

# Agro-Economic Policy Briefs

*Aiding the Future of India's Farmers and Agriculture*



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## On Critical Policy Issues in India's Agricultural Economy

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For kind attention of:

The Hon'ble Prime Minister's Office,  
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# Potential of Ginger and Related Products in India

Sangeeta Shroff

## Introduction

- Ginger rhizomes are cultivated in several countries of the world and India stands as the largest producer. The area under ginger in India is about 1.72 lakh hectares and has increased gradually over the decades, as it was grown on barely 53,900 hectares in 1990-91. In 2019-20, the share of Madhya Pradesh (MP) in area was 14.77 percent, followed by Karnataka, and Assam which was 12.59 and 11.25 percent respectively. The area under ginger in MP has been increasing only since 2012-13.
- Kerala was one of the traditional ginger producing states in the country with a share of 26.5 percent in 1990-91. The share has, however, been declining over the years and presently contributes to only 2.48 percent of total area in the country. This decline is explained by a high cost of cultivation which has made ginger farming and processing unprofitable. Consequently, the area under ginger increased in Karnataka as farmers from Kerala began to shift there as land was available on lease and labor was relatively cheap.
- Ginger is also gaining popularity in the eastern belt of the country which constitutes almost half the area under ginger. The yield of ginger has not shown much improvement over the years and the north-eastern states experience even lower yields as they practice organic farming.
- The produce of ginger is sold in both dry and fresh forms, but discussion with traders revealed that the sale is mostly in fresh form, as ginger is mostly used as a vegetable. The dry form is mainly used for value addition in other products. The main purpose of this study was to observe the usage of ginger in different forms such as culinary, powder, volatile oils, oleoresins, and other value added products. The export potential of ginger has been observed and suggestions to revitalize its economy are highlighted.

## Findings

- The ginger produced in India has wide varieties, each having its own characteristic and purpose. Discussion with several farmers, traders and units using ginger as a raw material unanimously revealed that a large part of ginger produced in the country is consumed in fresh form by households and hospitality sector.
- In Maharashtra, about 90 percent of the ginger is consumed in fresh form for culinary purposes which includes about 40 percent usage in paste form. In Karnataka, however, discussion with traders revealed that half the produce is utilized for processing it into dry form. Kerala, till 1990s, carried on the same trend. The major ginger growing districts were Wayanad, Idukki, and Palakkad where ginger was processed into dry form. However, due to a sharp fall in the area and volume of trade under ginger, the traders began to sell the produce in fresh form as the price realized for dry ginger was not remunerative. There is one unit operating in Ernakulam where it is processed into dry form and parts of Karnataka and Pallakad region transport their fresh produce to this unit.
- In Assam, the produce cannot be easily converted into dry form due to high moisture content in the air. Since Sikkim is declared as a cent percent organic state, the ginger produced there contains high oleoresin of about six to ten percent, and gives high oil recovery of two to three percent. Stakeholders revealed that out of its total production in Sikkim, about 65.50 percent is sold fresh while 13.86 percent is sold in dry form.
- Considering the infrastructure available for processing and the market prices of fresh and dry ginger in domestic and global markets, farmers retain about 20 percent produce as seed and 20 percent is processed into dry ginger. Out of the remaining 60 percent, about ten percent is converted into ginger paste, and

the remaining 50 percent is consumed in its fresh form. Ginger flakes and ginger powder are made from dry ginger which is a by-product of dry ginger. Further, dry ginger is also purchased by manufacturers of oil and oleoresin units who depend upon imports for their raw material.

- India is also the largest consumer of ginger as most of the produce is consumed in the domestic economy itself and barely five percent is exported. It is exported in the form of fresh and dry ginger, value added products such as ginger powder, ginger oil and oleoresin, and other non-crushed/crushed forms. The total exports were 25731.31 tons in 2015-16 valued at Rs.359.83 crores. This showed an increase of about 31 percent in the following year but there was a drastic fall of exports in 2018-19 by 32 percent from 2016-17. However, exports increased again by 123 percent in 2019-20 from the previous year.
- India exports fresh ginger mainly to Bangladesh and it was observed that during 2007 to 2018, about half the exports of fresh ginger were to Bangladesh. This is possibly due to its close proximity to the north-eastern states of India which are important ginger growing regions. Exports to Nepal and Pakistan also take place due to the same reason and small quantities are exported to further destinations such as United Arab Emirates (UAE), Saudi Arabia, Spain, Morocco, Egypt, and Yemen. Dry ginger is mainly exported to Spain, Morocco, Saudi Arabia, United States of America (USA) and UAE. Ginger powder is mostly exported to USA and United Kingdom (UK) along with many western countries. However, the average price at which ginger powder is exported declined from Rs.237.33/kg in 2015-16 to Rs.192.66/kg in 2017-18.
- Ginger oil is mostly exported to UK, USA, and South Africa. It is also exported to several other countries like Netherlands, France, and Germany. The average price at which ginger oil is exported has shown huge fluctuations over the years. The price which was as high as Rs.9,220.69/kg in 2015-16, declined to Rs.6,957.26/kg in 2017-18 showing a sharp fall of about 25 percent. It is a low-volume but high-value product, and a fall in its price is a revenue loss for the country.
- The main countries to which ginger oleoresin is exported are USA, UK, and South Africa. Other countries with a lower share of exports are Australia, Germany, and South Korea. There was a sharp fall in average export price of oleoresin from Rs.2,346.16/kg in 2014-15 to Rs.1,446.89/kg in 2015-16 showing a 38 percent decrease.
- China is the leading exporter of ginger with a share of 69.14 percent of the world exports with respect to volume of trade. While Thailand ranks second, its share is far lower (9.57%). Although India ranks third (along with Peru), the share of exports is very small (3.72%) perhaps because of high domestic demand. The world area under ginger increased from 2.64 lakh hectares in 2010 to 3.73 lakh hectares in 2018, i.e., by 41 percent. Most countries have increased their area and production with a view to export as their domestic requirements are limited.
- China again leads the export of crushed or ground ginger with a share of 37 percent in the world exports as of 2019 in value terms. India ranks second but its share is much lower (14.63%) in the corresponding period, and it mainly exports varieties cultivated in Kerala where labor costs are very high. Chinese and Nigerian ginger are available in the international markets at lower rates.
- Cochin ginger had a considerable demand in the international market due to its unique characteristics such as low-fiber content, pleasant flavor, and acceptable pungency. Idukki district in Kerala, which was traditionally a ginger producing district, has a variety called Ellakalan which has high oil content. The oil and oleoresin units, which earlier purchased this variety, gradually began to import varieties from Nigeria which were available at cheaper prices. Even ginger powder is imported at prices much lower than the domestic prices. Hence, cheap

imports gradually led to the disappearance of high-quality varieties in India.

## Conclusion and Recommendations

- Focus needs to be laid on increasing productivity of ginger in India for it to compete in global markets. The export potential of the crop must be realized. In order to increase productivity, the farmers must use disease-free planting materials and practice better input management. The country must ensure that suitable varieties with high yields are made available in the domestic markets at competitive prices. This will also enable the processors of value added products such as ginger flakes, oils, oleoresins, etc., to source quality raw material at cheap prices and capitalize on exports. The prices of ginger often fluctuate in the domestic market due to the cob-web phenomenon.
- The world trade in ginger imports was \$976.42 in 2019-20 and the share of USA was highest (13.13%) followed by Japan (10.32%). Many countries like Pakistan, UAE, Bangladesh import ginger to use it as an ingredient in food, while western countries import it due to its medicinal

properties. Overall, there is a potential to increase imports of ginger as all countries are not in a position to cultivate it, especially the European countries. The demand is likely to increase in view of its usage for medicinal properties. Hence, efforts must be made for the country to become competitive and capitalize its potential of the produce in domestic as well as international markets.

## Acknowledgement

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## Problems Perceived by Farmers in Adoption of Micro-Irrigation Systems in Madhya Pradesh

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### Introduction

- Micro-Irrigation (MI) refers to the slow application of water on, above, or below the soil by a surface drip, sub-surface drip, bubbler, and micro-sprinkler system. Water is supplied using discrete or continuous drips, tiny streams, or miniature sprays through the emitters or applicators placed along a delivery line adjacent to the plant row (Rao and Anitha, 2016<sup>1</sup>). MI has proved to be an efficient method for water saving. Projected additional returns from

the saved water must also be considered as compared to the conventional surface method of irrigation. It is necessary to further evaluate and confirm the best system for local producers that will result in high profits so that repayment of irrigation investment loans can become easy (Suryavanshi and Buttar, 2016<sup>2</sup>).

- Successful adoption of MI requires, in addition to technical and economic efficiency, two preconditions vis-a-vis technical knowledge and accessibility through institutional support

<sup>1</sup> Rao, VP, Anitha, V. (2016), Micro-Irrigation Technologies for Water conservation and Sustainable Crop Production. International Journal of Economic Plants. 2016, 3(1): 027-033.

<sup>2</sup> Suryavanshi, P. and Buttar, G.S. (2016), Economic Feasibility of Micro-Irrigation Methods for Wheat Under Irrigated Ecosystem of Central Punjab. Indian Journal of Economics and Development. Volume 12 No. 1a: 485-488.

systems (Palanisami et. al., 2014<sup>3</sup>). MI technologies are believed to be one of such innovative intervention approaches. Originally, MI was associated with the capital-intensive, commercial farms of wealthier farmers. The systems used on large farms, however, are unaffordable for smallholders and are not available in sizes suitable for smaller plots. Recently, these technologies were technically transformed from large, sophisticated, and capital-intensive mode to an input mode (Namara et. al., 2007<sup>4</sup>).

- In Madhya Pradesh (MP), micro-irrigated area was found to be 0.21 meter hectare (m ha) with 0.15 under drip and 0.06 m ha under sprinkler irrigation during the year 2015-20. MP occupied 4.35 percent area under MI, out of which the area under drip and sprinkler was 5.90 and 2.53 percent respectively in the country.
- To identify the problems in adoption of MI technologies by farmers, a multi-stage stratified random sampling method was used for selection of districts, blocks, villages, and respondents. In the first stage, districts were selected based on higher irrigated area under different system of MI, and among all the districts of MP, Dhar district was selected for drip irrigation system and Sagar district was selected for sprinkler irrigation system. In the second stage, from each of the selected districts, two blocks having maximum area under MI were selected. In the third stage, three villages in each block were selected randomly from the list of micro-irrigated villages. In the fourth stage, a list of all the adopters in the selected villages was prepared and eight adopters from each village were selected constituting 96 adopters from

both the districts (48 adopters/district). Five point Likert scale (1932) was used to measure the severity of the problem perceived by the farmers in adoption of MI.

### Findings

- Majority of adopters were found to be strongly agreeing with the problems such as lack of fencing (58.33%), land fragmentation (46.88%), damage of crop and MI equipment (45.83%), difficulties in getting proper government support (30.21%), poor marketing arrangement (19.79%), and water table going down (14.58%). Majority of adopters also agreed to high cost of wells and tube-wells (57.29%), poor quality of MI equipment (46.88%), difficulty in obtaining government subsidy and support (46.88%), poor after-sale services of MI equipment (45.86%), high cost of maintaining MI (43.75%), lack of credit facilities (35%), poor market arrangement (36.46%), and land fragmentation (33.33%).
- The major problems faced by the adopters in relation to MI were lack of fencing (4.36), MI structure damaging by animals (4.13), land fragmentation (4.13), difficulties in obtaining government subsidy and support (3.75), poor marketing arrangement (3.70), poor quality of MI equipment (3.64), high cost of well/ tube well (3.61), lack of government support (3.56), high need/cost of maintenance of MI (3.55), lack of credit facilities (3.46), and poor after-sale services (3.45). The mean score of the above mentioned problems were found to be near four or more, indicating major problems in the study area (Table 1).

<sup>3</sup> Palanisami, K., Mohan Kadiri, Kakumanu, K. R., and Raman, S. (2014), Spread and Economics of Micro-irrigation in India: Evidence from Nine States, Economic & Political Weekly Supplement. Vol. xlvi no.(s) 26 & 27.

<sup>4</sup> Namara, R. E., Nagar, R. K., and Upadhyay, B. (2007), Economics, adoption determinants, and impacts of micro-irrigation technologies: empirical results from India. Water Productivity: Science and Practice, Irrig Sci (2007) 25:283–297.

**Table 1: Major Problems Perceived by Farmers in Adoption of Micro-Irrigation (%)**

Sr. No.	Problems	Strongly Agree	Agree	Partially Agree/ Disagree	Disagree	Strongly Disagree	Mean Score
		5	4	3	2	1	
1	Poor quality of MI	12.50	46.88	32.29	8.33	0.00	3.64
2	High need/cost of maintenance in MI	10.42	43.75	36.46	9.38	0.00	3.55
3	Inadequate water	1.04	11.46	33.33	43.75	10.42	2.49
4	Poor water quality	0.00	8.33	25.00	36.46	30.21	2.11
5	Difficulty in obtaining government subsidy & support	20.83	46.88	20.83	9.38	2.08	3.75
6	Unreliable electricity supply	3.13	11.46	23.96	36.46	25.00	2.31
7	Lack of credit	7.29	40.63	42.71	9.38	0.00	3.46
8	Lack of own wells/tube-wells	1.04	13.54	39.58	29.17	16.67	2.53
9	High cost of wells/tube-wells	9.38	57.29	18.75	14.58	0.00	3.61
10	Water table going down	14.58	20.83	50.00	13.54	1.04	3.34
11	Lack of knowledge/training for MI	2.08	13.54	42.71	41.67	0.00	2.76
12	Lack of government support	6.25	12.50	34.38	34.38	12.50	2.66
13	Difficulty in getting government support	30.21	34.38	27.08	8.33	0.00	3.86
14	Lack of MI dealers in area	1.04	17.71	57.29	17.71	6.25	2.90
15	Poor after sales service	6.25	45.83	39.58	6.25	2.08	3.48
16	Low output price/profitability	1.04	13.54	43.75	39.58	2.08	2.72
17	Poor marketing arrangements	19.79	36.46	37.50	6.25	0.00	3.70
18	Land fragmentation	46.88	33.33	16.67	3.13	0.00	4.24
19	Damage by animals	45.83	23.96	27.08	3.13	0.00	4.13
20	Lack of fencing	58.33	26.04	9.38	6.25	0.00	4.36

Source: Field Survey.

- MP is one of the leading states in successfully introducing MI facilities under Pradhan Mantri Krishi Sinchayee Yojana-Per Drop More Crop in almost all the districts. Its aim is to ensure food security for the growing population in the face of climatic change, limited water and land resources, and to provide irrigation to every farm through improved water use efficiency. Government of MP made excellent efforts in providing MI facilities to the beneficiaries through subsidies, equipment, technical knowledge, etc., under the programme. Since farmers of a few districts benefitted more than the others, efforts must be made in such a way that all the districts benefit.

### Conclusion and Recommendations

- Efforts should be made to promote MI in all the districts of the state with proper awareness of programme. Steps need to be taken to lower the price of MI equipment in order to reduce the subsidy in a gradual manner for horizontal expansion of the technology on a large scale.
- Provision/support must be given for farm-fencing, subsidy/government assistance for latest and improved MI technology/equipment, and better training to the farmers for them to expand the use of MI in future.

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# Development Prospects of Nam Deuri Village in Assam

Anup Kr. Das and Ranjit Borah

## Introduction

- Deuris, named after their village Nam Deuri, are one of numerous ethnic groups in Assam. Although the Deuri community is distributed in all the districts of upper Assam, Plain Deuri tribe exclusively occupies this village, and constitutes one of the major tribal communities of Assam. The community has been maintaining its racial traits, language, religion, priestly activities, folk tales, and traditional beliefs for centuries which separates them from other plain tribes. A periodic survey was undertaken in the village to aid planners and policy makers chart out a development agenda for the region.
- The study was conducted after a gap of 32 years (1987-2019) using both primary and secondary level data. Complete enumeration of the village was done instead of a sample survey wherein 262 households were interviewed using a questionnaire. The objective of the study was to create a longitudinal panel dataset to capture the socio-economic dynamics of the village. Focus was laid on change in agriculture and rural livelihood over the years, the efficiency of government interventions, and implications for future development.

## Findings

- The study observed that the educational level and health facilities improved considerably during the intervening period. Except for a few Assamese semi pucca/pucca houses, all houses were constructed on raised platforms popularly known as Chang Ghar (Figure 1). Other noticeable changes like drinking water facility, village roads, power connectivity, Integrated Child Development Services (ICDS), Customer Service Point under State Bank of India, and Self-Help Groups were observed. Increase in agricultural production along with a price rise, and earnings from non-agricultural vocations like business, salaried job etc., helped in raising household income.

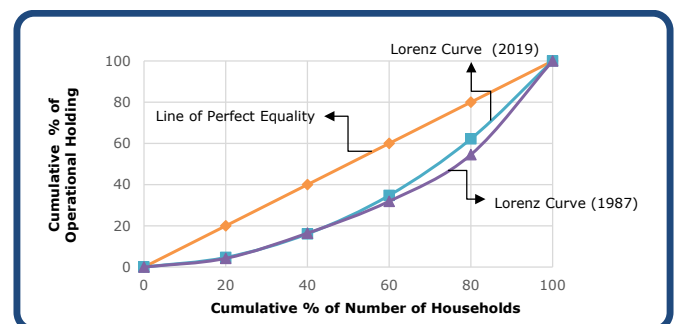
Figure 1: Houses Constructed on Raised Platforms



Source: Taken during survey.

- There was a natural increase in population during the intervening period from 1231 people (124 households) to 1501 with a Compound Annual Growth Rate (CAGR) of 0.60 percent only. The sex ratio of the village was 982 in 1987 and the figure marginally increased to 991 in 2019. The average size of family declined from 9.93 to 5.73. Engagement in main/marginal work increased from 54.35 to 74.28 percent. The CAGR of working population was 1.51 percent.
- The CAGR of operational holdings was 7.38 percent for marginal farmers and 3.04 percent for small farmers, while the CAGR for medium and other farmers was -6.75 percent between the two surveys. The value of Gini Co-efficient (Figure 2) for operational holdings changed from 0.38 to 0.35 indicating moderate inequality for both the years.

Figure 2: Lorenz Curve and Gini Co-efficient



Source: Computed.

- Due to population pressure, the per-capita land availability reduced from 0.29 to 0.16 hectares, however, the cropping intensity increased from 124.69 to 156.57 percent. Paddy was the dominant crop cultivated earlier but the overall area under the crop declined subsequently, however, the area under vegetable crops increased.
- The cropping pattern of the village remained traditional with a little change. Area under kharif paddy and vegetables was mostly rain-fed than irrigated. During rabi season, major crops grown by the farmers were vegetables, peas, potato, and mustard. Analysis of the extent of crop diversification reveals that the value of Herfindahl Index was 0.6953 in 1987 as against 0.3894 in 2019, indicating higher crop diversification. The yield of paddy and mustard crop increased by 79.92 and 73.19 percent respectively. Out of the total paddy production, 32.85 percent was sold to the middleman/commission agent at Rs.1,350/quintal. However, 91.92 percent of vegetables were sold either to retailers or middlemen at an average price of Rs.1,543/quintal.
- There were changes in livestock composition as well. Although, the work cattle, milch cattle, and buffalo population declined, whereas the number of goat, pig, duck, fowl increased by 103.30, 166.80, 80.63, and 59.47 percent respectively.
- Farm size wise, average value of assets was Rs.54,523 for marginal farmers, Rs.93,073 for small farmers, Rs.2,34,734 for medium and other farmers, and average value of assets was Rs.77,295. The highest annual average income was found among the medium and other farmers (Rs.4,24,856), followed by small farmers (Rs.2,28,602) and marginal farmers (Rs.1,34,876), with an average annual income of Rs.1,83,483 during 2019.
- The overall CAGR of income from all sources at current prices stood at 8.25 percent. The average annual income in 1987 was recorded at Rs.14,517 at current prices and

values. Considering the price relative to the corresponding year, the income was Rs.46,815 registering a 3.92-fold increase during last 32 years, revealing a poor economic development in terms of annual income of the farm household. The CAGR of per capita income, expenditure and savings stood at 9.90, 9.60, and 11.03 percent respectively. The per capita income, expenditure, and savings increased by 6.36, 5.82 and 8.82 times each respectively.

- During last five years, around four lakhs was borrowed from commercial banks, 5.75 lakhs from private banks, and 14.81 lakhs from Self-Help Groups. The highest loan (~13 lakhs) was borrowed by marginal farmers, followed by small farmers (~10 lakhs), and minimal (~one lakh) by medium and other farmers.

### Conclusions and Recommendations

- A large part of the village remains water-logged during the summer, causing health hazards. Certain areas of the village are prone to high soil erosion due to the sandy-alluvial soil in the region. Focus should be laid on helping villagers obtain Soil Health Cards.
- The already installed Shallow Tube Wells (STW) remain unused because of high price of diesel and no electrical connection. The department of agriculture and irrigation must come forward to aid in this regard. Electricity connection may be extended to the STW points so that the farmers can avail the benefits of irrigation at affordable rates.
- There is a lack of use of fertilizers and pesticides in the village, affecting productivity. Need-based training and demonstration on balanced use of fertilizers, improved practices, pest and disease control measures, balanced feeding of fish and livestock, and establishment of fish hatchery must be arranged.
- Only traditional breeds of livestock and birds are raised by the villagers, which yield low returns. There is a scanty knowledge of improved feeding/fodder crops. There are potentialities for development in crop, livestock, and fishery



sector in an integrated manner. The government should devise useful strategies to expose the farmers to modern and scientific methods of livestock production and management with an element of commerce. Strengthening of extension services to encourage the livestock rearers about balanced feeding, disease diagnosis and treatment, and adoption of improved breeds must be promoted.

- Most of the crops are also cultivated in traditional manner without much use of High Yielding Varieties. Vegetables are produced in some selected pockets of the village with no market outlet, storage, and processing facilities. Small land holder farmers need to be encouraged for crop diversification with the inclusion of low-volume, low-cost, quick return, and high income generating enterprises.
- Weaving happens to be an important cottage industry of the village which has been hit hard in the recent years because of scarcity of raw materials and lack of organized market support. Tribal women folk of the village may be encouraged for livestock rearing (mainly

piggery) and weaving in the village.

- Considering the inherent potentiality of the village, fruit trees and medicinal plants may be promoted along with focused priority on sericulture. Accordingly, awareness programmes on market intelligence, growers' cooperative societies, storage, and transportation must be arranged. Resource recycling through vermi-compositing, biogas preparation, liquid manure production, etc., may be encouraged.
- Skill Development Programmes may be organized in the field of nursery, wood carving, cloth spinning, cane and bamboo related work, hospitality management, and eco-tourism to improve their standing and lifestyle. Considering the demand for meat and eggs, the young educated should be encouraged to start up new ventures like poultry and piggery farming.

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## Sugarcane Transportation and Harvesting Cost in Uttar Pradesh

Javed Akhtar and Hasib Ahmad

### Introduction

- Sugarcane crop offers multi-faceted values in terms of (i) being the main cash crop for Indian farmers, (ii) intrinsic value of its final processed product sugar, used for both domestic consumption and export, (iii) its importance in terms of gur making, khandsari units, sugar mills associated distillery units, electric production, and by-products like molasses, bagasse, bio-fertilizers.
- In addition to timely payment by sugar mills and transportation and harvesting problems of sugarcane, the price fixation of the crop has always been the most delicate issue right from the inception of planning era in 1951. As indicated by several empirical findings, prices of agricultural commodities rises very high during

lean agriculture productions in turn seriously affecting the ultimate buyers. In the similar manner, prices slump down during bumper production leading to frustration among farmers because they don't get a good price for their produce.

- Transportation and harvesting costs are important components of overall cost structure of any crop including sugarcane. There is a need to develop a reliable data source that covers the cost components for sugarcane crop in the country. Inputs provided by state governments which are not based on any scientific survey are the only source for now. This study is an attempt to analyze the problems encountered by the sugarcane growers, sugar mills in UP with respect to cost incurred in various stages.

## Findings

- As per the time-series (1990-91 to 2016-17) data of UP for the sugarcane crop, one can observe that there has not been much variations

in the three basic crop parameters, i.e., area, production, and yield of the sugarcane during the entire period. The statistics from 1990-91 to 2015-16 are given below in Table 1.

**Table 1: Area, Production and Yield of Sugarcane in Uttar Pradesh (1990-91 to 2015-16)**

Sr. No.	Year	Area ('000' ha)	Indices T.E.* 1992-93 as base	Production ('000' tons)	Indices T.E. 1992-93 as base	Yield (tons/ha)	Indices T.E. 1992-93 as base
1	1990-91	1856	98.62	103562	97.83	55.8	99.29
2	1991-92	1933	102.71	111098	104.95	57.5	102.31
3	1992-93	1857	98.67	102929	97.23	55.4	98.58
4	1993-94	1761	93.57	104082	98.32	59.1	105.16
5	1994-95	1839	97.72	110239	104.13	59.9	106.58
6	1995-96	1974	104.89	119830	113.19	60.7	108.01
7	1996-97	2110	112.11	125349	118.41	59.4	105.69
8	1997-98	1985	105.47	129267	122.11	65.1	115.84
9	1998-99	1975	104.94	116483	110.03	59	104.98
10	1999-2000	2011	106.85	115419	109.03	57.4	102.14
11	2000-01	1938	102.98	106068	100.19	54.7	97.33
12	2001-02	2035	108.13	117982	111.45	58	103.20
13	2002-03	1852	98.41	116324	109.88	62.8	111.74
14	2003-04	2030	107.86	112754	106.51	55.5	98.75
15	2004-05	1955	103.88	118715	112.14	60.7	108.01
16	2005-06	2156	114.56	125470	118.52	58.2	103.56
17	2006-07	2247	119.39	133949	126.53	59.6	106.05
18	2007-08	2179	115.78	124665	117.76	57.2	101.78
19	2008-09	2084	110.73	109048	103.01	52.3	93.06
20	2009-10	1977	105.05	117140	110.65	59.3	105.52
21	2010-11	2125	112.91	120545	113.87	56.7	100.89
22	2011-12	2162	114.88	128819	121.68	59.6	106.05
23	2012-13	2212	117.53	132427	125.09	59.9	106.58
24	2013-14	2228	118.38	134689	127.23	60.6	107.83
25	2014-15	2161	114.82	133061	125.69	62.1	110.50
26	2015-16	2169	115.25	145385	137.33	67.0	119.22
27	2016-17	2034	109.14	148657	140.42	72.4	128.77

**Note:** \*Triennium Ending (T.E.)

Triennium Average Value Ending 1992-93 as base:

\*Area: 1882; \*Production:105863; \*Yield:56.2  
'000'ha '000' tons tons

**Source:** Co-operative Sugar, Vol 44 (II) July, 2017 and Office of Sugarcane Commissioner, Uttar Pradesh.

- In UP, harvesting operation cost of sugarcane are totally borne by the cane growers themselves and the sugar mills do not contribute to it at all. As per records for the year 2019-20, out of 119 sugar mills in the state, majority of

them (77.31%) belonged to the private sector, followed by the co-operatives (20.17%), and the corporation, i.e., *Nigam* (2.52%). This shows that sugar mills are mostly private owned and the least owned by the corporation.

- During the period 2014-15 to 2018-19 the state of UP has observed a few changes like (a) continuous rise in the quantum of sugarcane crushed, sugar production, and sugar recovery rate, (b) as compared to 744.54 lakh ton of sugarcane crushed, 71.01 lakh ton sugar production, and 9.54 percent sugar recovery rate in 2014-15, the corresponding figures in 2018-19 were 1031.67 lakh ton, 118.22 lakh tons, and 11.46 percent respectively.
- The main features of the three sugar mills under the study revealed that (a) installed capacity of the sugar mills varied from 3000 to 10500 Ton Capacity Day (TCD), (b) capacity utilization ranged from 85.72 to 100 percent, (c) total cane crushed by factory during the sugar season 2018-19 has been in the range of 475393.86 to 1770891.40 tons, (d) total sugar production in a factory has been 59510 to 217690 tons, (e) sugar recovery rate ranged from 12.29 to 12.52 percent which has been higher than the state average (11.46%), and (f) the average cost of sugarcane transportation incurred by the sugar mill for transporting sugarcane from the mill purchase center to the mill gate ranged from Rs.16.54/quintal to Rs.20.48/quintal.
- On the overall sample basis, the sale percentage of sugarcane from its total produce has been 87.95 percent while category-wise the sale percentage has been highest (89.59%) for marginal category farmers, and the lowest (85.42%) in case of medium category farmers. Of the total quantity of sugarcane sold, maximum has been sold to sugar mills (55.82%) followed by gur manufacturers (27.48%), sugar mill purchase centers (15.20%), and khandasari units (1.50%).
- Among various modes of transportation like manual carts, trucks, tractor trollies, the only mode of transportation used by all the 200 sample respondents were tractor trolleys to transport sugarcane from their fields to ultimate destinations. Destination-wise, average distance covered by a cane grower was (i) 12.96 kilometers to reach the sugar mill gates, (ii) 2.08 kilometers to sugar mill purchase centers, (iii) 4.06 kilometers to gur manufacturers, and (iv) 4.87 kilometers to khandasari units. Manual transportation mode was not used by any of the sample respondents while in case of mechanized transportation tractor trolleys were exclusively used.
- While the machine mode of loading/unloading was not used by any of the sample respondents, the wage rate (male laborers) for manual loading was Rs.278/day and Rs.244/day for unloading.
- In case of sugarcane harvesting (i) machine mode of harvesting was not practiced in the study area, (ii) under manual mode of harvesting, the prevailing contract rate of harvesting and cleaning (Rs.25) in the region of was Rs.30/quintal including loading charges (Rs.5).

### Conclusion and Recommendations

- Sugar mills must lend out their support to cane growers for the harvesting operations on a voluntary basis. This will help them cover their losses as well. Since most of the sugar mills are privately owned, they can contribute to aiding the cane growers at a huge scale. They also purchase the highest quantity of sugarcane and must aid farmers facing any financial problems.
- Measures must be taken to help sugarcane growers gain from the increased production and sugar recovery rates in the state via properly developed storage and marketing channels. Appropriate support measures must be taken for the mills under the study as their sugar recovery rate was higher than the state average. This looks like a profitable avenue.
- Cost reduction measures for transportation can be undertaken so that the burden of losses incurred on the way does not fall on the sugarcane growers alone. Provisions could be made for machine based harvesting and loading/unloading of sugarcane.

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