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Investigation of Cropping Pattern of Jalangi Block, West Bengal

Kajal Kumar Mandal[1], Avinash Ranjan[2], Pammy Kumari[3], K. Dharanirajan[1]
[1]*Department of Disaster Management, Pondicherry University, Pondicherry*
[2]*Department of Humanities and Social Sciences, Indian Institute of Technology (ISM) Dhanbad*
[3]*Department of Environmental Science, Ranchi University, Ranchi*

Abstract: Cropping pattern of a region or an area is influenced by various factors which includes soil type, land holding size, climate, and capability, population composition, irrigation facilities, fuel price, farm equipment and market. In this paper we have identifies and analyzed such factors which have influences the cropping pattern of Jalangi Block. We have used both primary and secondary type of data for the analyses. Primary data include the interview with the farmers and block level officials in agriculture department. Whereas, secondary data include, diesel prices, minimum support price of crops, groundwater depth at various sites, etc. we have used tools such as Microsoft excel and ArcGIS for the representation of the collected data. In this study we have found that the stagnancy in the minimum support price for the traditional crops, input output cost ratio, low landholding size and fuel price are playing major role in deciding the cropping pattern in the study area. we have arrived at conclusion that the farmers are now shifting or have shifted towards the horticulture rather growing tradition Paddy, Jute and Wheat.

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I. INTRODUCTION

Cropping pattern refers to the relative arrangement of crops on a farm, region, province, or county. Factors such as soil, climate, crop production, land capability, irrigation facilities, and farm equipment have a great influence on the cropping pattern. Further, factors such as marketing and transportation facilities and growth of agro-based industries also play a significant role in cropping patterns of a region (Dale, 1997; Gadge, 2003; Neena, 1998), which varies spatially and temporally (Bilsborrow, 1987). These determinants are of two types viz. physical and non-physical determinants. Physical determinants such as soil, water, climate, terrain, altitude, wind direction, slope, etc. influence the cropping pattern silently. In contrast, non-physical determinants are chemical fertilizers, availability of farm laborers, the unemployment rate of the region, prices of oil, electricity, etc. Andrews & Kassam (1976) argues that the cropping pattern is the yearly sequence, temporal, and practical arrangement of crops in a given land area. It is dependent on the physical, historical, and economic factors as well as on the government's policies. There are some studies which suggest that the change in cropping pattern is governed by the profitability and market demand (Isaacs, Snapp, Chung, & Waldman, 2016) Example can be drawn from the Indian state of Kerala, which has shifted from a predominately a food grain cultivator to a commercial crops cultivator which gives better profit than the food crops (Kannan, 1999).

After 1950, change in cropping pattern can be observed in most of the country due to industrialization, availability of fertilizers, and high growth of population (Wilber, 1969). In India, we have seen a drastic change in cropping pattern after the advent of the green revolution. It has impacted all over India, but the northwestern part was most affected. At that time, India was struggling for self-sufficiency in food grain production, and the green revolution changed the whole scenario. The semi-arid regions of Punjab and Haryana receive an average of 50-75 cm of rainfall annually. These states have increased their area under paddy cultivation with the help of irrigation through groundwater. The area under paddy in these states increased from about 2.4 lac hectares in 1961 to about 28 lac hectares in 2015 (NITI Aayog, 2015), and consequently, the water table went down. Both these states require 50% more water than the traditional paddy growing regions of India such as West Bengal, Chhattisgarh, Odisha, Bihar, Uttar Pradesh, etc. Change in cropping pattern has led to the large amount of groundwater extraction in the northwestern part of India making Indus aquifer system as the second most overexploited aquifer after Arabian aquifer system and followed by Murzuk-Djado aquifer system in Northern Africa (Richey, Thomas, Lo, Famiglietti, et al., 2015; Richey, Thomas, Lo, Reager, et al., 2015). Similarly, the Marathwada region having only 4% of the cultivable land of Maharashtra, the area is using about 70% of the total irrigation water of the state. Cultivation of sugarcane (a high-water demanding crop) in the Marathwada region lies in the rain shadow area of Western Ghats, has exploited the water resources at its highest level. Areas under sugarcane cultivation have increased tremendously; it has reached 10 lac hectares in 2011, which was only 16 thousand hectares in 1970. Data from the National Remote Sensing Centre shows that there are certain

districts in the Marathwada region where the cultivation of sugarcane has rose more than 1000% between 2005-06 and 2011-12 (NRSC, 2018).

West Bengal is predominantly a paddy and jute growing state, but after attaining the self- sufficiency in food grains, cropping in the state have now shifted towards commercialization or became more market-oriented. In the last three decades, it has been observed that the cropping pattern in West Bengal is dominated by boro paddy, oilseeds (including rapeseed and mustard), and potato (Majumder, 2014). These crops are high yielding, and cash crops and hence are remunerative over others. The advantage of growing oilseeds is that they require less irrigation, making it ideal for cultivation even in the areas of predominantly less rainfall. Pulses, as a whole, have lost both in terms of acreage and production in West Bengal. Jute is grown as an intercrop before paddy transplantation. Jute is being cultivated in Bengal for nearly 200 years and reached its peak in 1907 when almost four million acres of land was under jute cultivation (Banerjee, 1955). After the division of India in 1947, most of the jute growing areas went to former East Pakistan and present-day Bangladesh. The Gangetic plain region of the state is the most important area of jute cultivation. Nearly 80% of the production comes from the district of Nadia, Maldah, Murshidabad, Midnapore, N- 24 Parganas, S- 24 Parganas, Hooghly, Koch Behar and Jalpaiguri.

Objective

The main objective of this study is to find out the change in the cropping pattern and its causes in the Jalangi block of Murshidabad district in West Bengal.

II. METHODOLOGY

To situate the change of cropping pattern of the Jalangi block, we have used the panchayat level data for groundwater depth, irrigation, average income, diesel price, fuel consumption, cropping area, cropping class, and landholding size. After analyzing the data, we have put forward our arguments for the causes.

Study Area

The Jalangi block is located between $24^0$4’55’’ N and $24^0$17’30’’N latitude and between $88^0$35’30’’E and $88^0$44’5’’ E longitude in Murshidabad district of West Bengal, India. This block lies in the lower Gangetic Plains having domination of highly fertile alluvial soil brought down and deposited by river Ganga annually. The block consists of ten panchayats, which are Shahebnagar, Kantabari, Debipur, Sagarpara, Kharamari, Ghoshpara, Faridpur, Sadikhandear, Jalang, and Choapara (Fig.1).

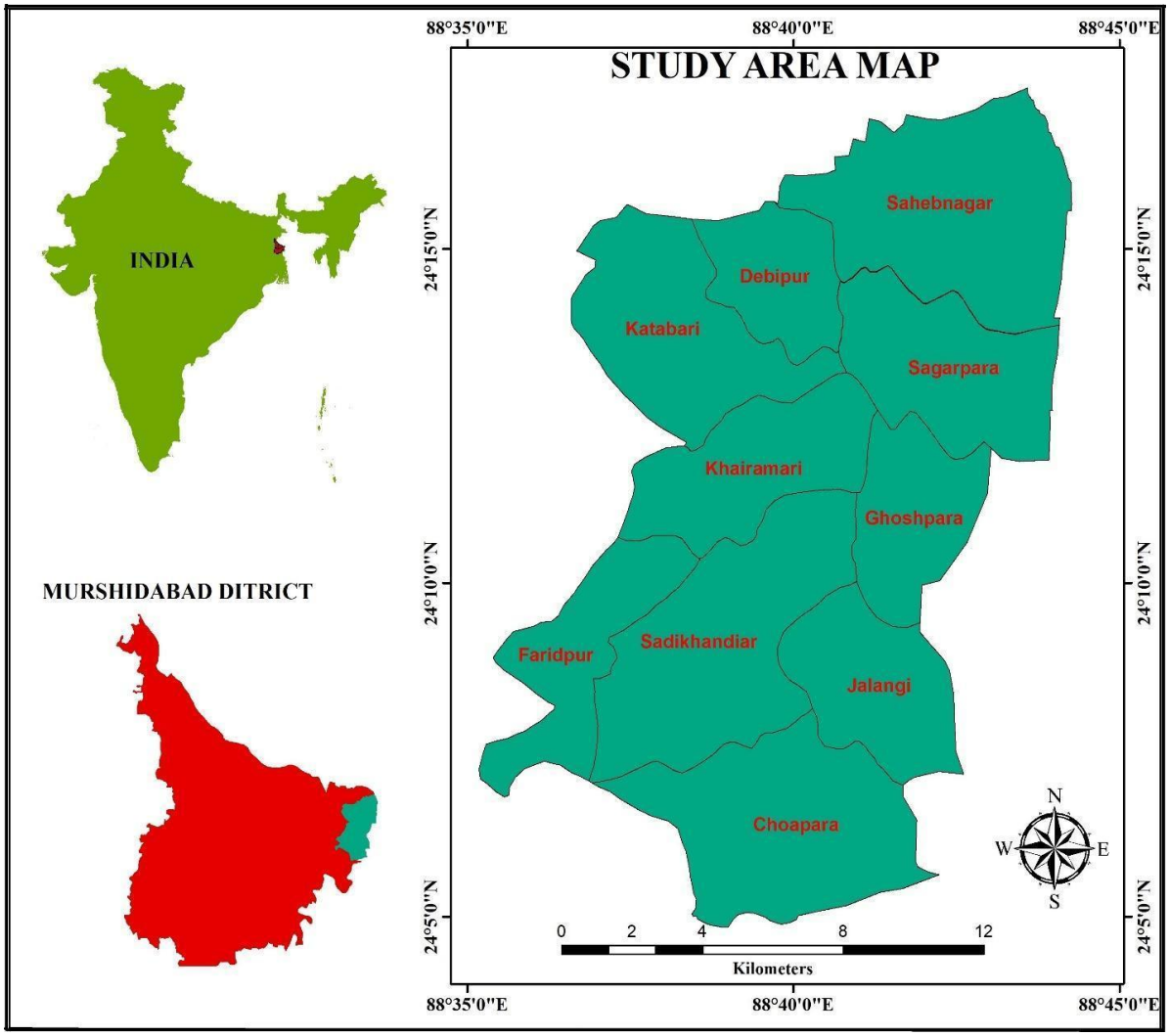

Fig. 1 Location of the Study area.

Relationship between Diesel Prices, Diesel Use, Groundwater Depth and Change in Cropping Pattern

There is always a direct relationship between diesel prices (Dp) and Groundwater depth (GwD). It means that when the diesel prices are low, people use more diesel propelled pump sets to irrigate their land using groundwater, consequently depleting the groundwater table. In the Jalangi block, a large proportion of agriculture is dependent on the groundwater irrigation, so the increase in the diesel prices always act as an obstacle in cropping during the sowing period. At the same time, when the diesel prices remain more or less constant, there is not much change in the GwD; it is the fluctuation in the Dp that determines the level of groundwater in the study area. But, when the Dp and GwD increase together, then it influences the cropping pattern in the areas concerned. In the Jalangi block, it has been observed that GwD has increased gradually (Fig. 2) along with the Dp from Rs 10.01/ L in 1998 to 59.93/L in 2017 (Fig.3) which has made difficult for marginalized farmers to sustain their traditional cropping pattern. Data from the block offices have revealed that the average diesel required in 2001 was 182 L/ha (with reference to 14.2 m of GwD), and the total cost of irrigating a hectare of land was Rs 3104.92. This requirement reached to 209.8 L/ha (15.32% increase from 2001), which has drastically changed the cropping pattern of the given area.

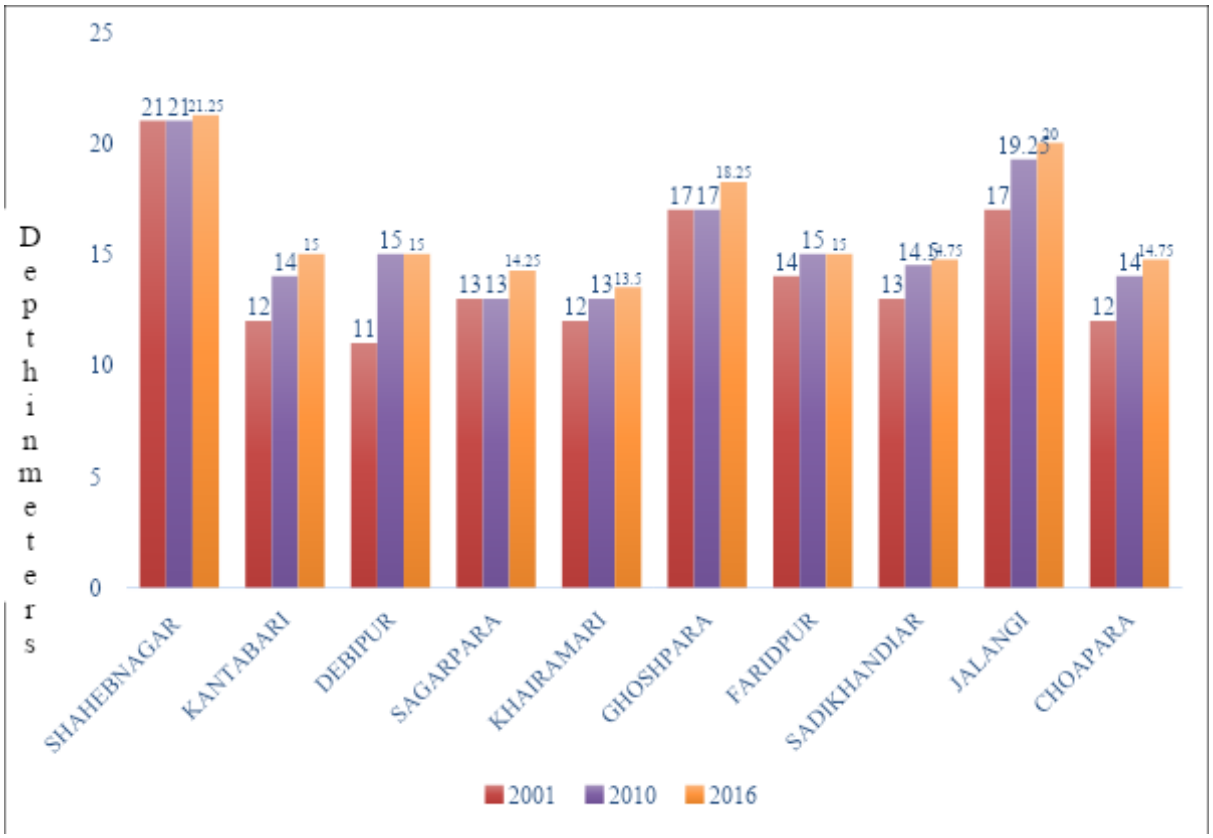

Fig. 2 Groundwater depth at various locations in Jalangi Block

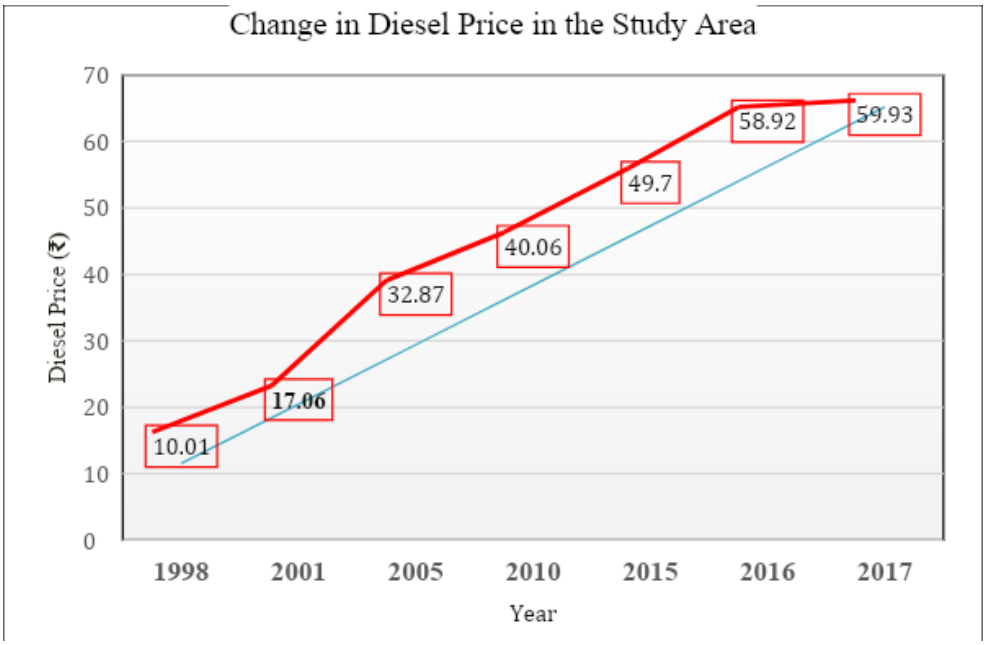

Fig. 3 Change in Diesel Price in the area.

Declining Land Holding Size and Area Under Irrigation

There is a 17.38 percent increase in the population from 215538 in 2001 to 252477 in 2011 (Census of India). Since the total area of this region is only 122 km^2, it is one of the highly densely populated blocks in the state (2069.48 persons/km^2). The high density of the population is responsible for the low average landholding size in the area. Cultivable land and population pressure ratio for these blocks are 0.14/acre in 2001 and 0.12/acre in 2011. Per-capita landholding (1.5 acres/person) along with increased diesel requirement per unit of land, high diesel prices, and groundwater depletion are a significant factor in changing cropping patterns in Jalangi block of West Bengal.

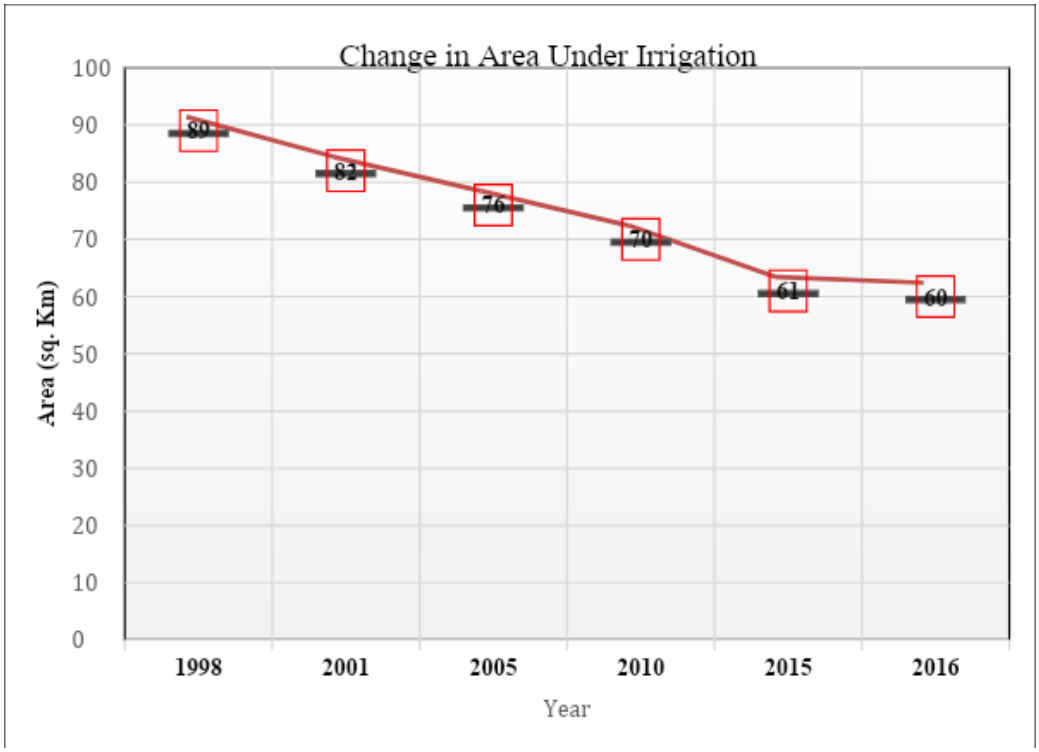

Fig. 4 Area under irrigation from 1998 to 2016

Input-Output Ratio

Due to the increase in the input cost, farmers have changed their cropping pattern in the area. From We can identify that there is a decline in the cultivation of traditional crops like Jute, Wheat, Oilseeds, Paddy, Pulses, and Sugarcane. But, at the same time, there is an increase in the cultivation of crops, which gives them maximum profits with minimum input (Table 2). Farmers in the given area are now turned towards the cultivation of vegetables such as cauliflower, cabbage, carrot, tomato, beet, ladies' finger, chili, peanuts, etc. (Fig.5). Horticulture, is a high value product has gained the momentum in the area and it is reflected through the increase in the cultivation area (from 4.5 km^2 in 2001 to 25.5 km^2 in 2016) of these products. From available data and analysis, we can see that the farmers are now changing their cropping pattern and moving from the traditional crops to the market-oriented crops like vegetables and horticulture. The reason for the

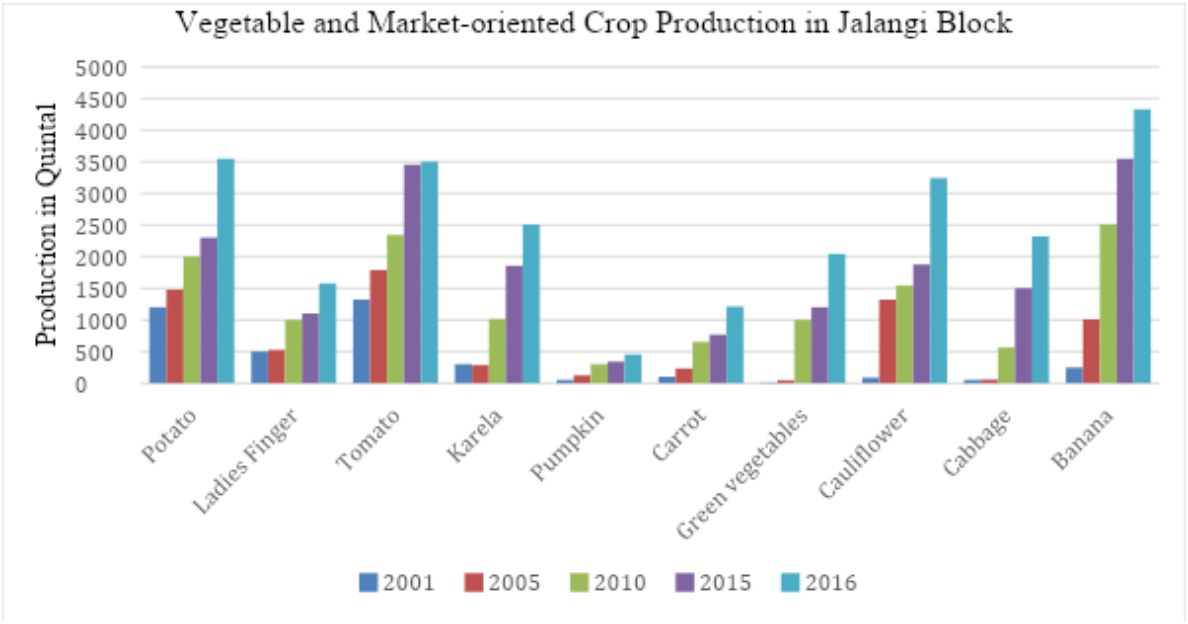

Fig. 5 Vegetable and market-oriented crop production in the area

cultivation of vegetables is because the input cost, such as for irrigation and labor, is minimum, and also, it requires less amount of fertilizers. In contrast to this, traditional cropping has to deal with the high diesel prices, lowering of groundwater table, unpredictable nature of rainfall, and high requirement of fertilizers.

Furthermore, we can see that the average input cost for cultivation of both paddy and jute have increased three times between 2001 and 2018 (Table 1). Similarly, minimum support price for both the crops have also followed the suit and increasing around four times between period of 2001 and 2018 (FCI, 2020; PIB, 2018). So, we can analyze the stagnancy in the profit to the farmers in cultivating traditional crops.

Table 1 Input cost for the cultivation of Jute and Paddy per hectare in the area.

Input cost (in INR)/ hectare					
JUTE			**PADDY**		
	2001	2016		2001	2016
Ploughing	250	500	Seedling growing	250	1000
Seeds	50	80	Ploughing	700	1200
Chemical fertilizer (KNP)	300	920	Paddy transplanting	550	900
Water (two times)	270	980	Weeding	600	2000
Grass cleaning (150/labour)	400	1200	Pesticides	150	500
Cleaning thin jute(200/labour)	250	1000	Fertilizer	600	1500
Cutting rate (250/labour)	240	1000	Sowing	500	750
Jute separation (250/labour)	500	1250	Thrashing	400	600
			Watering (average 60Lt)	1024	3535
Total Spend for Jute cultivation	**2260**	**6930**	**Total Spend for Paddy cultivation**	**4774**	**11985**

Source: Oral Interview from farmers

Table.4 Change in cropping area of various crops in different panchayats of Jalangi Block

Gram Panchatats	**JUTE**		**WHEAT**		**OILSEED**		**RICE**		**PULSES**		**SUGARCANE**		**GARLIC**		**ONION**		**Banana**	
	2001	2016	2001	2016	2001	2016	2001	2016	2001	2016	2001	2016	2001	2016	2001	2016	2001	2016
Shahwbnagar	15	14	8	13	2	6	9	4	1	2	0.5	1	0.25	0.25	0	0	0.25	3
Kantabari	13	12	5	10	2	4	5	3	0.5	1	1	1	1	0.25	0	0.25	0	4
Debipur	10	8	5	5	3	5	8	3	0.25	1	4	5	0.25	0.5	0.25	0.5	0.25	3
Sagarpara	6	5	3	7	2	2	5	3	1	1	0.5	1	0	0	0	0	0	2
Khairamari	3	1	4	7	1	1	12	8	1	2	0.25	0.5	0	0	0	0	0	1
Ghosh para	5	5	4	6	4	7	5	2	2	3	0.25	0.5	0	0	0.25	0	1.0	3
Faridpur	8	7	2	7	3	3	4	3	2	2	0	0	0	0	0	0	0	1
Sadikhandiar	13	12	3	5	1	1	6	5	4	6	0	0	0	0	0	0	1	5
Jalangi	7	6	5	6	5	7	4	2	3	5	0.5	1	1	0.5	0.25	0.25	0.50	3
Choapara	12	11	7	10	6	9	3	2	5	8	0.25	0	0	0	0	0	1.50	5.5

III. CONCLUSION

After analysis of the various factors, we have come to the conclusion that there are wide range of causes for the change in the cropping pattern in the Jalangi block. One of the major factors responsible for the change in the cropping pattern is the stagnancy in the minimum support price for the traditional crops. Others factor include the decline in the per-capita landholding size in the area which is now not suitable for cultivation of crops like paddy, wheat and Jute. So, the farmers have shifted towards horticulture which give them high and instant income. Jalangi block is mostly dependent on the groundwater irrigation, so the increase in the diesel

price and lowering of the groundwater table have forced the farmers to opt for the water intensive crops like oilseeds. Better connectivity to the market through Pradhan Mantri Garmin Sadak Yojana has proved to be bonus for the farmers engaged in the horticulture. They can now transport their vegetables and other agro products easily to the market. All these factors have led to the shift in the cropping pattern of the area.

REFERENCES

[1]. Banerjee, B. (1955). Jute : Especially as Produced in West Bengal. *Economic Botany*, *9*(2), 151–174.

[2]. Bilsborrow, R. E. (1987). Population pressures and agricultural development in developing countries: A conceptual framework and recent evidence. *World Development*, *15*(2), 183–203. https://doi.org/https://doi.org/10.1016/0305-750X(87)90077-5

[3]. Dale, V. H. (1997). The Relationship between Land -Use Change and Climate Change. *Ecological Applications*, *7*(3), 753–769.

[4]. FCI. (2020). Procurement- Food Corporation of India. Retrieved March 17, 2020, from http://fci.gov.in/procurements.php?view=89

[5]. Gadge, S. S. (2003). Influence of changes in cropping pattern on farmers' economic status. *Indian Journal of Extension Education*, *39*(1), 99–101. Retrieved from http://agris.fao.org/agris-search/search.do?recordID=IN2006000072

[6]. Isaacs, K. B., Snapp, S. S., Chung, K., & Waldman, K. B. (2016). policy environment in Rwanda Assessing the value of diverse cropping systems under a new agricultural policy environment in Rwanda. *Food Security*, (May). https://doi.org/10.1007/s12571-016-0582-x

[7]. Kannan, K. P. (1999). Rural labour relations and development Dilemmas in Kerala: Reflections on the Dilemmas of a socially transforming labour force in a slowly growing economy. *The Journal of Peasant Studies*, *26*(2–3), 140–181. https://doi.org/10.1080/03066159908438706

[8]. Majumder, K. (2014). Nature and Pattern of Crop Diversification in West Bengal. *Kamalika Majumder / International Journal for Research in Management and Pharmacy*, *3*(2), 33–41.

[9]. Neena, D. (1998). Inter-state Variation in Cropping Pattern in India. *Indian Journal of Regional Science*, *30*(2), 57–63.

[10]. NITI Aayog. (2015). Raising Agricultural Productivity and Making Farming Remunerative for Farmers. *An Occasional Paper, GoI*, (December).

[11]. NRSC. (2018). Land Use/Land Cover Data. Retrieved January 19, 2018, from http://bhuvan.nrsc.gov.in/gis/thematic/index.php

[12]. PIB. (2018). *Cabinet approves Minimum Support Prices for Raw Jute for 2018-19 season*. New Delhi. Retrieved from https://pib.gov.in/newsite/PrintRelease.aspx?relid=178897

[13]. Richey, A. S., Thomas, B. F., Lo, M.-H., Famiglietti, J. S., Swenson, S., & Rodell, M. (2015). Uncertainty in global groundwater storage estimates in a Total Groundwater Stress framework. *Water Resources Research*, *51*(7), 5198–5216. https://doi.org/10.1002/2015WR017351

[14]. Richey, A. S., Thomas, B. F., Lo, M.-H., Reager, J. T., Famiglietti, J. S., Voss, K., … Rodell, M. (2015). Quantifying renewable groundwater stress with GRACE. *Water Resources Research*, *51*(7), 5217–5238. https://doi.org/10.1002/2015WR017349

[15]. Wilber, C. K. (1969). The Role of Agriculture in Soviet Economic Development. *Land Economics*, *45*(1), 87–96.