenues in rural areas.
- Neem-coating helps check heavily subsidized urea's diversion to the chemical industry and other uses such as adulterated milk.

2.2 Government Policy on Neem Coated Urea

In January 2015, the government allowed the urea producers to produce up to 100% of production as NCU. Further, the government made it mandatory to produce at least 75% of domestic Urea as Neem coated. The current policy is that the Government has mandated all indigenous producers of Urea to produce 100% of urea as NCU.

The research reported in 2017 says that 66 percent of Non-NCUis being purchased from private fertilizer dealers and 40 percent from cooperatives. The price of the fertilizer also varies. The cost of using NCU is higher than the non-neem coated (Singh et al., 2019). Though NCU improves productivity and soil health yet there has been a scarcity of research to understand the 4 Ps – product, price, place and promotion and develop a market strategy. There is a research gap between the farmers' adoption behavior of NCU and the sellers. Farmers are not much aware of the NCU. The application of Non-NCU results in quick greening of the crops which also makes it popular among the farmers.Direct Benefit Transfer

(DBT) system was also initiated to release 100% subsidy on various fertilizer grades to the fertilizer companies based on the actual sales by the retailers.

2.3 Research Gap

There has been ample research on the impact of NCU on productivity and soil health but management strategy for promoting NCU is still an untouched area.

Colour and leaf figure on the bag besides a price difference helps in differentiating NCU from Non-NCU. None of the farmers in Maharashtra, growing sugarcane, has noticed the leaf figure on the bag (Ramappa and Manjunatha, 2017). The factors which help farmers to differentiate between NCU and Non-NCU depend on more than one aspect like color difference, price difference, leaf figure and others. Only 24.5 percent of the farmers have attended training on the application of fertilizers in the case of sugarcane in Maharashtra (Ramappa and Manjunatha, 2017). In the case of sugarcane, the majority of the fertilizers are purchased from private dealers. There has been a paucity of research on the marketing strategy of NCU. Communication between the company officials and the farmersneeds to be researched by minimizing the gap and undergoing the marketing strategy for the same.

The research gap drives the research question as

- **What is the market share of Neem Coated Urea by private, public, and cooperative sectors?**
- **Why sugarcane farmers are not using NCU?**
- **What is the existing marketing strategy of NCU? What efficient and ideal marketing strategy can be proposed for NCU?**

2.4 Research Objectives

To answer the above-mentioned research question, the following objectives of the study must be addressed.

1. To study the market share of NCUby IFFCO
2. To identify the present marketing potential and sales potential of NCU
3. To find out sugarcane farmers' perception and responses towards marketing system of NCU
4. To propose suitable marketing strategies to IFFCO for NCU

3. RESEARCH DESIGN

3.1 Scope of Analysis

The study is based on sugarcane farmers. Satara as one of the top sugarcane producing districts in Maharashtra has been chosen for the study (Barakade et al., 2011). Villages in the vicinity of one of the sugar factories in Satara district of Maharashtra have been selected to study and understand the marketing strategy for NCU amongst the sugarcane farmers NCU. Kisan Veer Cooperative Sugar Factory has been selected for data collection from the sugarcane farmers. The farmers have been selected based on the sugarcane suppliers in KisanVeer Cooperative Sugar Factory. Kisanveer Sugar factory covers six tehsils of Satara district. It has a very huge area of sugarcane growers

3.2 Data Source

Both primary and secondary data have been collected. 104 farmers from sugarcane suppliers to Kisan Veer Cooperative Sugar Factory have been selected to understand the farmers' adoption behavior for neem coated urea. 20 Dealers have been selected for understanding the marketing strategy. Questionnaires, personal interviews and observation have been used to collect primary data (enclosed in Annexure). Secondary data has been collected from journals, research papers, reports and websites.

3.3 Sampling Technique

The Snowball sampling technique has been used to select the farmer. For selecting the agriculture input dealers, stratified random sampling has been used. 20 dealers have been selected from 5 regions of Maharashtra - Konkan, Pune, Khandesh, Marathwada and Vidarbha region.

3.4 Data Analysis

Data has been analyzed using SPSS and WarpPLS software. Descriptive statistics have been used to describe data collected from the research.

4. RESULT AND DISCUSSION

This section discusses the findings. The four objectives have been analyzed and discussed to develop strategies for efficient market strategies for NCU.

4.1 Market Potential and Sales Potential of NCU

4.1.1Production of NCU

National Fertilizers Limited, in the year 2002, standardized techniques for production of NCU in situ, at its Panipat Unit. Since then many changes have been made in the process and applicant solution, to have a uniform and consistent coating of Neem oil on urea prills, to maintain the concentration of Neem oil content as per the specification prescribed in the Fertilizer Control Order. Based upon the results of an extensive field trial where NCU was found to be superior to normal prilled urea, NFL became the first company in India that was granted the permission to produce and market vide Govt of India Notification No S.O.807 (E) dated 9 July 2004.Today the company has facilities at all its units;viz. Nangal, Bathinda, Panipat and Vijaipur, for production of NCU.

4.1.2 Major Players in Neem Coated Urea Production

- Coromandel International Ltd.
- National Fertilizers Ltd.
- Chambal Fertilizers& Chemicals Ltd.
- National Chemical & Fertilizers Ltd.
- Rashtriya Chemical & Fertilizers Ltd.
- Nagarjuna Fertilizers and Chemicals Ltd.
- Indian Farmers Fertilizer Cooperative Limited (IFFCO)
- Krishak Bharati Cooperative Limited (KRIBHCO)

The year-wise production of NCU in the metric ton is given in table 3 before it was mandatory in the year 2015.

4.1.3 Annual Neem Coated Urea Production

The section shows the year wise production of neem coated urea in public, private and cooperative sector.

Table 3: Year-wise production of NCU in a metric ton

Year	Total Consumption(in LMT)	Total Production (in LMT) India	Import in (LMT)	Total Production (in Public Sector)	Total Production (in IFFCO)	Total Production (in KRIBHCO)	Total Production (in Cooperative Sector)	Total Production (in Private Sector)
2007-08	259.63	198.57	-----	58.7	39.63	17.4	57.03	82.84
2008-09	266.49	199.22	-----	58.42	40.68	17.4	58.08	82.69
2009-10	266.74	211.12	52	61.64	43.25	17.8	61.05	88.44
2010-11	281.12	218.80	66	62.67	44.02	18.4	62.42	93.71
2011-12	295.65	219.84	78	62.74	44.87	14.32	59.19	97.91
2012-13	300.02	225.75	80	63.73	45.1	21.32	66.42	95.59
2013-14	306	227.15	70	67.74	43.8	22.1	65.9	93.52
2014-15	306.1	225.85	87	69.29	41.27	22.25	63.52	93.05
2015-16	306.35	244.75	84.7	70.8	46.68	22.68	69.36	104.6
2016-17	296.14	242.01	54.8	71.41	43.27	23.53	66.8	103.79
2017-18 (upto October 2017)	NA	135.47	45.61	39.85	20.83	13.61	34.44	61.19

Source: Compiled by the Authors

http://fert.nic.in/page/approved-monthly-bulletin
https://www.alphainvesco.com/blog/fertilizer-industry-landscape-subsidy-scene-government-policies/
http://fert.nic.in/sites/default/files/Annual_Report_2017-2018.PDF

The production of fertilizer has increased from 2006-2007 to 2015-2016. The private sector has the highest share in the production of NCU followed by the cooperative sector. The consumption has reduced from 306.35 in 2015-16 to 296.14 in 2017-18. This may be due to soil health card where the farmers are provided with the information for reducing the use of excess amount of fertilizer.

4.2 Production of Neem Coated Urea in IFFCO

Table 4: Production units of IFFCO for NCU

Cooperative Sector	2007-08	2008-09	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18(upto October, 2018
IFFCO KALOL	5.45	5.6	6.01	6.00	6.00	6.00	6.00	5.97	6.01	6.02	3.33
IFFCO- Phulpur	6.30	6.6	7.23	7.45	7.01	6.73	6.52	5.78	7.58	6.32	3.97
IFFCO-PhulpurExpn.	9.24	8.4	10.00	10.26	11.33	9.92	9.51	8.84	10.54	9.92	4.71
IFFCO- Aonla	8.76	9.9	10.00	9.89	10.66	10.92	11.03	10.47	11.33	10.69	4.40
IFFCO- Aonla Expo.	9.89	10.2	10.00	10.43	9.87	11.53	10.74	10.21	11.23	10.34	4.42
Total IFFCO	39.63	40.68	43.25	44.02	44.87	45.10	43.80	41.27	46.68	43.27	20.83

Source: Compiled by the Authors

http://fert.nic.in/page/approved-monthly-bulletin
http://www.iffco.in/index.php/productionunit/index/kalol

NCU is produced at IFFCO's Gujarat, Uttar Pradesh, Bareilly and Orissa units as shown in table 4. The total production for NCU can be found increasing in all the units of IFFFCO. There has been an increasing demand for NCU by farmers.

Table 5: Month Wise Availability and sales of NCU in IFFCO Maharashtra (*Qty in MT)

Months	**Requirement**	**Availability**	**Sales**	**Percentage Share Requirement to Availability**	**Percentage Share Sales to Availability**
July, 2018	330000	336105.01	307533.98	98.18	91.50
August, 2018	305000	269682.54	6 254094	113.10	94.22
September, 2018	175000	213892.98	185670.	81.82	86.81
October, 2018	114000	95970.05	69872.5	118.79	72.81
November, 2018	133000	93033.79	66922.76	142.96	71.93
December, 2018	120000	126666.32	112938	94.74	89.16
January, 2019	120000	162925.84	147251.18	73.65	90.38
February, 2019	126000	205984.34	174186.26	61.17	84.56
March, 2019	120000	269172.79	227156.86	44.58	84.39
April, 2019	180000	228153.52	166484.6	78.89	72.97
May, 2019	210000	263348.91	199842.92	79.74	75.89
June, 2019	330000	281495.73	239003.67	117.23	84.90
July, 2019	315000	283882.6	245752	110.96	86.57

August, 2019	285000	212447.06	198408.02	134.15	93.39
September, 2019	180000	258760.29	238459.58	69.56	92.15
October, 2019	143000	166784.32	126706.12	85.74	75.97
November, 2019	187000	168666.41	130026.04	110.87	77.09
December, 2019	209000	817020.92	482675.58	25.58	59.08
January, 2020	209000	895202.08	572545.8	23.35	63.96
February, 2020	187000	239742.07	222688.88	78.00	92.89
March, 2020	165000	177082.59	157149.55	93.18	88.74
April, 2020	180000	144127.89	135657.22	124.89	94.12
May, 2020	210000	232748.72	224415.92	90.23	96.42

Source: Compiled by Authors

http://www.iffco.in/index.php/productionunit/index/kalol

Table 5 shows the month-wise availability, requirement and sales of fertilizer. The percentage share varies based on the Kharif and Rabi seasons. There has been sufficient NCU to meet the requirement of the farmers.

4.2.1 Neem Coated Urea and Agriculture Input Dealers

Data has been collected from 20 agriculture input dealers and the results have been tabulated.

Table 6: Categories that best describes the business

Sr.No	Dealer	Location	Agro-Input	Krishi Seva Kendra	Cooperative	Other
1	ShetibeezBhandar	Kohlapur	-----	Yes	-----	-----
2	Monika Agro Services	Nashik	Yes	-----	-----	-----
3	VardhamanKrushiSeva	Nashik	-----	Yes	-----	-----
4	GodavariAgro House	Ahmednagar	-----	-----	-----	Agro House
5	Sai KrushiSeva Kendra	Kohlapur	-----	Yes	-----	-----
6	TSR Organic Fertilizers	Akola	Yes	-----	Yes	-----
7	JIO green garden Store	Baramati	Yes	Yes	-----	-----
8	Sai Balagi Enterprises NPK	Pune	Yes	Yes	Yes	-----
9	Bharath Agencies Urea Fertilizers	Pune	Yes	Yes	-----	-----
10	ShehriKisan	Satara	Yes	-----	-----	-----
11	Evana Organic Fertilizers	Akola	Yes	-----	-----	-----
12	Divesh Store	Pune	Yes	-----	Yes	-----
13	Janathafertizers	Kolhapur	Yes	Yes	-----	-----
14	KRISHI Biotech	Kolhapur	Yes	-----	Yes	-----
15	MahaGro Organic	Baramati	Yes	-----	-----	-----
16	Neeraj Traders	Baramati	Yes	-----	Yes	-----
17	Utkarsh Fetilizers	Akola	Yes	-----	Yes	-----
18	Great Indo Gardens	Satara	Yes	-----	-----	-----
19	Preyank Solar Urea	Satara	Yes	-----	-----	-----
20	Sky Life Fertilizers	Satara	Yes	Yes	Yes	-----

Source: Created by the Authors

It is seen from Table 6 that the agriculture input dealers were from Agro input service, Krishi Seva Kendra and Cooperatives. Agro input service describes the best business for the respondents.

Table 7: Number of years in this business

Sr.No	Dealer	Location	Years
1	ShetiBeej Bhandar	Kohlapur	60
2	Monika Agro Services	Nashik	23
3	VardhamanKrushiSeva	Nashik	28
4	Godavari Agro House	Ahmednagar	10
5	Sai KrushiSeva Kendra	Kohlapur	11
6	TSR Organic Fertilizers	Akola	4
7	JIO green garden Store	Baramati	2
8	Sai Balaji Enterprises NPK	Pune	6
9	Bharath Agencies Urea Fertilizers	Pune	4
10	ShehriKisan	Satara	4
11	Evana Organic Fertilizers	Akola	2
12	Divesh Store	Pune	2
13	JanathaFertizers	Kolhapur	1
14	KRISHI Biotech	Kolhapur	3
15	MahaGro Organic	Baramati	4
16	Neeraj Traders	Baramati	3
17	Utkarsh Fertilizers	Akola	4
18	Great Indo Gardens	Satara	3
19	Preyank Solar Urea	Satara	4

20	Sky Life Fertilizers	Satara	2

Source: Created by the Authors

as shown in table 7. Most of the dealers have been in the business for 2 to 4 years.

Table 8: Number of stores owned

Sr.No	Dealer	Location	No. of Stores
1	ShetiBeej Bhandar	Kohlapur	2
2	Monika Agro Services	Nashik	1
3	VardhamanKrushiSeva	Nashik	3
4	Godavari Agro House	Ahmednagar	1
5	Sai KrushiSeva Kendra	Kohlapur	1
6	TSR Organic Fertilizers	Akola	1
7	JIO green garden Store	Baramati	2
8	Sai Balaji Enterprises NPK	Pune	2
9	Bharath Agencies Urea Fertilizers	Pune	1
10	ShehriKisan	Satara	3
11	Evana Organic Fertilizers	Akola	1
12	Divesh Store	Pune	2
13	JanathaFertizers	Kolhapur	2
14	KRISHI Biotech	Kolhapur	1
15	MahaGro Organic	Baramati	2
16	Neeraj Traders	Baramati	1
17	Utkarsh Fertilizers	Akola	3
18	Great Indo Gardens	Satara	1
19	Preyank Solar Urea	Satara	1

20	Sky Life Fertilizers	Satara	3

Source: Created by the Authors

It is observed that the VardhamanKrushiSeva has a greater number of stores followed by Sheti BeejBhandar as shown in table 8. Proper storage facilities are there for fertilizers. Awareness about neem coated urea is more and about 100% of the dealers sell the same.

Table 9: Frequency of farmer customers for NCU for the season

Sr.No	Dealer	Location	Farmers for Rabi/Day	Farmers for Kharif/day
1	ShetiBeej Bhandar	Kohlapur	17	20
2	Monika Agro Services	Nashik	11	15
3	VardhamanKrushiSeva	Nashik	15	18
4	Godavari Agro House	Ahmednagar	8	10
5	Sai KrushiSeva Kendra	Kohlapur	10	15
6	TSR Organic Fertilizers	Akola	10	15
7	JIO green garden Store	Baramati	20	40
8	Sai Balaji Enterprises NPK	Pune	25	25
9	Bharath Agencies Urea Fertilizers	Pune	14	18
10	ShehriKisan	Satara	20	50
11	Evana Organic Fertilizers	Akola	50	25
12	Divesh Store	Pune	10	15
13	Janathafertizers	Kolhapur	35	45
14	KRISHI Biotech	Kolhapur	14	18
15	MahaGro Organic	Baramati	45	25
16	Neeraj Traders	Baramati	20	40
17	Utkarsh Fertilizers	Akola	20	30
18	Great Indo Gardens	Satara	57	14
19	Preyank Solar Urea	Satara	10	15
20	Sky Life Fertilizers	Satara	20	40

Source: Created by the Authors

It is seen that the number of farmers in the Kharif season is slightly more than inthe Rabi season as shown in table 9.

Table 10: Details of the warehouse for NCU and Capacity/Bags

Sr.No	Dealer	Location	Warehouse	Storage Capacity in
1	ShetibeejBhandar	Kohlapur	Yes	200
2	Monika Agro Services	Nashik	Yes	150
3	VardhamanKrushiSeva	Nashik	Yes	250
4	Godavari Agro House	Ahmednagar	Yes	100
5	Sai KrushiSeva Kendra	Kohlapur	Yes	150
6	TSR Organic Fertilizers	Akola	Yes	1250
7	JIO green garden Store	Baramati	-----	-----
8	Sai Balaji Enterprises NPK	Pune	-----	-----
9	Bharath Agencies Urea Fertilizers	Pune	-----	-----
10	ShehriKisan	Satara	Yes	1500
11	Evana Organic Fertilizers	Akola	-----	-----
12	Divesh Store	Pune	-----	-----
13	Janathafertilizers	Kolhapur	Yes	2500
14	KRISHI Biotech	Kolhapur	-----	-----
15	MahaGro Organic	Baramati	-----	-----
16	Neeraj Traders	Baramati	-----	-----
17	Utkarsh Fetilizers	Akola	Yes	1000
18	Great Indo Gardens	Satara	-----	-----
19	Preyank Solar Urea	Satara	-----	-----
20	Sky Life Fertilizers	Satara	-----	-----

Source: Created by the Authors

It is seen that most dealers have warehouses. VardhanmankrushiSeva has the highest capacity warehouse as shown in table 10. Around 50 percent of the fertilizer dealers have warehouses for storing the fertilizers.

Table 11: Estimation of fertilizer product sales during 2018 and current prices:

Sr.No	Dealer	Location	Buying Price	Selling Price
1	ShetiBeezBhandar	Kohlapur	285	310
2	Monika Agro Services	Nashik	280	300
3	VardhamanKrushiSeva	Nashik	280	300
4	Godavari Agro House	Ahmednagar	290	300
5	Sai KrushiSeva Kendra	Kohlapur	290	305
6	TSR Organic Fertilizers	Akola	300	385
7	JIO green garden Store	Baramati	245	330
8	Sai Balagi Enterprises NPK	Pune	-----	-----
9	Bharath Agencies Urea Fertilizers	Pune	225	315
10	ShehriKisan	Satara	-----	-----
11	Evana Organic Fertilizers	Akola	-----	-----
12	Divesh Store	Pune	250	330
13	Janathafertizers	Kolhapur	-----	-----
14	KRISHI Biotech	Kolhapur	-----	-----
15	MahaGro Organic	Baramati	235	330
16	Neeraj Traders	Baramati	-----	-----
17	Utkarsh Fertilizers	Akola	285	365
18	Great Indo Gardens	Satara	-----	-----
19	Preyank Solar Urea	Satara	-----	-----
20	Sky Life Fertilizers	Satara	-----	-----

Source: Created by the Authors

The margin in buying and selling of urea is low and that can be one reason for many dealers not selling theseproducts as shown in table 11.

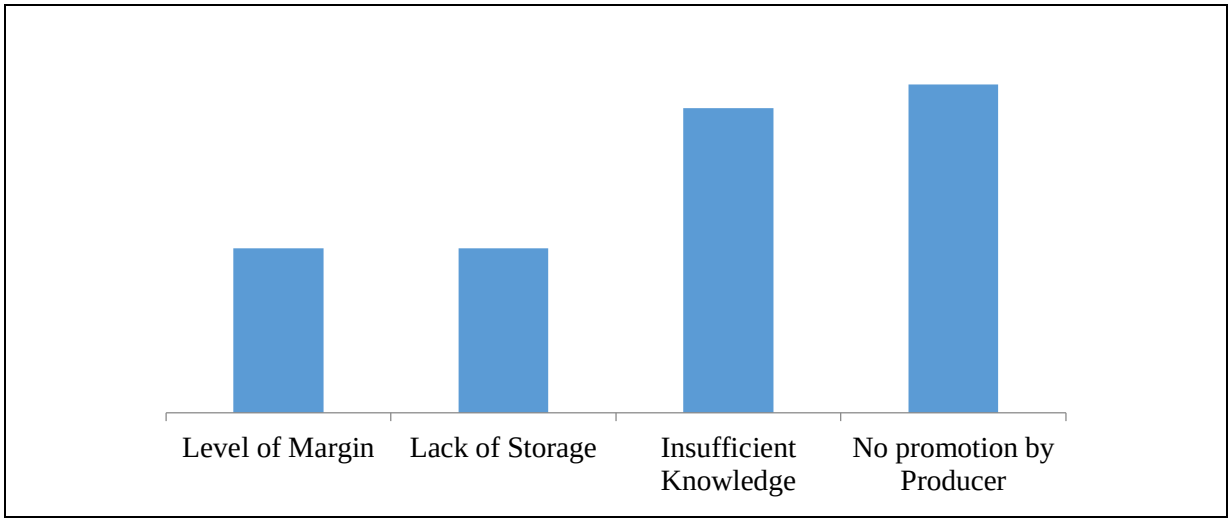


Figure 1: Frequency of problems as reported by the dealers

Source: Created by the Authors

It is seen that insufficient knowledge and lack of promotion by the producer is the major constraint for dealers to sell as shown in figure 1. There is a need to work on the promotion strategy for NCU.

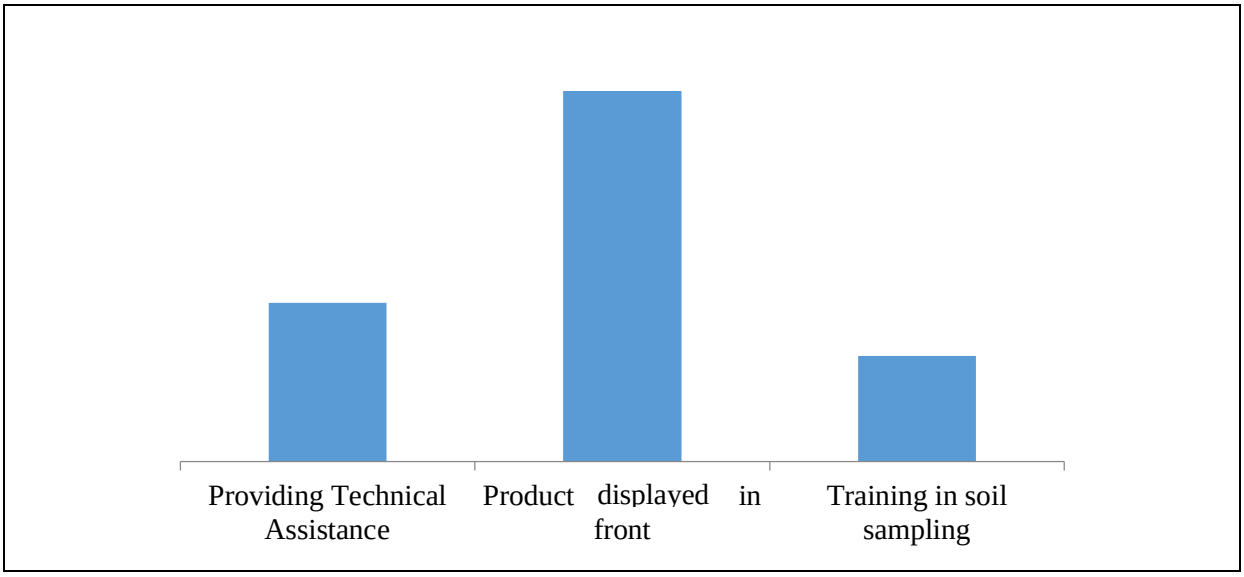


Figure 2: Frequency of promotional strategies used by dealers

Source: Created by the Authors

It is seen that product is being displayed in front for promoting the fertilizer by most of the dealers as shown in figure 2. Most of the dealers do not adopt any promotion strategy for neem coated urea. This is also one of the constraints which act as a barrier in the sales of the fertilizer. The dealers are located 5 to 20km from the place of the farmers. This makes it difficult for farmers to purchase fertilizer. According to the dealers, there is a need to create awareness about the fertilizer for better sales and an efficient marketing strategy is lacking to promote the fertilizer.

4.1.3 Sugarcane Farmers' Perception on marketing system of NCU

This section explores the descriptive statistics of farmers and their perception of the marketing system of neem coated urea.

4.1.3.1 Descriptive Statistics of Farmers

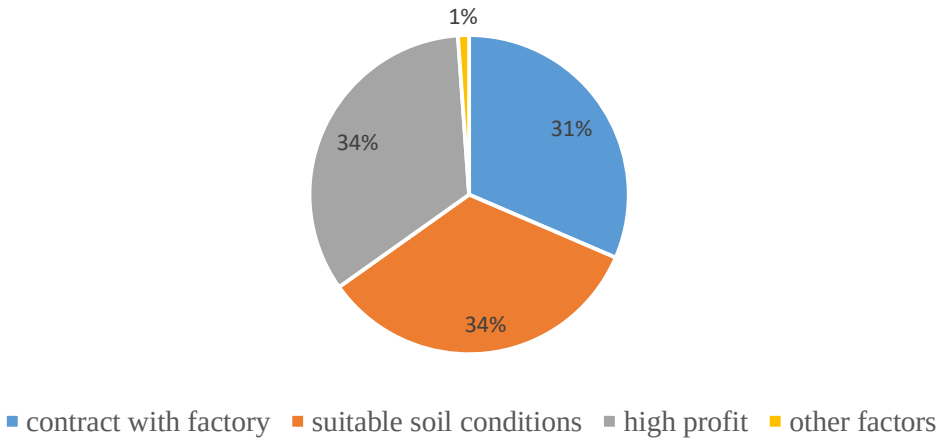


Figure 3: Motivational Factors induced for sugarcane cultivation

Source: Created by the Authors

The farmers are motivated to grow sugarcane due to several factors like contracts with factories, suitable soil conditions, high profit and other factors (Figure 3).

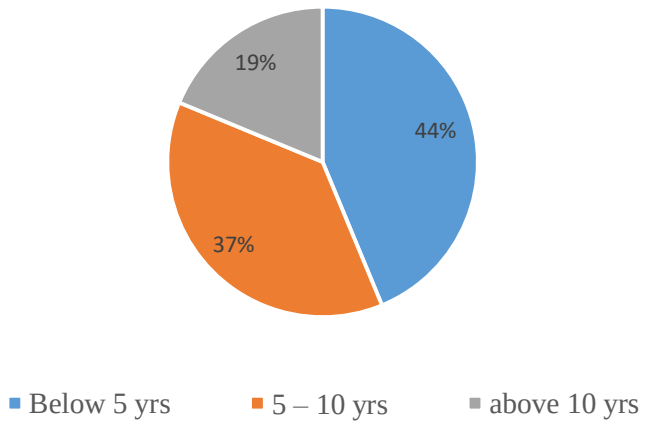


Figure 4: Years of Involvement in Sugarcane Cultivation

Source: Created by the Authors

44 percent of the Farmers selected for the study have below 5 years of involvement in sugarcane cultivation (Figure 4).

The types of irrigation used by the sugarcane farmers are ofcanal, drip, tube-well, and bore-well or rainfed irrigation. It has been observed that most of the farmers are using bore-well and rainfed irrigation for sugarcane. Most of the farmers who are using canal irrigation are not using NCU. The farmers going for other types of irrigation are using NCU in their fields. From the data, it has been observed that the farmers who are not using NCU have their yields below 30 tons per acre.

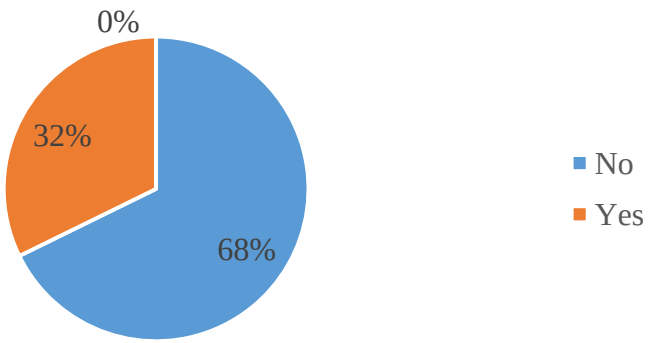


Figure 5: Difficulty in the supply of NCU

Source: Created by the Authors

For the total sample of farmers understudy, the extent of awareness about NCU was 100 percent (Figure 6).

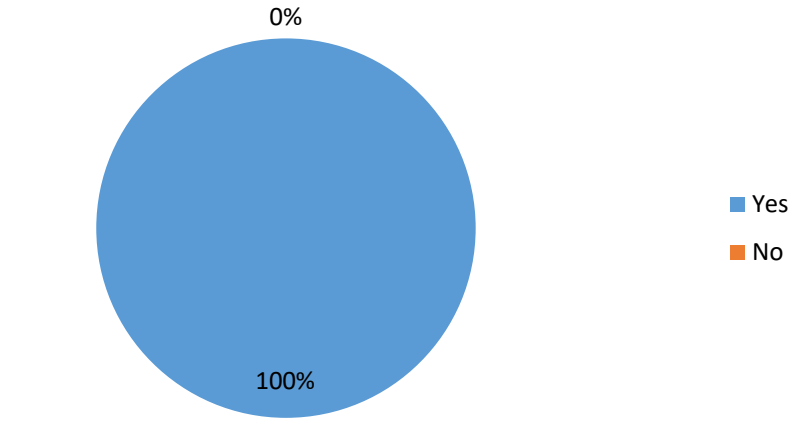


Figure 6: Awareness of NCU among farmers

Source: Created by the Authors

Around 32 percent of the farmers have said that they face difficulty in the supply of NCU (Figure 5).

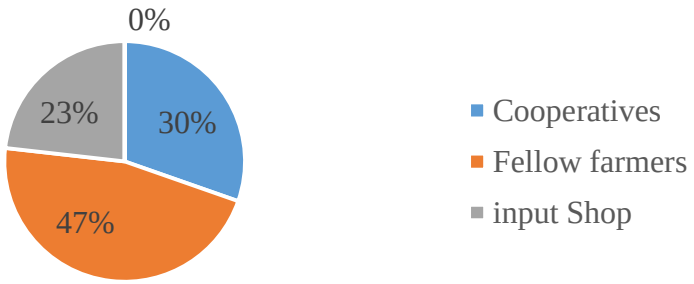


Figure7: The percentage share of the source from where farmers came to know about NCU

Source: Created by the Authors

Around 47 percent of the farmers came to know about NCU from their fellow members. 30 percent of the farmers came to know from the cooperatives while 23 percent from agriculture input shops. The farmers purchase the fertilizer from private dealers, cooperatives and others (Figure 7).

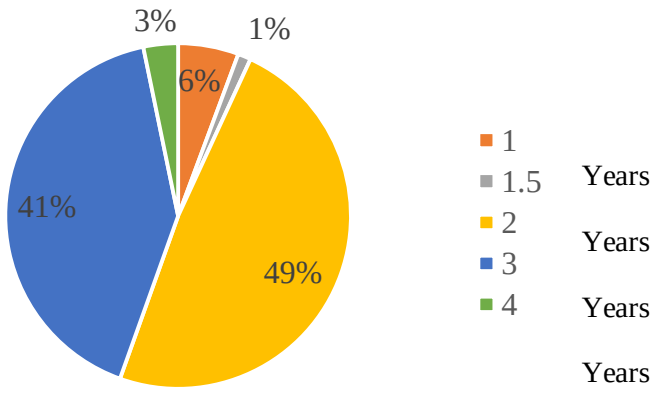


Figure8: Number of Years using Neem Coated Urea

Source: Created by the Authors

The majority of the farmers are using NCU for 2 to 3 years (Figure 8).

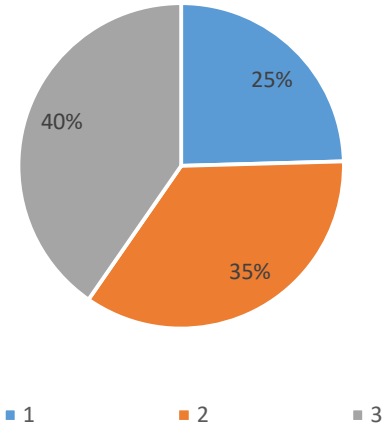


Figure9: Price at which Farmers purchase Neem Coated Urea

1-Rs. 270 2- Rs. 290 3- Rs. 330

Source: Created by the Authors

The price at which farmers purchase the fertilizer is in the range from Rs. 270 to Rs. 330 per 45kg of a bag of NCU. There is a need to work on the pricing strategy of the fertilizer (Figure 9).

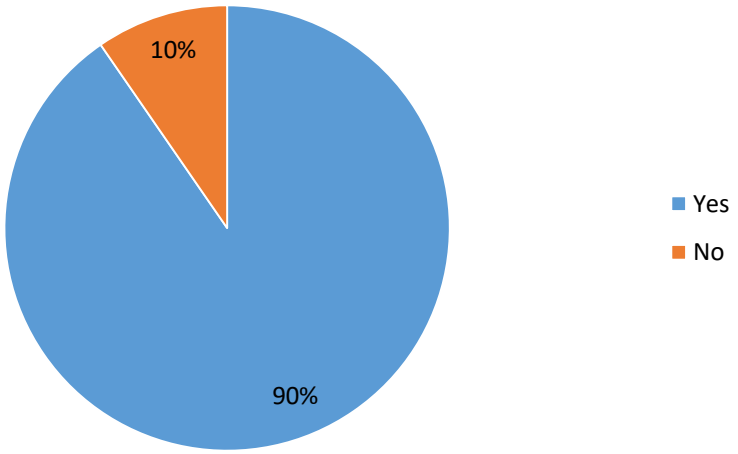


Figure 10: Percentage of usage of NCU for sugarcane cultivation (clubbing)

Source: Created by the Authors

Figure 10 shows that the usage of total urea (NCU plus urea) for sugarcane cultivation. 90% of farmers use NCU for the cultivation of sugarcane in Maharashtra (Figure 10).

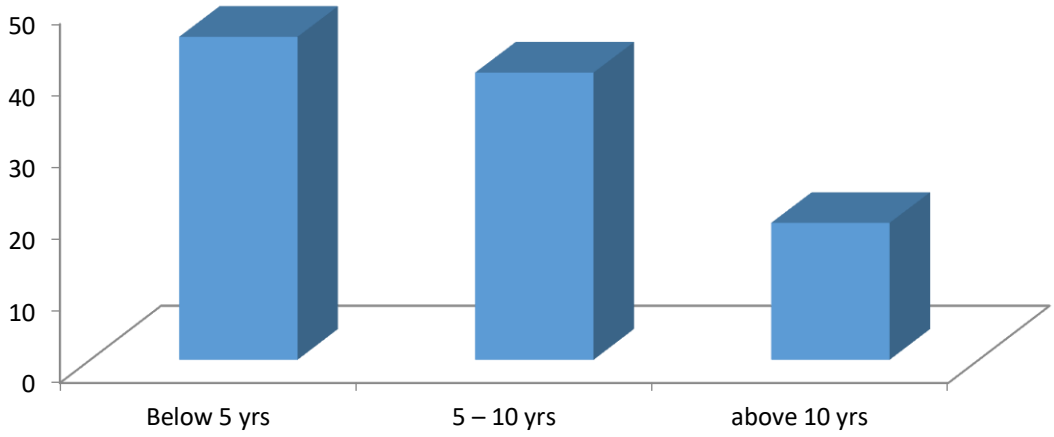


Figure 11: Years of involvement in sugarcane production

Source: Created by the Authors

Figure 11 shows the years of involvement of farmers in sugarcane cultivation vary from 5 years to more than 10 years. The farmers are cultivating sugarcane for long.

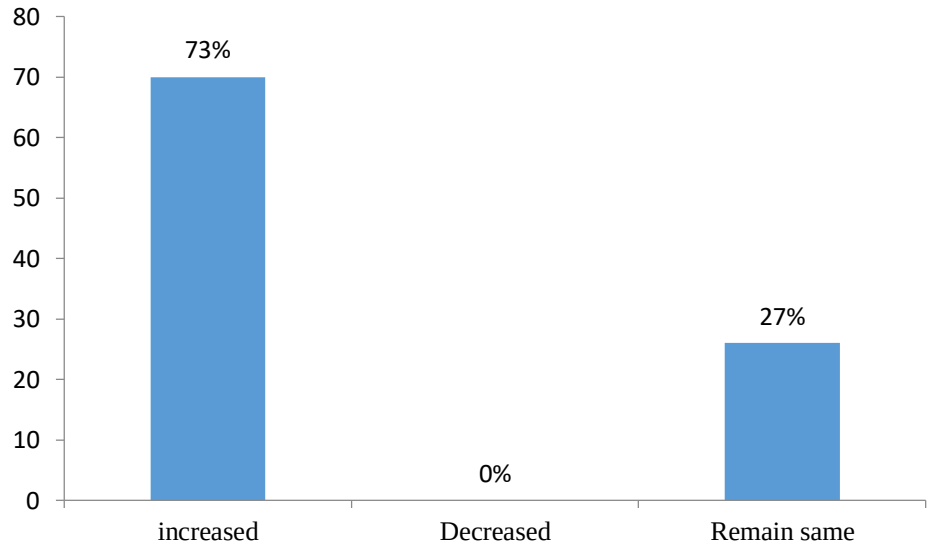


Figure 12: Difference in using normal Urea and Neem coated Urea on sugarcane production

Source: Created by the Authors

Most of the farmers (around 73 percent) felt that the benefits of NCU in terms of total fertilizer usage and urea usage had increased. However, 27 percent of farmers felt that there was no change with regards to the production of sugarcane (Figure 12).

4.1.3.2 Farmers' Perception for Neem Coated Urea

To design a marketing strategy, farmers' perception regarding the purchasing behavior was tested. The variables have been identified from extensive literature and experts' opinion analysis to capture and analyze the farmers' perception.

The purchasing behavior as shown in figure 13 depends upon different factors. These factors have been further analyzed using a 1 to 5 scale to check if there is any significant impact on the purchasing behavior of NCU.

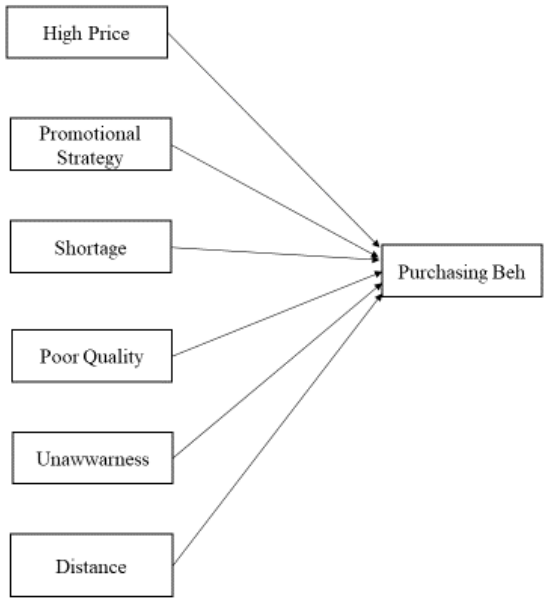


Figure 13: Purchasing Behavior of NCU

Source: Created by the Authors

Before proceeding to the analysis, reliability was checked through Cronbach alpha and normality checked through skewness and kurtosis. The Cronbach alpha of the data is found to be more than 0.6 that indicates its reliability. Table 15 presents the skewness and kurtosis. The skewness is found to be in the range of +2 and -2. Kurtosis is found to be in the range of +7 and -7. This shows that the data in table 18 is normal and can be further used for analysis (Curran et al., 1996, Dubey et al., 2015).

Table 12: Normality of the Data

	HP	Purchas	Shortage	PoorQuality	UAW	PS	DS
Skewness	-0.75	1.40	0.47	1.40	1.02	-2.00	0.56
Kurtosis	-1.42	-0.01	-1.77	-0.01	-0.95	6.10	-1.67

Source: Compiled by the Authors

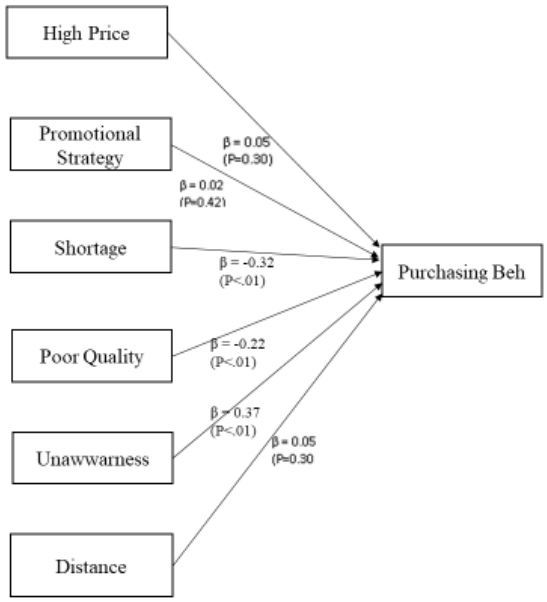


Figure 14: Impact Study on Purchasing Behavior of NCU

Source: Created by the Authors

Figure 14 above shows the impact of factors on the purchasing behavior of NCU. It has been found after analysis that out of the six factors for the study, three factors have a significant impact on the purchasing behavior of NCU. The high price of NCU does not have a significant impact on the purchasing behavior of NCU. Promotional Strategy according to the farmers does not have a significant impact on the purchasing behavior of NCU. The shortage of fertilizer has a significant negative impact on purchasing behavior. The shortage of fertilizer results in the low purchasing behavior of the fertilizer. Poor quality of the fertilizer has a significant negative impact on purchasing behavior. With a rise in the quality issues, there is a dent in the purchasing behavior of the farmers. Unawareness about the fertilizer has a significant negative impact on the purchasing behavior. Awareness about fertilizer and farmers' purchasing behavior towards demanding it are positively correlated.

Purchasing Behavior = a – 0.32 Shortage - 0.22 Poor Quality - 0.37 Unawareness + Error

Model Fitness of Farmers' Perception on Purchasing Behavior of Neem Coated Urea

The model fitness has been analyzed in table 13. It has been found that the quality indices are in the acceptable range.

Table 13: Model fit and quality indices

Average path coefficient (APC)=0.173	P=0.018		
Average R-squared (ARS)=0.286	P<0.001		
Average adjusted R-squared (AARS)=0.239	P<0.001		
Average block VIF (AVIF)=1.915	acceptable if <= 5	ideally <= 3.3	
Average full collinearity VIF (AFVIF)=1.901	acceptable if <= 5	ideally <= 3.3	
TenenhausGoF (GoF)=0.535	small >= 0.1	medium >= 0.25	large >= 0.36
Sympson's paradox ratio (SPR)=1.000	acceptable if >= 0.7	ideally = 1	
R-squared contribution ratio (RSCR)=1.000	acceptable if >= 0.9	ideally = 1	
Statistical suppression ratio (SSR)=0.833	acceptable if >= 0.7		
Nonlinear bivariate causality direction ratio (NLBCDR)=1.000	acceptable if >= 0.7		

Source: Created by the Authors

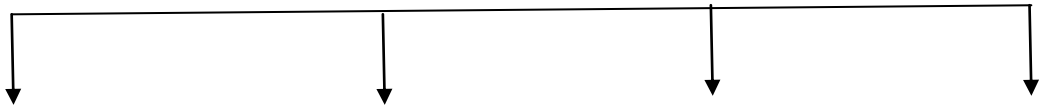
4.4 Marketing Strategies for NCU for IFFCO

4.4.1 Marketing channels used by IFFCO.

IFFCO produces urea as complex fertilizer through 5 plants. It is the only fertilizer institution in the country to produce high-quality fertilizers. IFFCO contributes about 20% to total $N_2$and 25% to total P_2O_5.

IFFCO undertakes promotional activities to market fertilizer. Program to promote balanced fertilizer through village adoption, farmers training, and soil testing are a few strategies that are adopted by IFFCO.

IFFCO Farmers Program



Demonstration Seed Multiplication Field Program Field Test

- Through 5 zonal office
- Area officers
- Field officers do marketing at Farmer Service Centre
- Marketing channel: State-level Apex ⟶ Society ⟶ IFFCO
- Small quantities are provided through institutional agencies Rail (80%) Road (20%)

The distribution of IFFCO's fertilizers is undertaken through 38155 cooperative societies. The entire activities of distribution, sales and promotion are coordinated by Marketing Central Officer (MKCO) at New Delhi assisted by the marketing offices in the field. Essential agriculture inputs in crop production are made available to the farmers through a chain of 158 Farmers Service Centre (FSC). These are IFFCO owned shops and are located in the area where fertilizer marketing societies are less.These FSC are marketing fertilizers, seed, pesticides, etc. IFFCO has promoted several field level institutions and organizations to work for the welfare of farmers, strengthening cooperative movement and improve Indian agriculture. Indian Farm Forestry Development Cooperative Ltd (IFFDC), Cooperative Rural Development Trust (CORDET), IFFCO Foundation, KisanSewa Trust belongs to this category. The broad objective of IFFDC is to promote forestations on wastelands through Primary Farm Forestry Cooperative Societies (PFFCS) at the village level. Its area of operation is in 11 states. Co-operative Rural Development Trust (CORDET) was promoted by IFFCO to provide practical training to the farmers to improve their skills in agricultural production, dairy, poultry, fisheries and professional leadership at the village level.Besides, CORDET is involved in soil testing.

There are about 200 sugar factories in Maharashtra and out of which 165 are run by cooperatives. Cooperative sugar factories supply fertilizer to their member farmers to increase sugarcane production per acre.

4.4.2 Efficient Marketing strategies for Neem Coated Urea

Marketing strategy involves three steps:

1. Segmentation
2. Target
3. Positioning

Table 14: Efficient and Future Marketing strategies for NCU

Elements	Efficient Marketing strategies	Future Efficient Marketing Strategy for Neem Coated Urea
Segmentation	Identify the niche (Target audience) There is a need to identify the target audience or customer to whom one will sell NCU. Mainly the sugarcane, maize, tur, paddy, soybean, and red gram farmers are the customers of NCU. Also, one can distribute to farmers nursery and gardens.	Target Market + Marketing Mix = Marketing Strategy The marketing strategy can focus on the target group and 4Ps.
Targeting	Meet local farmers and their leaders There is a need to arrange seminars on awareness of using neem coated urea explaining the details of government subsidy and also the crop benefited after using NCU is required.	A target market is a homogeneous group of customers. Marketing Mix is the controllable variable to satisfy the target mix. There is a need to build up connectivity and relationship with the farmers. Farmers can be helped or supported with free samples of the fertilizer Broken Supply Chain needs to be focused
Positioning	Offer free sample/ demonstration IFFCO has promoted NCU by offering free samples to customers. Offer a trial period to your customers and let them experience the benefits or advantages of neem coated urea.	Providing free consultation scheme Providing free consultation to farmers about soil health, nutrient requirements by educating them with the basics of Macro-Micro nutrient application.
Product Strategy	Many farmers get convinced of technical aspects if one can explain NCU's technical benefits to crop.	Tie-up with new start-ups Tie-up with new start-ups like Dehaat, Gramophone etc. which are bringing innovation by adopting new technologies by providing home delivery of the agriculture product at farmers' doorstep. Micro-Encapsulation As Micro-Encapsulation used in many pesticides same theory can be used in fertilizers which protects the main ingredient with coating and releasing nutrients supply and does not get affected by the environment like rain can affect leaching out of nutrients. So micro-encapsulated techniques can be a protective layer against such

		problems.
Pricing	After all the efforts and explanations to farmers and after acceptance of the product, now comes the cost of the product on which the final decision is dependent. The pricing of the product needs to be well explained to the farmers.	Management of Money can be done as there is a price variation of the fertilizer from Rs. 270 to Rs. 330.
Network Building and Coordination	Connect with retailers and dealers As retailers and dealers are proven to be the main consultant for farmers, so if we can convince retailers they can automatically advise farmers to use NCU.	Nano-technology Soon many organizations are working on Nano-technology in fertilizer. So it can be done for neem coated urea where 50kg would replace by 10 gm or 100 gm. There is a need to motivate, inspire and assure the farmers regarding the results of neem coated urea. There is a need for communication amongst the farmers, dealers and cooperatives.
Promotion Network building and Coordination Campaigning Social Media	Brochures can be printed and distributed among the farmers containing all the benefits and advantages of using NCU. Campaigning in villages for spreading awareness and marketing (NCU) is required. Advertising and providing demonstrations on social media can have an impact on the acceptance of NCU.	Advertisement of Direct Benefit Transfer (DBT) More advertisements should be done on direct benefit transfer to attract farmers and build their trust in subsidy schemes. In many cities, it's now impossible for people to go out and buy vegetables. By utilizing this opportunity one should promote kitchen gardening that will directly result in building customers in cities as well for NCU. Providing free soil health check-up Providing free soil health check-ups may be made as farmers are not satisfied by the government's soil health card. There is a question of genuine or authentic check-up. Video Conferencing Promoting the fertilizer through gifts Win the confidence of the farmers A database needs to be built by the dealers and cooperatives Free tools can be utilized

5. CONCLUSION

NCU has significantly impacted production and productivity of agriculture crops. There is a scarcity of research conducted on the marketing strategy of NCU as a sustainable and efficient soil nutrient. There has been a need to explore the factors which result in the marketing of NCU and enhancing acceptability for its application by farmers. The analysis on sales potential and farmers' perception of NCU highlighted various key issues in the purchase and use of NCU – a shortage of the urea available in the village, quality of the packaging, high price, promotional strategy, distance of the fertilizer suppliers and unawareness. The results show that shortage of urea, quality of packaging and unawareness; have a significant impact on NCU. The purchasing behavior is dependent upon different factors like awareness regarding NCU, quality of packaging and product and availability of the fertilizer in the nearest village.

Data analysis suggests that there is a need for designing and implementing promotional strategies and product specific strategy to encourage farmers' acceptability of NCU. With 100% neem coating of urea, the government has now asked fertilizer manufacturers to reduce the weight of the Urea bags from the existing 50kgs to 45kgs to maintain equilibrium in the requirements of nitrogen as a soil nutrient.However, farmers were found using fertilizers without honoring the quantum of soil nutrient required. Providing urea in 45kg bags would have straightaway brought down the consumption of urea by almost 10%, which can be one of the reasons for the big drop in the demand of urea in the last couple of years.There is a need for demonstration and continuous monitoring of the fertilizer dosage. The reduction in the amount of fertilizer in a bag has resulted in saving the wastage of the extra fertilizer in the bag. A net saving of 5kg NCU results in better soil health management and input cost reduction. This is a profitable and productive approach. There is a need to generate awareness in terms of monetary and productivity. The agriculture input cooperatives and dealers have been emphasizing on the marketing strategies to increase the production and promotional strategies. The study has also documented future marketing strategies for promoting neem coated urea. The study is limited to the sugarcane farmers and agriculture input dealers from regions of Maharashtra. The study can be further extended by working on Point of sale, campaign budget optimization

6. IMPLICATIONS OF THE STUDY

The present study will help to promote NCU and create awareness amongst farmers thereby developing marketing strategies for NCU. The study is a pioneer work based on the farmers' perception and sales potential of neem coated urea. The study finds theoretical, managerial and policy implications.

6.1 Theoretical Implications

First, the study explores a rich literature on neem coated urea and it's a significant impact on the agriculture production. The use of NCU has resulted in increase in the yield and productivity of crops like sugarcane, soybean and paddy. The study has documented the literature on significant impact of NCU on productivity.

Second, the study tabulates the sales potential and market potential of the fertilizer over a year. This helps in understanding the use of the fertilizer. Over the years the market share of the fertilizer has increased significantly.

Third, the study analyzes farmers' perception of neem coated urea and the factors which affect the purchasing behavior. The result can be beneficial for the academicians and practitioners to understand the challenges of farmers in its application. The shortage of NCU, quality and unawareness can be worked on.

Fourth, the study also explores the marketing strategy used by agriculture cooperative players like IFFCO. Based on the present marketing strategy, the study also highlights future marketing strategies for NCU. The future strategies can benefit the practitioners to promote the fertilizer and sustain the market.

Fifth, the usage of NCU by the farmers is dependent upon social participation, extension contact, mass media exposure, motivation and awareness.

Sixth, the age, education and experience of the farmers have an impact on usage of neem coated urea. The educated and experienced farmers understand the benefit of the fertilizer.

6.2 Managerial Implications

The study leads to managerial implications for the agriculture input dealers, cooperatives, private firms and other firms.

Firstly, majority of the farmers face problems in getting NCU at the right time. This is due to the low inventory of NCU by the dealers. The dealers can further work on the inventory of the supply chain.

Secondly, agriculture input dealers are of the opinion that the promotional strategies should reach to the farmers.

Thirdly, there is a need to make the farmers understand about the slow results of neem coated urea. NCU gives slow results but increases the efficiency. There is a need to differentiate between the rapid results of normal urea which may not be useful in long term as compare to NCU.

Fourthly, agriculture input dealers and retailers have lack of information about the product which results in problems in selling it. Awareness through promotion and advertisement can be made.

Fifth, the price margin in neem coated urea varies from Rs. 293 to Rs. 330. There is a need to understand the variation in the price. The variation may be due to the transportation cost linked with the product.

Sixth, demonstration of neem coated urea for farmers and dealers can result in better use and utilization. There is a huge demand of demonstration which should take place.

Seventh, farmers are not getting the fertilizer as per their requirement.

6.3 Policy Implications

The promotional strategy needs to be centralizedand focusedon farmers. There is a need to provide literacy to the agriculture input dealers regarding the fertilizer dosage requirements. The study paves a way for the policymakers for building a roadmap for interlinking the promotional strategy to farmers. There is a need for promotion of right dose of neem coated urea in the social media.

First, there is a need to conduct training programs for generating awareness and dosage of NCU for the small and marginal farmers. Farmers may be encouraged and motivated to understand the use and significance of neem coated urea.

Second, IFFCO and KRIBHO should make the farmers aware about the composition, fertilizer application, proper dosage and benefits of NCU. The price fluctuation issues should also be focused. Special policies and schemes need to be designed to gain competitive

advantage. Self Help Groups of the villages may be contacted and the farmer problems for NCU may be discussed.

Third, the fertilizer consumption is seasonal but importance should be given to storage and handling in order to minimize the market cost. Availability of warehouse space at PACS level needs improvement. The media advocacy can be done by manufacturers and agriculture input dealers.

7. REFERENCES

Azeem, B., KuShaari, K., Man, Z. B., Basit, A., &Thanh, T. H. (2014). Review on materials & methods to produce controlled release coated urea fertilizer. *Journal of Controlled Release*, *181*, 11-21.

Azeem, B., KuShaari, K., Man, Z. B., Basit, A., &Thanh, T. H. (2014). Review on materials & methods to produce controlled release coated urea fertilizer. *Journal of Controlled Release*, *181*, 11-21.

Bhandari, J., Naik, S., Pati, S., Bhandari, D., Acharya, M. K., Kudale, A., ... & Kumari, S. (2019). Exploratory Study on Rural Development in India Developing a Model by Comparing Role Model of a Sustainable Village with Other Village. *SAMVAD*, *19*, 34-47.

Curran, P. J., West, S. G., & Finch, J. F. (1996). The robustness of test statistics to non-normality and specification error in confirmatory factor analysis. Psychological methods, 1(1), 16.

Das, Bismajeet (2016). A Study on Customer's value evaluation of IFFCO fertilizer in jagatsinghpur District" (WITH REFERENCE TO THE IFFCO) , Department of Agribusiness Management Centre for Post Graduate Studies Orissa University of Agriculture and Technology Bhubaneswar-751003 2016 .

Desai, M.K., Usadadiya, V.P., Thanki, J.D., Patel, K.G. and Arvadia, K. (2014) Growth, yield and quality of Bt cotton (G. Hirsutum) as influenced by nitrogen application under South Gujarat condition. Int. J. Agric. Innov. Res. 2:871-873.

DHNS, 2017; https://www.deccanherald.com/content/603384/neem-coated-urea-preserves-soil.html as retrieved on 31st October, 2018.

Dubey, R., Gunasekaran, A., & Ali, S. S. (2015). Exploring the relationship between leadership, for green supply chain. International Journal of Production Economics, 160, 120-132.

FAI (2015), Fertilizer Statistics 2014-15, Delhi, Fertilizer Association of India.

https://krishijagran.com/interviews/100-neem-coated-urea-a-necessity/ as retrieved on 23rd July, 2020

https://www.hindustantimes.com/india-news/pm-modi-hails-iffco-s-measures-for-farmer-s-upliftment/story-8mLkEwhE61n14mmdSVvmhK.html, as retrieved on 23rd July, 2020.

https://www.thehindubusinessline.com/economy/agri-business/iffcos-digital-push-a-boon-for-farmers/article9854435.ece, as retrieved on 23rd July, 2020.

Jain, S.C., Katty, G.V., Jain, N.K. and Iyer, B.J. (1982) Efficacy of blended urea in upland cotton under different nutrient levels and field conditions. J. Indian Soc. Soil Sci. 30: 224-226.

Jain, V. (2008). Market strategies of fertilizer manufacturing companies: study of selected units.

Kajale, J; Shroff, S. and Migliani, V (2017), AERC Report on Impact of Neem Coated Urea on Production, Productivity and Soil Health in India – A Case of Sugarcane and Tur in Selected Districts of Maharashtra , Submitted to Department of Agriculture and Farmers' Welfare, Ministry of Agriculture and Farmers' Welfare.

Kasat, K., Kumari, S., & Shaikh, N. (2017). Conceptual framework for developing an occupational health care management in factories. *Journal of Ecophysiology and Occupational Health*, *17*(1/2), 28-33.

Kumari, S. (2017). Review on developing a conceptual framework for technology adoption towards sustainability in agro based industry. *SAMVAD*, *13*, 14-19.

Kumari, S., & Patil, Y. (2017). Achieving climate smart agriculture with a sustainable use of water: a conceptual framework for sustaining the use of water for agriculture in the era of climate change. In *Reconsidering the Impact of Climate Change on Global Water Supply, Use, and Management* (pp. 122-143). IGI Global.

Kumari, S., & Patil, Y. B. (2019). Enablers of sustainable industrial ecosystem: framework and future research directions. *Management of Environmental Quality: An International Journal*.

Kumari, S., Jeble, S., & Patil, Y. B. (2018). Barriers to technology adoption in agriculture-based industry and its integration into technology acceptance model. *International Journal of Agricultural Resources, Governance and Ecology*, *14*(4), 338-351.

Kumari, S., Kasat, K., & Patil, Y. (2017). Resource based view of innovative strategies in sugar industry and their effects towards healthcare. *Indian Journal of Public Health Research & Development*, *8*(4), 954-961.

Kumari, S., Kumbhar, V., & Patil, Y. (2017). Measuring the impact of technology trends and forecasts in sugar industry towards sustainable health-care services. *Indian Journal of Public Health Research & Development*, *8*(4), 939-946.

Mani, S., Jayaraman, C. and Durai, R. (2008) Yield and quality of sugarcane as influenced by organic manures and chemical fertilizers on long term basis. Madras Agric. J. 95:462-466.

Naik, S., Bhandari, J., Pati, S., Bhandari, D., Acharya, M. K., Mane, M. K., ... & Kumari, S. (2019). Developing a Model to Study the Influence of Resource Based and Social Capital Theory on Performance of Sugar Cooperative Factory: A Case Study Approach. *SAMVAD*, *19*, 20-33.

Parashar, K.S., Prasad, R., Sharma, R.P., Sharma, S.N. and Singh, S. (1980) Efficiency of urea, nitrification treated urea and slow-release nitrogen fertilizers for sugarcane. Z. Pflanzen. Bodenkd. 143:262-267.

Patil, Y., & Kumari, S. (2016). Trends of Seeds in the Era of Climate Change–an Issue of Concern towards Sustainability. *Indian Journal of Science and Technology*, *9*(21).

Prasad, R., Sharma, S. N., Singh, S., & Prasad, M. (1990). Nitrogen management. *soil Fertility and fertilizer Use*, *4*, 41-51.

Ramappa, K. B and Manjunatha, A. V (2017), Impact of Neem Coated Urea on Production, Productivity and Soil Health in India, Agricultural Development and Rural Transformation Centre INSTITUTE FOR SOCIAL AND ECONOMIC CHANGE.

Rose, W. C., & Dekker, E. E. (1956). Urea as a source of nitrogen for the biosynthesis of amino acids. *Journal of Biological Chemistry*, *223*(1), 107-121.

Seshadri, V., & Prasad, R. (1979). Influence of rates and sources of nitrogen on growth, nitrogen uptake and yield of cotton (G. hirsutum L.). *ZeitschriftfürPflanzenernährung und Bodenkunde*, *142*(5), 731-739.

Sheshadri, V. and Prasad, R. (1979) Influence of rate and source of nitrogen on growth, nitrogen uptake and yield of cotton. Z. Pflanzen. Bodenkd. 142: 731-739.

Singh, B. (2016). Agronomic benefits of neem coated urea–A review. *International Fertilizer Association Review Papers. Paris: International Fertilizer Association*.

Singh, K.D.N., Prasad. C.R., Rai, Y., Singh, D. and Sahi, B.P. (1987) Effect of Gamma BHC and blended urea on yield, nutrient uptake and quality of sugarcane in a calcareous soil. J. Indian Soc. Soil Sci. 36:455-460.

Singh, T. P., &Kumdhar, V. (2016). SnehaKumari,. Socio-economic status of farmers in drought prone region of Maharashtra, India-Case Study. *International Journal of Current Research*, *8*(06), 33304-33306.

Sinha, R. K. (2017). IMPACT OF NEEM-COATED UREA ON PRODUCTION, PRODUCTIVITY AND SOIL HEALTH IN BIHAR.

Sivaraj, A. and Iruthayaraj, M.R. (1980) Effect of nitrogen inhibitors under different levels and time of application on seed cotton yield. Madras Agric. J. 67:807-810.

SNEHA, K. (2017). Exploration and development of a sustainable agro based industrial ecosystem model with special reference to sugar industry.

Swain, Rajashree (2013). A Report On Marketing And Channel Management Of Iffco Fertilizers In Khorda District, Submitted To Department Of Agri-Business Management Centre For Post Graduate Studies Orissa University Of Agriculture And Technology.

Viets, F. G. (1965). The plant's need for and use of nitrogen. *Soil nitrogen*, (soilnitrogen), 503-549.

Yadav, R.L., Kumar, R. and Verma, R.S. (1990) Effects of nitrogen applied through new carriers on yield and quality of sugarcane. J. Agric. Sci. 114:225-230.

8. ANNEXURE

Annexure - I

Permission Letter for Data Collection of Cooperative Sugar factory in Satara District

वैकुंठ मेहता राष्ट्रीय सहकारी प्रबंध संस्थान
(कृषि एवं किसान कल्याण मंत्रालय, भारत सरकार)
सावित्रीबाई फुले पुणे विद्यापीठ मार्ग, पुणे 411 007
VAIKUNTH MEHTA NATIONAL INSTITUTE
OF CO-OPERATIVE MANAGEMENT
(Ministry of Agriculture and Farmer's Welfare, Govt. of India)
Savitribai Phule Pune University Road, Pune - 411 007

स्नेहा कुमारी
सह - प्राध्यापक

संदर्भ : टी/आईएस/2019 दि.3.12.2019

माननीय **कार्यकारी संचालक** ,
किसनवीर सातारा सहकारी साखर कारखाना मर्यादित,
भुईंज,जि.सातारा - 415 115

महोदय,

आपणास माहिती आहेच कि वैकुंठ मेहता राष्ट्रीय सहकरी प्रबंध संस्थान (वैमनिकॉम), पुणे भारतातील सहकार क्षेत्रातील कार्यकर्ते, पदाधिकारी, संचालक, अधिकारी तसेच कर्मचारी यांना सहकारी शिक्षण व प्रशिक्षण देणारी राष्ट्रीय स्तरावरील संस्था आहे. आपल्या मदतीने व सहकार्याने संस्था गेली 63 वर्षे वाटचाल यशस्वीपणे करीत आहे. भारतीय राष्ट्रीय सहकारी संघ, नवी दिल्ली यांनी संस्थेला ऊस उत्पादक शेतका-यांसाठी कडुलिंब लेपित युरियाच्या विपणन धोरणाच्या संशोधनावर अभ्यास करण्यासाठी महिती संग्रहित करण्याचा प्रकल्प दिला आहे.या प्रकल्पामधे आपल्या कारखान्याची निवड करण्यात आली असुन या संदर्भात आपल्या कारखाना क्षेत्रातील ऊस उत्पादक शेतका-यांकडुन माहिती गोळा करण्यासाठी आम्हाला तुमच्या सहाय्याची आवश्यकता आहे .

आपणांस विनंती आहे कि, मी व माझे 1/2 सहकारी डिसेंबर 2019 मध्ये प्रत्यक्ष भेट देऊन कृपया, आपला व आपल्या सहका-यांचा बहुमुल्य वेळ देऊन सहकार्य करावे हि विनंती. संशोधकाच्या चमुला आपल्या भेटी दरम्यान ऊस उत्पादक शेतक-यांची आवश्यक ती माहिती उपलब्ध अरुन द्यावी व सर्व ते सहकार्य करावे हि विनंती.

भारतीय सहकारी संघाने या संस्थेला दिलेला हा प्रक्लप पुर्णपणे शैक्षणिक अभ्यासविषयक प्रकल्प असुन त्याच इतर कोणताही व्यवसायिक उपयोग केला जाणार नाही.आपल्या संस्थेमधुन मिळालेली माहिती या प्रकल्पामध्ये तसेच अन्य संशोधन कार्यात वापरण्यास परवानगी मिळावी ही विनंती. गरज भासल्यास प्रकल्पाचे/संशोधनाचे निष्कर्ष फक्त जनरल/शैक्षणिक निष्कर्ष फक्त प्रसिध्द केले जातील.

आपल्या सहकार्याच्या अपेक्षेत,

(स्नेहा कुमारी)

(संस्थान हिन्दी पत्राचार का स्वागत करता है।)

दूरभाष:PHONE : 020- 25701206/25537974/09405143788 फैक्स:FAX : 91-020-25537726
E-mail: crp@vamnicom.gov.in/skumari@vamnicom.gov.in Web-site: www.vamnicom.gov.in

Annexure -II Questionnaire – (For sugarcane farmers on Neem Coated Urea)

Village: **Mandal:**

Name of the Respondent: **Mobile No:**

1. Age
a. 20 –30 yrs b. 30 – 40 yrs c. 40 – 50 yrs d. above 50 yrs

2. Gender:
a. Male b. Female

3. EducationalQualification
a. Below SSC b.SSLC c. Degree d. PG

4. Size of thefamily
a.2-4members b.4-6members c. Above 6

5. Years of involvement in sugarcanecultivation.
a. Below5yrs b. 5 –10yrs c. above10yrs

6. Motivational factors induced for sugarcanecultivation.
a. contract with factory b. suitable soil conditions c. Highprofit d. otherfactors

7. Other Occupation
a. Agriculture b. Business c.Service

8. Total area undercultivation
a. less than1 ha b.1-2 ha c.2-4ha d. above4 ha ( )

9. Total area under sugarcanecultivation
a. less than1 ha b.1-2 ha c.2-4ha d. d. above4ha ( )

10. Description of landholdings c.Sub-lease ( )
a. Own land b. Tenancy Land

11. Source of finance for agriculturaloperations
a.Ownfund b. money lender c.bank ( )

12. Yield of sugarcane from an acre ofland
a. Below 30 Ton b. 30-45 tons c. 45 – 60 ton d .above60 ton ( )

13. The type of irrigation used for sugarcanecultivation

a. Canal b. Bore-Well c.Tubes d.Rain-fed ( )

14. Are you aware of Neem coated urea for cultivation?

15. If yes, do you use Neem coated Urea for sugarcane cultivation?

16. At what price do you get Neem coated urea?

17. Since how many years are you using neem coated urea?

18. Do you see any difference in using normal Urea and Neem coated Urea on sugarcane production?

19. From whom do you purchase the Neem Coated Urea.

a. Private Fertilizer company b. Cooperatives c. other

20. Name the source from which you came to know about Neem coated Urea.

……

21. Do you find any disadvantage in using Neem coated Urea?

……

……

22. Is there any promotional strategy in the village to use Neem coated Urea?

……

23. Is there any difficulty in supply of Neem coated Urea in your village. If yes, Kindly state.……

Any more suggestions/comments

Annexure – III Questionnaire for Dealers

Please provide the following information on your agro-input business.

1. Name ofdealer: _____

2. Nameofrespondent:_____

3. Gender:M/F_____

4. Address: _____

5. Telephone:_____Mobile:_____Email: _____

6. Which of the following categories best describes yourbusiness?

1) Agro-inputdealer2)Cooperative_____3) Krishi Sewa Kendra

SpecifyOther_____

7. Number of years in thisbusiness:_____

8. Are you registered as an agro-inputdealer? ____

9. Number of storesowned:_____

10. Number ofemployees:Total_____Male_____Female _____

11. Do you sell

1) Normal Urea_____ 2) Neem Coated Urea(NCU)?_____ 3) Both_____

12. How many farmer customers do youhave for Normal Urea for season

Rabi _____ Kharif _____

13. How many farmer customers do youhave for Neem Coated Urea for season

Rabi_____ Kharif_____

14. Do you own awarehouse for NCU? ____

If yes, what is the storage capacity in No. of bags?___

15. What is the NCU fertilizer storage capacity ofthestore(s)?_____bags

16. Do you sell productstosub-dealers? _____ If yes how manysub-dealers? _

17. In addition to selling to farmers, do you sellagro-inputs at wholesale to other largedealers?_____

18. How many other storesare competitors? _____

19. Please estimate fertilizer product sales during 2018 and currentprices:

Products	Normal Urea (domestic)	Buying Price	Selling Price	Neem Coated Urea	Buying Price	Selling Price
Sales in 2016						
Sales in 2017						
Sales in 2018						

20. SupplierServices

Company	Buying Price

21. What are your major constraints in selling Neem Coated Urea? Select one or more ofthese.

a.	No or insufficientdemand
b.	No availability of inputs in nearby markets
c.	Level of margins
d.	Insufficient product knowledge ofNCU
e.	Lack offunds
f.	Lack of storagespace
g.	No sales promotion by producers/suppliers/Governmentagencies. Any other reason----------

---

Annexure -IV: Marathi version of the Questionnaire

विक्रेत्यांसाठीप्रश्नावली (कडुलिंबलेपितयुरीयावर)

१. विक्रेत्याचेनाव ----------
२. प्रतिवादीचेनाव ---------- लिंग: स्त्री/ पुरुष
३. पत्ता : ----------
४. फोननं. : ----- मोबाइलनं. : -------- इ-मेल ---------
५. खालिलपैकीकोणतीश्रेणीआपल्याव्यवसायाचेसर्वोत्तमवर्णनकरते?
अ) अँग्रोइनपुटडिलरब) सहकारीक) कृषीसेवाकेंद्रड) इतर

६. व्यवसायाचीवर्षे : ----
७. आपणयाव्यवसायातनोंदनीकृतआहातका?
८. मालकीच्यास्टोअरचीसंख्या : ------
९. कर्मचा-यांचीसंख्या :एकुण -- स्त्री :---- पुरुष ----
१०. तुम्हीविकताकाअ) साधारणयुरीयाब) लेपितयुरीयाक)दोन्ही
११. हंगामातआपल्याकडेसर्वसाधारणयुरीयासाठीकितीशेतकरीग्राहकआहेत?
अ) रब्बीब) खरिप
१२. हंगामातआपल्याकडेलेपीतयुरीयासाठीकितीशेतकरीग्राहकआहेत?
अ) रब्बीब) खरिप
१३. आपल्याकडेNCUसाठीकोठारआहेका?
असल्यासपिशव्यांच्यासंख्येमध्येसाठवणक्षमताकितीआहे?-----
१४. स्टोरचीNCUसंचयनाचीक्षमताकितीआहे? --- पिशव्या : --
१५. आपणउपविक्रेत्यांनाउत्पादनेविक्रीकरताका?
होअसल्यासकितीउपविक्रेत्यांनाउत्पादनेविक्रीकरता? ---
१६. शेतका-
यांनाविक्रीबरोबरचतुम्हीइतरमोठयाविक्रेत्यांनाघाऊकठिकाणीअँग्रोइनपुटविकताका?
१७. इतरकितीस्टोरप्रतिस्पर्धीआहेत?
१८. २०१८आणिचालुवर्षाच्याकलावधीतखतउत्पादनाच्याविक्रीचाअंदाजलावा :

उत्पादने	साधारणयुरीया	खरेदीकिंमत	विक्रीकिंमत	कडुलिंबलेपितयुरीया	खरेदीकिंमत	विक्रीकिंमत
२०१६मधील विक्री						
२०१७मधील विक्री						
२०१८मधील विक्री						

१९. **पुरवठादारसुविधा**

कंपनी	खरेदीकिंमत

२०. कडुनिंबलेपितयुरीयाविक्रीततुमचीकोणतीमोठीअडचणआहे?खालीदिलेल्यापैकीएककिंवाएकपेक्षाजास्तनिवडा

अ) नाहीकिंवाअपुरीमागणी

ब) नजीकच्याबाजारपेठेतीलसाधनांचीअनुप्लब्धता

क) समासपातळी

ड) NCUचेअपुरेउत्पादनज्ञान

इ) निधीचाअभाव

ई) साठवणुकीच्याजागेचाअभाव

उ) उत्पादक/पुरवठादार/सरकारीसंस्थांकडुनविक्रीचीजाहिरातकेलीजातनाहीइतरकोणतेहीकारण -----

२१. कडुलिंबलेपितयुरीयायाच्याजाहिरातीसाठीआपणकोणत्याप्रचारात्मकपद्धतींचावापरकरता ?

अ) मोबाईलद्वारेमाहितीपाठवणेब) मातीसाधेकरण्याचेप्रशिक्षण

क) NCUचेनमुनेविनामुल्यववेळेवरमिळवणेड) शेतक-यांनातांत्रिकप्रशिक्षण

इ) उत्पादनसमोरठेवलेजातेई) इतर

२२. आपणकितीशेत-यांनाकव्हरकरताआणितेकितीअंतरावरआहेत?

प्रश्नावली -- कडुलिंबलेपितक्षेत्रातीलऊसउत्पादकांसाठी

गाव :

मंडळ :

प्रतिवादी/ जबाबदेणारा :

मोबाईलनं. :

१. वय
अ. २०-३०वर्षेब. ३०-४०वर्षेक. ४०-५०वर्षेड. ५०वर्षांपेक्षाजास्त

२. लिंग
अ. पुरुषब. स्त्री

३. शैक्षणिकपात्रता
अ. पूर्वमाध्यमिकब. उच्चमाध्यमिकक. पदवीड. पदव्युतर

४. कुटुंबाचाआकार
अ. २-४सदस्यब. ४-६सदस्यक. ६पेक्षाजास्त

५. ऊसउत्पदनातसहभागीवर्षे
अ. ५पेक्षाकमीब. ५-१०वर्षेक. १०वर्षांपेक्षाजास्त

६. ऊसउत्पादनातीलप्रेरकघटक
अ. कारखान्याबरोबरकंत्राटब. प्रतिकुलमातीक. भरघोसनफाड. इतरघटक

७. इतरव्यवसाय
अ. शेतीब. व्यापार-उद्योगक. नोकरी

८. लागवडीखालीलएकूणक्षेत्र
अ. १हेक्टरपेक्षाकमीब. १-२हेक्टरक. २-४हेक्टरड. ४हेक्टरपेक्षाजास्त

९. ऊसलागवडीखालीलएकूणक्षेत्र
अ. १हेक्टरपेक्षाकमीब. १-२हेक्टरक. २-४हेक्टरड. ४हेक्टरपेक्षाजास्त

१०. जमिनीचीधारकता
अ. स्वत:चीजमिनब. भाडयानेघेतलेलीक. पट्टीकुळानेघेतलेली

११. जमिनीचाप्रकार
अ. जलसिंचितब. कोरडवाहूक. एकुण

१२. जलसिंचनाचास्त्रोत
अ. विहीरब. बोरवेलक. कालवाड. टाकीइ. इतर

१३. शेतीसाठीआर्थिकस्त्रोत
अ. स्वत:चानिधीब. सावकारक. बँक

१४. प्रतिहेक्टरऊसाचेउत्पन्न
अ. ३०टनपेक्षाकमीब. ३०-४५टनक. ४५-६०टनड. ६०टनपेक्षाजास्त

१५. उत्पन्नासाठीवापरण्यातआलेलासिंचनाचाप्रकार
अ. कलवाब. बोरवेलक. कुपनलिकाड. पावसाचेपाणी

१६. आपणअजूनमातीपरिक्षणआणिमातीआरोग्यकार्डाविषयीअनभिज्ञआहात
अ. होयब. नाही

१७. जरहो,आपणमातीपरिक्षणासाठीकितीपैसेदिले?

१८. शेवटचेमातीपरिक्षणकेव्हाकेलेहोते?

१९. अहवालातमातीच्यामायक्रोआणिमॅक्रोपोषकतत्वांचीस्थितीकायहोती?

२०. तुम्हालालगवडीसाठीकडुलिंबलेपितयुरीयामाहितआहेकाय?

२१. जरहो,तुम्हीलगवडीसाठीकडुलिंबलेपितयुरीयावापरताकाय?

२२. तुम्हालाकडुलिंबलेपितयुरीयाकितीरुपयेकिंमतीलामिळतो?

२३. तुम्हीकितीवर्षांपासुनकडुलिंबलेपितयुरीयावापरतआहात?

२४. एनसीयुचाडोस
अ. मुलभुतअनुप्रयोग (Basal application)
ब. वनस्पतिवतहोणारीबाह्यवाढ(Vegetative growth)
क. तणानंतर(After weeding)
ड. पुर्णवाढ(Maturity)
इ. एकुण(Total)

२५. ऊसउत्पादनावरसाधारणयुरीयाआणिलेपितयुरीयाचाकाहीफरकदिसला का?वाढ,घट / काहिचबदलनाही

अ. वजनब. वाढक.पाण्याचीगरजड. साखरेचेप्रमाणइ. इतर

२६युरीयावापराच्याबाबतीतएनसीयूचेफायदे

अ. मातीतीलमऊपणमधेसुधारणाब. पाणीझिरपण्यातसुधारणा
क. पोतसुधारणाड. कॉम्पॅक्शनकमी

२७. लेपितयुरीयातुम्हीकोणाकडूनखरेदीकरता?

अ. खाजगीखतकंपनीब. सहकारीक. इतर

२८. शेतापासुनअंतर

२९. लिपितयुरीयाचीमाहितीतुम्हालाकशीमिळाली?

अ. राज्यकृषीविद्यापीठे

ब. कृषीविगननकेंद्र

क. खाजगीकंपन्या

ड. मित्रमंडळी

इ. शेजारी

ई. कृषीविभाग

उ. इतर

३०. लेपितयुरीयावापरण्यामध्येकाहीसमस्याआल्याका?

अ. दुर्गंधब. नवीनकिटकआणिरोगाचाहल्लाक. माहितीचाअभाव

ड. जास्तकिंमतइ. NCU वापरण्याबाबतकमीजागरुकता

ई. NCU उपलब्धनसणेउ .NCUचीसंथप्रक्रियाऊ . NCUआणिNUमध्ये

फरककरण्यातसमस्याए. NUच्यातुलनेतNCUलाभाविषयीजागरुकता

नसणेऔ. इतर

३१. तुमच्यागावातलेपितयुरीयाच्यापुरवठयातकाहीसमस्याआहेतका. जर

हो,कृपयानमुदकर.

३२. प्रत्येकहंगामातकिंमतकितीआहे

अ. किटकआणिरोगनियंत्रणाचीकिंमतब. तणव्यवस्थापणाचीकिंमत

क. NCUचीकिंमतड.इतरखतांचाखर्च

इ. संपुर्णकिंमत

३३.

अ. दर्जाब. उपलब्धताक. रंगातीलफरकड. किंमतीतीलफरक

इ. किटकआणिरोगांचाप्रादुर्भाव

Vaikunth Mehta National Institute of
Cooperative Management
(A Grant-in-aid Institution of Department of Agriculture, Cooperation & Farmers Welfare, Ministry of Agriculture & Farmers Welfare, Government of India)
Ganeshkhind Road, Pune- 411007, Maharashtra, India
Website: www.vamnicom.gov.in
Email id: info@vamnicom.gov.in, crp@vamnicom.gov.in